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FOR THE

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

CONDUCTED BY

H. H. STATHAM,

FELLOW OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

"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."

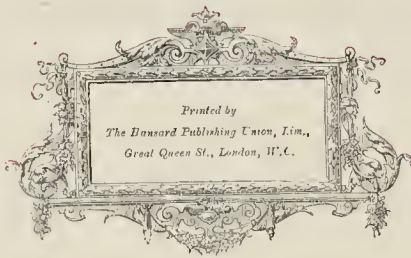
"Architecture can want no commendation, where there are noble men, or noble mindes."—SIR HENRY WOTTON.

"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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Superintendence.



the erection of a large building the direct duties of superintendence devolve upon the clerk of works, but it is even in that case incumbent upon the architect to visit the building with tolerable frequency, for his drawings and specifications will not always be accurately interpreted, even by a clerk of works who has been under him for years. It is possible, too, that clerks of works may not be always worthy of that implicit confidence which architects, sometimes to their own loss and discredit, are only too willing to place in them. Moreover, clients consider their architect's repeated presence on the building a necessity; they have often a blind belief in his omniscience and omnipotence, and cannot think that all will be well if the master-mind be not there to oversee.

But it is not always that an architect has the pleasure of carrying out large buildings, and of being relieved of much of the irksomeness of superintendence by an efficient clerk of works. In every practice there are many buildings which are too small to warrant the employment of a clerk of works, and it is in supervising the erection of these that an architect needs all the care, watchfulness, honesty, and decision which he can command. If, again, the work be let in trades to different contractors, the architect's difficulty reaches its maximum. The proprietor, however, expects everything to be done according to drawings and specifications, and really be-

lieves that his architect will see to it that such is the case. Wightwick, in his "Hints to Young Architects," says, "a gentleman . . . will . . . be inclined to visit upon his architect those failures in particular construction which only good workmen can insure, under the direction of the contracting builder, and the supervision of an ever-watchful clerk of works, exclusively occupied on one job. It will be well, therefore, for the architect at once to undeceive his employer in this last particular." And, again—"when an employer will not take upon himself the responsibility of trusting to the efficiency of the contractor and his men, the architect is bound to insist on the engagement of a well-tried clerk of the works. The author of these 'Hints' has suffered so much from a too-ready desire to save his employer the charge of a constant supervisor, that he cannot too strongly urge upon those whom he now addresses the advisability of having a clear understanding with their patrons on this point." We wonder if an employer ever did arrive at any clear understanding on the point, other than this, that the architect is responsible from beginning to end. The claim of the architect to the possession of all drawings and specifications is supported by the argument that the client required a building, not paper; that the latter represents but a means to an end, and is as much the property of the architect as the chisel is of the mason or the plane of the joiner; and this argument,—not altogether flawless, let us say,—acknowledges the architect's responsibility for the proper erection of a building in accordance with his client's requirements. We do not see that an architect can rightly claim possession of the drawings, and at the same time disclaim respon-

sibility for the work. However, disclaimer or no disclaimer, it will always be found that, whether a clerk of works be employed or not, clients unhesitatingly consider that architects have neglected their duties if buildings exhibit faults of construction, however minute, and are not erected strictly in accordance with the original drawings and specifications, or such modifications thereof as the clients themselves have approved. A recent resolution of the London School Board, "calling on their former architect, Mr. Robson, to make good the loss arising from defective foundations in the Broad-street Schools," shows this very plainly. Taking into consideration the somewhat peculiar nature of Mr. Robson's appointment, this resolution was a mistaken one, but the fact remains that a majority of the Board declared their conviction of the architect's responsibility for bad workmanship and deficient materials. It was stated in the *Builder* at the time (July 21, 1888), that "if the case had been that of an architect in ordinary practice on his own account, it might reasonably be said that he ought to have given personal inspection to so important a matter as foundations; every architect in ordinary practice ought to do that."

This unchangeable and, to our mind, quite unblamable, determination of clients respecting an architect's responsibility, is almost, if not altogether, universal. It is vain for an architect to contend against it; on the contrary, he ought to accept the position fearlessly, and do his utmost to ensure the proper realisation of his schemes. It will be better for his own future practice; for, be a house never so picturesque, if the drains smell it will be an abomination to its owner, and the latter will become a thorn in the architect's side. Architects lose more clients through

carelessness of superintendence than from any other cause.

There is another reason why architects, especially in country towns, can ill afford to neglect the arduous duties of superintendence. We refer to the existence of that great army of men, chiefly, we believe, joiners, who, on the strength of their "practical knowledge" of the building trades, "creep and intrude and climb into the fold." The artistic faculty is in most of them wofully lacking, but, despite the ugliness of their productions, they prosper, and one reason of their success is this: the belief which men have that their "practical knowledge" (magical words!) will ensure more searching superintendence of work; on the principle, doubtless, of setting a thief to catch a thief.

The architect will do well also to remember that additions to his works by brother-practitioners at some future time will make known his shortcomings. But we do not wish to insist upon the necessity for close supervision merely because that would be to the architect's pecuniary interest; there is a higher motive than that. It is in truth a question not so much of self-interest as of duty; the architect is engaged to superintend the erection of a building as well as to design it, and if he neglect the former he is, like an idle servant, dealing unjustly with his employer, receiving wages for work which he does not perform. If the architect recognise this truth and act up to it, it will be well with him; if not—with all sorrow be it said—he scamps his work no less than does the dishonest builder, and is not acting for the honour and best interests of his great profession.

The necessity for effectual superintendence having now been stated, the question remains for our determination,—how can an architect with least possible annoyance to proprietor, contractor, and himself, ensure the careful and honest erection of buildings without the constant supervision of a clerk of works?

In February last Mr. T. M. Rickman read a paper at the Institute on "Writing a Specification," and the speech of Mr. Arthur Cates in the discussion which followed, is thus reported:—"From the paper they gathered that Mr. Rickman considered that the first qualification of an architect was to possess patience, and after that the most essential quality was decision, and in the latter quality *he feared architects were often wanting, especially in insisting that the work should be executed as specified.*" Let us take these italicised words as a sort of text, calling attention first, however, to the further qualification, which Prof. Roger Smith pointed out to be still more important, to wit, knowledge.

Every architect learns by experience,—more or less bitter,—the difficulties of superintendence, and as the years pass discovers how prolific of such difficulties are the unconsidered clauses of a specification. It is a golden rule for all students that, when drawing a ground-floor plan, every line must be studied in its relation not only to the remaining portions of that plan, but also to all other plans up to the roof-plan, and to all elevations. A similar rule would be this,—in writing a specification every word must be studied not only in its relation to other words and to the drawings, but also in its relation to the building and the superintendence of its erection. All words such as "proper," "sufficient," "strong," "good," and the like, which convey no definite meaning, must be avoided, and strict definitions must be given of terms, which are variously interpreted by different architects and builders,—"prime cost," "best," "perfect," "complete." In specifying that wood shall be "free from sap," the architect is demanding something of which the getting will cause him endless trouble; when he says that it must be "without large dead knots" he binds himself to pass small dead knots, and also large knots which are not dead, although such is probably not his intention. We often see in specifications of woodwork that "all measurements refer to finished sizes," and in many cases it is absolutely impossible to obtain material of the

specified scantling without an unwarrantable waste of a client's or a builder's money. A cut of an ordinary circular saw wastes, roughly speaking, $\frac{1}{2}$ in. of wood; thus, a plank 11 in. by 3 in. will cut into four pieces 3 in. by about $2\frac{1}{2}$ in., and the size of such a piece when planed on all sides will be probably less than $2\frac{1}{2}$ in. by $2\frac{1}{2}$ in. For an architect to write such a clause, and then specify a piece of planed deal 3 in. thick betrays great thoughtlessness, and if he obstinately adheres to the letter of the specification, the builder will have to pay heavily in a large contract for the architect's original blunder. The thicknesses of floorboards and doors may prove a bone of contention if the architect has specified them to be 1 in., $1\frac{1}{2}$ in., $1\frac{1}{2}$ in., and so on; it is better to ask for $\frac{3}{4}$ in., $1\frac{1}{4}$ in., $1\frac{3}{4}$ in., and so on. It is foreign, however, to our purpose to enter into the hundred and one details that must be considered in writing specifications; but the broad fact must be stated that the most exasperating difficulties of superintendence are those which arise from the vagueness, inaccuracy, or incompleteness of the specification, for these faults come home to roost with the architect himself. If the writing of the specification be scamped, depend upon it, the work itself will be scamped. Do not specify "best red deal," and be content with "fourths" and "fifths"; but be very careful to specify exactly what you require, and see that you get it.

In the retirement of the "private office" it is comparatively easy to decide upon the merits of rival materials; to determine the quality of each according to the character of the building, so that everything shall be quite good enough for its purpose, but not extravagantly so; to say that this method of construction will be better than that; and to demand the special fittings of one firm in preference to all others. The architect sitting in his own little court is not wearied by the cries of an irate plaintiff or an exasperated defendant, but calmly judges each question of material and construction as it arises. He is unhissed, comparatively unfurried, and deliberately, to the best of his knowledge and judgment, specifies whatever is most adapted to the special needs of the building which he is about to erect. It is this coolness, this freedom from disturbing influences, upon which we wish to lay particular stress. It is true that it is at times necessary to deviate from a specification, however carefully it may have been written, but it is equally true that at the time of writing a specification the experienced architect is, on the whole, more able to see clearly and without prejudice what is best for his client than at any subsequent time. His thoughts are concentrated on the work then in a manner they will not be again. Soon other buildings thrust themselves upon his attention, and in a very few weeks he forgets the motives which induced him to write this clause or that clause, and would forget a great part of those decisions which had cost him so much thought, if the specification were not before him in black and white. Again, when the building is being erected, the architect is, to some extent, however unconsciously, under the influence of the contractor; and the latter, by plausible pretexts and persistent attempts, is often able to obtain the architect's sanction to variations of the work which are probably to the contractor's benefit, and possibly to the proprietor's loss. During the preparation of the drawings and specifications the client's influence is paramount, but after the contract is signed it usually happens that the contractor is seen a dozen times while the client is seen once,—this is especially true in reference to works carried out for bodies of men,—and, unless the architect be very wary, the contractor's influence waxes while the client's wanes. The fact, too, that for one building transaction with any one client the architect may have half a score with a successful contractor tends to the same result.

These three reasons—the unbiassed deliberation with which a specification is (or ought to be) written, the absorption of thought by new

work at a later time, and the subtle influence of the contractor—seem to us so cogent that we recommend the architect never to alter a specification except after the very gravest consideration. Moreover, when an architect prepares a specification, he does it as agent for his client; he provides for his requirements as well as and as economically as he can, and translates these requirements into technical language; but as soon as the specification is accepted by proprietor and builder as the basis of a contract the architect's position changes; his specification becomes a legal document, and he the person appointed to see that the work is carried out in accordance therewith, and also (often enough) in case of dispute to act as arbiter between the two contracting parties. The duty he owes to his client compels him to insist that every detail be completed as well as specified; his duty as an upright man pre-emptorily declares that he shall not attempt, to the contractor's loss, to read into a vague specification a meaning which the words will not rightly bear. There are cases where an architect has laid the punishment for his own carelessness upon the back of a poor contractor, or has even connived at inferior work in order that the builder should not claim an extra for additional labour caused by constructional errors, for which the architect was responsible. In the former case the architect is grossly unjust; in the latter, fear of a client's displeasure makes him disingenuous, and causes him to sacrifice his employer's interests to hide his own mistakes; he loses his integrity, and with it the contractor's good opinion, for he has joined with him in doing an underhand action.

To young architects we would say, let your drawings be accurate and complete; let your specifications be written carefully and deliberately; let them contain, as clearly and simply as your knowledge of the English language will permit, all the information which is necessary for the thorough conveyance of your ideas on every detail of the projected work; and then, having done all this, make up your mind to adhere to the drawings and specifications unless absolutely compelled by uncontrollable circumstances or by increase of knowledge, to alter them. If you do this, superintendence will be rid of some, at any rate, of its difficulties.

We have more to say on the subject in a subsequent article.

SCHOOL-PLANNING OF SECONDARY SCHOOLS FOR DAY BOYS.

BY A HEAD MASTER.



THE following paper is an attempt to describe the requirements of the schoolmasters who have to use Secondary, or what are sometimes called High schools. Mr. Robson has written a book mainly on the planning of elementary schools; and Mr. Robins mainly on technical schools; but I do not know of any attempt to deal with higher schools specially. As to my own qualifications, I may say that I am myself head master of a large higher school, and that I have visited most of the high schools in Paris, and here and there in Belgium, Germany, and Scandinavia. I am inclined to think that, of all the day schools, those in Stockholm and Gothenburg are the most perfect and complete in plan; while, of the boarding schools, the Ecole Monge, in Paris, is by far the most perfect in arrangement. It is worth mentioning that the head master of the latter school had a very large influence in settling the plans.

School arrangements may be looked at from three points of view, according as they facilitate the work of the head master, teachers, or pupils. Now the most important work of the head master is supervision. Indeed, in most Continental schools he does not teach at all; in English schools he teaches too much. Shut up in his sixth form room he may be giving a good lesson, while, perhaps, ten or twenty assistants may be giving bad ones. He ought, indeed, to teach the sixth form boys to such an extent as to keep thoroughly in touch

with them; but his main task is, or should be, supervision. He is better employed in teaching his assistant-masters than in teaching his boys. But supervision means much more than this. He has to supervise not only all the teaching, but much of the discipline of the school. So long, indeed, as the boys are shut up in their respective class-rooms, the assistant-masters are mainly responsible for discipline. But when the school is assembled together, *e.g.*, at prayers, or when all the boys are entering the building or leaving it, then the head master is mainly responsible. Also when the classes are redistributed at the change of lessons, when boys are passing about for various reasons, it is the head master, with his porter or discipline master, who is responsible. If you wish to make his task of supervision difficult, then build all the class-rooms in a line, as in Reading School, so that the boys may have far to go in changing classes; and you may connect the line of class-rooms with a long echoing corridor,—convenient for a stampee, for hustling, for running races. Narrow corridors especially facilitate hustling. Also sharp turns in a corridor will bring classes into sudden collision and riot at change of lessons. Nor will it be possible to detect the ringleaders if the corridor is dark. Moreover, a good deal of quiet bullying may be done in a dark corridor. While the head master is in one corridor the riot can be started in another. Also, if the head master's private room is properly sequestered, the boys can be noisy with safety.

I may as well make a list of a head master's chief foes as regards discipline. They are (1) disorder and noise; (2) bullying; (3) petty larceny; (4) indecent writing. In coping with all these the architect can greatly aid him, or can render good discipline almost impossible. I have said enough to show that to cope with disorder or bullying, the fewer corridors we have the better. But it should be remembered that horse-play, practical joking, and bullying occur in the playground and outbuildings also. Every corner, therefore, of the playground should be visible from the head master's room and from some of the class-rooms. Disorder, too, is very likely to occur at the entrances and exits of the school; these, therefore, should be commanded from the head master's room. It follows, then, that the administrative block should be so placed that it commands a view of the main entrances to the school, the playground, the hall, and the corridors. By the administrative block I mean the four rooms which are assigned (1) to the head master for interviews with parents, teachers, and pupils; (2) to the secretary, with shelving for school stationery, &c.; (3) to the assistant-masters, with room for their hats and coats, and for the school library; (4) for the porter or discipline master, with space for maps, tools, stores, &c. We may say that the porter, the secretary, and the head master form the special disciplinary staff. They must, therefore, be housed centrally, and their rooms must not be far away from one another, as the head master will be continually requiring to communicate with the porter and the secretary. The porter, like the head master, should be so placed as to be able to keep an eye on every boy who attempts to enter or leave the school, who is loafing in a corridor, or is outside of his class-room on any pretext. It is especially important that the porter should have a view from his room of the latrines and urinals, and of every one who enters or leaves them.

Now I come to the third offence, not very common, and happily confined as a rule to small deer,—I mean petty larceny. This takes place mainly in the central cloak-room. There is nothing more difficult to stop than this petty larceny; and it occurs because it is impossible to supervise the cloak-room adequately. The porter's other duties make it impossible for him to be always on guard in the cloak-room. In addition to this trouble, much disorder and confusion arises on a wet day, before several hundred boys can find their own overcoats and umbrellas,

many of them being much alike. The remedy is to abolish the central cloak-room altogether; and instead of it, to attach a separate cloak-room to each class-room, and put it in charge of the master who teaches in that room. It should be about 6 ft. wide, and should run the whole length of the class-room. It may be 9 ft. high, or it may be carried up to the same height as the class-room. It should be separated from the class-room by a wooden screen, pierced with a continuous window; and the master should be so seated that he can command every part of it. It should be thoroughly well lighted by an external window, and be heated by hot-water pipes, so that wet coats may be dried. There should be two doors, both leading back into the class-room, and not into a corridor or the hall. Thus this annoying school offence may be made almost impossible. In this, as in all matters of discipline, prevention is better than cure.

The fourth trouble that a head master has to face is that, whatever pains he takes to get a good tone among his lads, some time or other he will admit a black sheep, and he will have indecent scribbling on the walls, or indecent writing passed about. The latter process is greatly facilitated by building plenty of corridors. To prevent the former,—scribbling on the walls,—all the internal walls of class-rooms, corridors, halls, &c., and, in particular, the slabs of the urinals and the closets should be lined with glazed bricks to the height of 7 ft. Moreover, the porter's room must be placed near enough to the urinals for him easily to make frequent visits. And I should like these offices to have only low walls, so that they may be completely open to the view of each master who has a first-floor room on that side of the building on which these offices are situated. They need not be placed close to the main block, but they should be placed near enough to facilitate supervision as much as possible.

So much for difficulties of discipline. Now as to the health and efficiency of masters and pupils. If unhealthy arrangements prevail, and I find them almost universally unhealthy, not only in the English public schools, but even in the model schools of Germany, Scandinavia, and France (here also the *Ecole Monge* is a brilliant exception), the efficiency of the school goes down to an enormous degree. I have hardly seen more than one or two schools where the boys do not look jaded and listless, pale or flushed, as the case may be, and restless and cross at the end of afternoon school; and the masters also, only more so. Again, my boys come back to school with clear skin, bright eyes, cheerful, full of work; the masters also; and for a time all goes merrily as a marriage bell. Then the health standard declines, industry declines, friction increases, the teacher ceases to be bright and cheerful himself, the boys do not learn well, and the teacher does not teach well. We systematically lower the health of teachers and boys all round. At last the boy leaves school, and probably recovers. It is usually surprising to see what a splendid fellow, physically, your boy soon is when he has left school. The masters do not leave, and often become nervous, querulous dyspeptics. Now architects can raise the efficiency of our teachers at least 25 per cent., and the happiness and cheerfulness of masters and boys at least 50 per cent., if they will exterminate four evils. These are noise, gas fumes, dust, and foul air.

Of noise, one of the causes is my *bête-noire*, the corridor. Another is the planked floors. Wood blocks are much less noisy and more durable. But I should like to see some kind of noiseless asphalt laid down, not only in the corridors, but in the class-rooms and hall. It need not be cold to the feet, for to each desk would be fixed a foot-rail, so that the feet of each boy would be removed from the floor. The noisiest of all corridors is that paved with flags or stone; the tramp of feet along such a floor echoes all over a building.

Till we get the electric light, it is inexcusable for architects to poison us by inserting gaseliers which do not carry off fumes.

But a much worse enemy is dust. The way to introduce plenty of it is to build projecting mouldings and wide window-sills in the class-rooms; secondly, to have cupboards with a well at the top to hold dust; thirdly, to have a wooden floor, which can only be brushed, and may not be washed except when the vacations begin; fourthly, ceiling and walls, if whitewashed, will hold some dust; these, also, cannot be washed; lastly, the desks of boys and master may be so designed that the sweeping-brush cannot get beneath them; thus nest-eggs of dust are left. The ideal class-room would have an asphalt floor, with a rise in the centre, and gutters all round; there would be glazed bricks for the walls, at any rate half-way up; and the ceiling also would be distempred or so constructed as to wash. In the corner should be a hydrant, and floor, walls, and ceiling should be sluiced, not once in three months, as at present, but every night, in a third of the time that it takes to sweep the room. The extra cost of the water-pipes would be saved in the lessened daily cost of cleaning, to say nothing of the additional security against fire. I remember seeing the great dining-hall at the *Ecole Monge*; it had just been vacated; the boys ate at little marble tables; a relay of servants carried off plates and dishes; the windows were thrown wide open; a mighty hydrant was opened, and a deluge was sent flying over tables, floor, and walls; and in a moment crusts, crumbs, smells, and foul air disappeared in one gush. The windows were closed, heat turned on, and soon the hall was ready for another batch of diners. No trouble is too much to take if only we can banish this great foe—dust.

But the worst of all these evils is foul air. This, more than anything else, ruins health and shortens lives. I never entered a school yet which was thoroughly well ventilated as well as warmed. The first thing to notice is that the problem of ventilation in summer is quite different from that of ventilation in winter; also that the problem is a much more difficult one if the rooms are not warmed by fires in open grates, but in some more artificial way that is less expensive in coal and labour. As to ventilation in summer, the extracting process differs little from that used in winter; except that in summer the outflow of vitiated air can only be assisted by heating with gas jets a main extractor flue of metal; whereas in winter we can accelerate it by using the waste heat of the chimney leading up from the fires and furnaces used to warm the building, as well as the gas fumes led up from the gaseliers in each room. In summer the real difficulty is not so much with the exits as with the inlets of fresh air. In the winter the difference of temperature between the air of the rooms and the outside air is usually considerable, and the air generally rushes up the "Tobin" tubes readily. But in summer the two temperatures differ much less, and much less air comes up the tubes. The only remedy I know is to have good cross-draughts, which, however, must be kept high up above the boys' heads. For this purpose, a large part of the head of each window should be made to open; and large shutters should be placed in the opposite wall at the top of it, swinging on a horizontal pin running through the centre of each. If both the shutters and the upper sashes of the windows are open, a good current of air can generally be produced into the corridor. It is, of course, essential the corridor itself shall have a good current of air passing through it.

In winter, the extracting-flues and the Tobin tubes usually work fairly well, when the tubes are properly constructed. Usually the external opening of the tube is masked by an ornamental grating, which diminishes the current of air by at least one-half. Why cannot this grating be omitted altogether? Secondly, in many tubes I have found valves inserted. These are often jammed by rubbish which has fallen into the tube, and which cannot be cleaned out. There should be no valve at all, but just an ordinary box-lid at

* Because rubbish will be put down the tubes: see next sentence.—Ed.

the top of the tube, which can be so made as to close either partially or wholly. It should be possible to clean out a Tobin tube as easily as one cleans one's pipe. Nor should cotton-wool or the like be placed in the tube to act as a dust-filter; it is soon stuffed up with dust, and no one remembers to remove it. It may be news to some that no air at all will pass through a Tobin tube if wire netting with fine meshes be placed over the top. I found six new tubes the other day all in this state: not a whiff of air passed up. The bappy owner had been deluding himself for three months with the idea that his rooms were being ventilated. As soon as I put my fist through the wire gauze, a strong draught rushed up. For school purposes, a Tobin tube should be open to its full width at both ends, but may have a lid at the top.

Connected with ventilation is the subject of heating. Under no circumstances should the temperature of a class-room be allowed to rise above 60 deg., nor should it fall below 55 deg. The two systems of heating of which I have heard good accounts are Mr. Cunningham's mechanical or positive system, by which warm or cold air is driven by a machine in the basement through tubes to each room at any rate and any temperature desired. This would seem to solve the whole problem of ventilation as well as of heating, if extracting flues be added. But I have no information as to the initial cost and daily cost of such a system, or of its success. I believe that it was adopted at the High School, Dundee. The system I have to deal with is that of Perkins' hot-water pipes, in which an alkaline solution should be put to prevent freezing in the Christmas vacation. I am told that they ought to have been placed in coils inside the Tobin tubes. But if my Tobin tubes acted as exits instead of inlets, as they do sometimes, all the heat would pass into the open air instead of into the class-room. Perhaps this would not occur if we had extracting flues, which we have not. Another difficulty that occurs to me is that the current up the Tobin tubes varies greatly in strength. If it were freezing outside, and I had the lid of the tube wide open, the air would rush up the tube so fast that it would be heated but little in passing among the hot-water pipes coiled in the tube. On the other hand, if I partly closed the lid, little air would pass up into the room. In the former case I should have plenty of air entering into the class-room; but it would be air almost cold. In the latter case the air entering the room might be warm enough, but there would be little of it. Can any of your readers tell me of any school where the difficulties of ventilation and heating have been met successfully?

So much for the buildings from the point of view of health. I have spoken, too, from the point of view of the head-master. Now, what do the assistant masters want? In the first place, architects should remember that nowadays no school, even in England, uses the hall for teaching purposes, except under compulsion, and because there are not enough class-rooms. Doncaster and Bristol Grammar Schools are, I hope, the last schools that will be designed in England for the classes to be taught in one big hall, each interfering with the other. On the Continent, one often meets with schools, even of the first magnitude, without a hall at all. I would not go so far as that. Without a common place of assembly a school would seem rather a collection of separate schools than one corporate entity. And that is what the Continental gymnasiums and the rest really are. We want a hall in an English school, but as we do not want it for teaching, or even for examinations, it must be regarded, in comparison with the class-rooms, where the main work of the school goes on, as being an article *de luxe*. What money there is to spare, then, should be spent on the class-rooms, and not on the hall. The uses of the hall are, or might be, these—(1) for prayers; (2) for the head-master to address a levy of the whole school on matters affecting the school as a whole. These two are the only two objects for which

the hall is essential; all the rest are subsidiary. (3) It may be used as a play-room in bad weather; but covered sheds in the fresh air of the playground are better. (4) It may be used as a gymnasium, one half being reserved for classes with dumb-bells and Indian clubs, the other covered with gymnastic apparatus. If so, the latter should be so constructed that part of it, *e.g.*, ropes and poles, can be raised overhead when not in use, as in the Central Gymnasium, Stockholm, while the rest, such as the bars, should sink beneath the floor, as in some other of the Stockholm schools. But gymnastics kick up a great dust, and moreover ought to be performed in fresh air, therefore it is better to have a separate gymnasium in the playground. However, if one has no gymnasium, but a large hall, it is well to turn the hall to account for gymnastics. (5) A great hall is not necessary for prize days. The hall need not be constructed so vast as to accommodate a crowd of outsiders who only come once or twice a year, perhaps. It is really too great a waste of capital. Much better to have the prize distribution and speech-day in the Town-hall, connecting the school, as it should be, more closely with municipal life. Therefore, the hall need not be larger than will accommodate the pupils, with perhaps a margin for 200 spectators at some school theatricals or bouse-concert. (6) Nor is the hall indispensable for examinations. It is better to have two or three sets of double class-rooms for this purpose, so arranged that each pair can be thrown into one. Supervision also is easier in such a room; and there is greater quiet than in a large hall. (7) The last use of a hall, and a very good use it is in my opinion, is to use it as a passage-room for all the class-rooms. But the class-rooms should open direct into it, and not into intervening corridors. I can conceive of no greater happiness for a disciplinarian, than to be able, from his own room, to see every boy who enters or leaves a class-room. That is what the central hall comes to. There should be a continuous window, about 5 ft. from the ground, running along the side of the class-room which is next to the hall, so that the head-master, as he goes round, can see the state of discipline in each room, without entering the room and disturbing the class in its work. Not that he wants to play the spy on his staff, but that he may see easily what are the classes where his assistance and presence is required by a weak disciplinarian or by some master newly appointed and in need of help. If the school is very large, the hall will need galleries, and may be surrounded by class-rooms, two stories high on all four sides. Or the class-rooms may be placed on three sides only, and on the fourth side may be placed rooms, of one story only, for the head-master, secretary, &c.; what I have called above the administrative block. A space may be reserved in the centre of the hall for assembly of the whole school at daily prayers, &c.; this may be marked off by wooden removable screens. These should be about 4 ft. high; thus, boys when seated in this central area would be unable to see any boys passing from room to room; in this way the central space might be utilised for examinations, if thought necessary. On the other hand, these low screens would not hinder the head-master or discipline-master from having an uninterrupted view of every part of the hall up to the class-room doors. I suppose that the stairs also leading to the gallery might descend into the hall, so as to be well in view.

To return to the assistant-masters and their class-rooms. There may be two or three small rooms, and certainly two pairs of double class-rooms, not only in order that these latter, when thrown together, may be used for examinations, but that every master, while new to the school, may be put at one end of a double room of which the discipline may be at first entrusted to an older and more experienced member of the staff at the other end. When the new man has got his footing the movable partition may be closed, and he may be left to his independence. Double rooms are also useful for choir-work

and art teaching, and a pair of class-rooms in the upper story should be specially designed and lighted for the latter purpose. Also two or three sound-proof piano-boxes or piano-rooms are usually necessary; they are better outside the building. The ordinary class-room should be at least 30 ft. long, 20 ft. broad, 16 ft. high. Three of my own class-rooms are 40 ft. long for classes of thirty boys, and we find it an enormous advantage to have the desks at one end of these oblong rooms and an open space at the other end; at this latter we seat the boys whenever any lesson is given where pens and ink are not required. At this end of the room we can have place taking, which greatly enlivens the work of a class of small boys. Moreover, the boys get change of position. I pitied the German boys, chained to one desk all day. And ventilation is aided greatly; *e.g.*, in summer, when the class is seated at the desks, the windows at the other end of the room are always open, and *vice versa*. If the desks are arranged in this fashion, and if dual desks are employed, 20 ft. is not quite sufficient breadth for the room. All cupboards should be carried up to the ceiling, so as not to bold dust. In every school I have seen abroad lately, the light is made to fall from behind over the boys' left shoulders; cross-lighting also is avoided. If the annual fee for tuition exceeds 10*l.*, there should not be more than thirty boys in each class; if the fee is lower, not more than forty. The windows should be carried high up, the panes should be of clear glass, and the amount of window-space should be large. There should be one main entrance to the room, besides two doors into the cloak-room attached to it.

I have spoken above of the floors, ceiling and walls. There should be a blackboard on wheels, even if a continuous blackboard runs all round the four walls. I think that the assistant-master would now be a happy man. I should add that it is most important to provide abundance of urinals and closets, far better to have too many than too few, scarcity of accommodation leads to the most serious trouble if boys are waiting about for their turn and conversing. It is as well to speak plainly about these things. It is also desirable to provide kitchens and a dining-hall in a large day-school. Many pupils may come from a distant part of the town, and a large number may come in by train from the surrounding towns and villages. Nothing can be worse for the morals of the school than for these boys to frequent public-houses for a sausage and glass of beer at 3*d.*, as they often will, in order to have some dinner-money left to be spent on other purposes. Nor is it advisable to let them loaf about in the streets and add to their education there.

Of the schools of the type which I incline to, those with the hall-passage, the following is a list more or less correct. I hope that any errors in the list may be corrected, and additions made to it. Mr. Robson's Board school at Haverstock-hill, and the Blackheath school for girls; Mr. T. Roger Smith's Board school in Johnson-street, Stepney; Mr. Robins's school in Camden-town; Mr. Clutton's day-school in Liverpool; St. Francis Xavier's College; Lancing College; the Salt schools at Saitaire; a new Board school at Leeds; and the École Monge, Paris. Useful remarks upon the hall-passage plan, as well as articles on ventilation and heating, will be found in Sonnenschein's new "Cyclopedia of Education."

I will conclude with a few particulars about the best day-school I have seen,—the new "Real-schule" at Gothenburg, built for 700 day-boys, and already nearly full. The town contains only 90,000 people, and there are actually two more high schools for boys, each of them with 700 boys. What a contrast to England! The total cost of the "Real-schule" comes out at 40*l.* per head. This includes the buildings, heating and ventilating apparatus, desks and fittings, and gas, water, and electric fittings. Externally, like all the Swedish high schools, the building is plain, but it is imposing from its height and mass, and it has the merit of telling its story,—you see at once that it is a school. It con-

sists of three stories above a basement. The reason why it comes out so expensive is,—first, the vast corridors; second, the immense hall at the back, a much finer room than many town halls; thirdly, the great number of rooms in excess of those used for the actual task of teaching. Out of forty-seven rooms only twenty-two are class-rooms, the remaining twenty-five being devoted to such purposes as laboratory work, lecture theatres, store-rooms, &c. In Stockholm also great high schools are being built at even greater cost, varying from 55*l.* to 65*l.* per head. Each has a large separate gymnasium. I found the cost of installing a large gymnasium for 600 boys to be about 275*l.* Gymnasiums seemed to be elaborated in Sweden more than anywhere else. F. B.

P.S.—Since this paper was written I have obtained a pamphlet by Sir Henry Roscoe, published by Danks, in which he demonstrates the astonishing foulness of the air of schools, and gives his preference to a mechanical system of ventilation, with particulars as to its initial and daily cost.*

NOTES.

THE course of Mr. Lambert's examination before the Board of Trade a few days ago, the Great Western Manager alluded to the constantly-increasing expense incurred by the Company in fulfilling the requirements of the Board in order to secure greater safety in the working. It is undeniable that a large expenditure is due to this cause, and not to any increase of traffic; and quite as true that such expenditure does not enable railway companies to work the traffic more economically or with greater speed. But the additional increase of safety brings with it a corresponding reduction in the amount paid by way of compensation for injury to life and property, and Mr. Courtenay Boyle promptly directed attention to this view of the matter. The measures of precaution which the Board have insisted upon have been called for by frequently-recurring disasters, and the adoption of such measures brings its own reward. An allusion was also made to the Railway Bills of 1885, which, it will be recollected, were petitioned against by all sections of the community, and ultimately abandoned. Mr. Lambert's explanation of this is that the Bills were not supported by the Board of Trade as the companies were led to believe they would have been. This is instructive, for the attitude of the Department,—and, indeed, of the Government,—towards these much-abused measures was the subject of a considerable amount of speculation at the time. The selecting of stations for working out the terminal expenses seems to grow more and more complicated. The London and North-Western Company, as we have already remarked, submitted sixteen, the associated companies are prepared with details of a further 101, while the traders have put in a list of forty-four more places with regard to which similar information is demanded. It is to be hoped that this part of the case will be narrowed down very considerably before the inquiry is re-opened next week. The able Secretary of the Railway Companies' Association (Mr. Oakley, of the Great Northern Railway) will probably be the next witness.

THE promoters of the Central London Railway Bill have issued a statement for the popular mind, to do away with the misapprehension which they say exists on the part of the public in regard to this scheme; and certainly if it is true that a leading London paper described it as a scheme for running an electric railway along the surface of the most crowded streets, the promoters have some

* There can be no kind of question that mechanical ventilation, when it can be afforded, is the most efficient and the most certain in all seasons, for schools and other public buildings; an opinion we have frequently expressed.—Ed.


reason to complain of "misapprehension." The following are the main points of the statement:—

"The Central London Railway is proposed to start at Queen's-road, Baywater, to pass under Baywater-road, Oxford-street, Holborn, Newgate-street, Cheap-side, and King William-street, and to terminate near the eastern end of King William-street by a junction with the recently-constructed City and Southwark Subway. . . . The mode of construction proposed to be adopted in the case of this railway (except as regards the stations) is practically the same as that used in the City and Southwark Subway. There will be two iron tubes, or tunnels, of about 11 ft. internal diameter. One will be used for the up traffic, the other for the down traffic. A steel shield with a cutting edge will be forced by powerful hydraulic pressure into the clay in advance of the excavation, so as to obviate the slightest risk of movement in the ground over or near to the tunnels. The iron tunnel as it is placed in position will be grouted with blue las line in a semi-liquid state, which, when it sets, becomes virtually stone, and the result is an iron tunnel encased in stone, the strength and durability of which will be enormous. The same system of construction will be adopted for the stations, which will be of iron, instead of brickwork as in the City and Southwark Subway. In order to drive these tunnels the sites of the proposed stations will be first acquired, and shafts will be sunk on the private property so acquired, and not in the streets. The spoil will be brought to the surface by these shafts, and the material for constructing the railway will be passed down through them. The work can be carried on simultaneously in both directions from all the station sites. In the construction of the railway there will be no interference with the surface of the streets, and consequently no stoppage of the traffic."

This seems to render it evident that the railway can be constructed without material interference with street traffic. Whether the game is worth the candle, and whether the proposed means of transit will be as popular as the promoters profess to believe, is another question. Travelling in a tube 50 feet under the ground is not an attractive idea; and while the pamphlet states that "perfect ventilation will be maintained" it does not go into any particulars as to the means to be adopted to ensure this. An extract fan would be necessary for each section of the line between stations, unquestionably.

WE learn that out of the first competition for New York Cathedral the designs of four architects or architectural firms have been selected, the authors of which are to compete a second time. They are Messrs. Potter & Robertson, Mr. W. Halsey Wood, Messrs. Heins & La Farge, and Mr. G. Martin Huss. The first-named architects are well known for good Romanesque work; and it is also known that Mr. Potter is the bishop's brother. The other three are not well known in regard to church architecture, and some of those who had considerable reputation in this respect, names certainly much better known on this side of the water, have been left outside. Nothing can however be done for a long time, as the 1892 Exhibition is to be held on the site ultimately to be appropriated to the cathedral.

THE *Berliner Philologische Wochenschrift* for December 21 gives a good summary of the most important of the archeological discoveries of 1889, among which, the discovery of the temple of Despoina, in Arcadia, to which we drew attention some weeks ago, naturally holds the first place. The temple, it will be remembered, was found on the north side of the ridge known as *Trophi*, about 100 metres to the west of the ruins of a chapel of S. Athanasios. The ground-plan has been clearly made out, and proves to be that of a Doric hexastyle prostyle temple. The orientation of the building is east and west. It is twenty metres long by ten broad, the cella is thirteen metres long. The portico, which fronts the entrance, is of marble; the walls of the cella have their lower courses of masonry of local stone, the upper of unburnt brick. The portico appears to have been crowded with votive offerings, of which the bases are fortunately still extant. Dedications to Despoina are frequent, and some of the tiles are inscribed *Δεσποινῆς*, "of Despoina." Happily, therefore, there is no

shadow of a doubt as to the name of the temple. Near to the back wall of the cella is a large base, shaped  Here

it is supposed stood the four figures by Damophon, which Pausanias describes (viii. 37, 3), and to which we have already called attention. The actual sculptural fragments discovered, which Mr. Kabbadias conjectures (and the conjecture amounts almost to certainty), belong to this group, are as follows:—A colossal female torso, three colossal female heads, various other fragments, among them a hand with the stump of a torch, another with a lamp, a third holding a piece of a snake; fragments of the feet of a marble chair, four female figures, the lower parts of which branch out into two snake-tails. These last are all the same height (0.23 m), and stand in the same attitude, with one hand raised; they each hold a round object, on which something else, presumably the side supports of a chair, rested. We can only repeat that, as these are the first and only fragments we possess from the hand of the famous Damophon, they are of signal importance, and we hope their publication may not be long delayed.

IN building the new railway-station of Trastevere, at Rome, some ancient Roman tufa quarries, with long and wide galleries, have been discovered in the east side of the hill of Monteverde, and in cutting through the rock a new road leading to the railway-station, a quadrangular niche was found in the tufa; this niche has a pediment, on which is sculptured in bas-relief a club between two vases. In the cornice the following inscription is cut:—

L' DOMITIUS' PERMISSVS.
FECIT

The bottom of the niche having been carefully cleared of earth, sculptures and other objects were found, which showed it to be a little shrine sacred to Hercules. The excavations were continued to a depth of 5 metres, when the altar was found in its place, standing on two steps built of brick, and before it were two pedestals, 0.75 m. high and 0.50 m. wide, each of which bore the following inscription:—

IMPERIO
HERCVLI SACRVM
L' DOMITIVS
PERMISSVS

On the front part of the altar traces of stucco bas-reliefs are to be seen, but as a great part of the stucco has fallen off, they can hardly be made out; they apparently represented a dance. The inside of the niche is covered with red plaster, and various ornaments, such as birds and flowers, are painted on a yellow field. The objects found in the shrine are four tufa statuettes, representing Hercules, a marble head of Bacchus, another of Jupiter, a bust of Minerva, and other fragments of marble and tufa statues. The excavations were continued around the shrine, and resulted in the discovery of various marble slabs, used for paving the temple or for covering its walls, and of the following pieces of sculpture:—Bust of a bearded adult; bust of a young man, with a light beard and thick hair; bust of a beardless youth, very well preserved; bust of a man strikingly resembling to the Emperor Trajan. These busts were placed on a base of variegated marble. Two fragments of Ionic capitals, a few terra-cotta lamps, and a great many bronze coins of Augustus and of Antoninus Pius, were also found.

IN the Prati dei Castelli of Rome, where the Palace of Justice is now being built, two large sarcophagi of marble have been dug out. One of these is 2 metres in length, and 0.65 metres in breadth. It is ornamented with two bas-reliefs representing winged *genii* occupied in picking grapes. On the front part of the sarcophagus is the bust of the defunct, who holds a book in her left hand. The sculpture and the manner in which the hair is arranged lead to the belief that the sarcophagus belongs to the second

half of the third century after Christ. Under the bust two masks of Bacchus are sculptured. On all the front part of the sarcophagus traces are still to be seen of ancient gilding. The style belongs to the epoch of decline in art. The other sarcophagus, of great size, is entirely made of unpolished marble, and its lid is a slab of marble which had already been used for some other purpose.

ON the Capitoline Hill, where important works for the erection of a monument to Victor Emanuel are going on, part of the fortifications belonging to the Arx or citadel have been discovered a few metres from the spot where the other ruins had already been found. (See *Builder*, 1889.) The newly discovered remains comprise four rows of large tufa blocks, perfectly square. Near this ancient building, in a subterranean chamber above which Paul III.'s (1534-1549) tower, demolished two years ago, originally rose, the skeleton of a man has been found on the bare earth, with two great medieval swords crossed on his breast.

EXCAVATIONS are now in progress in the area occupied in ancient times by the Imperial villa built by Nero (see *Builder*, July 13, 1889, pp. 21-23). Some rooms built of large bricks, covered with stucco of excellent workmanship, and with pavements of mosaic representing ornaments and different animals, have been found. In one room a fine statue of Venus of white marble was still preserved in its place. Of this we will give an illustration shortly.

THE City of Chicago seems to have been holding high festival over the opening of a music hall and theatre (or "theater," as they call it in the new American language) of no ordinary splendour and proportions. To judge from the language of the Chicago newspapers, indeed, one would think that Paradise had been opened to the citizens, but the illustrated supplement of the *Daily Inter-Ocean*, published in honour of the event, shows that a rather remarkable building has been erected, as far at least as its interior arrangement and design are concerned. Externally the building has the likeness of a monster hotel of rather heavy and ungainly design, and with nothing in its architectural treatment to indicate the nature of the interior which is enclosed behind this outer mask of hotel rooms. The paper above referred to publishes a section, which enables us to see how the large theatre is arranged within this outer rampart of chambers, which rises all round high above the roof of the theatre. The section as published does not, however, indicate how the interior is lighted. The property-rooms appear to form a solid block over the greater part of the auditorium, an arrangement which would not be approved of in this country. The arrangement of the seating as shown in the section ought to be very good for enabling a large number to see and hear well. There is an immense pit or "parquette" extending in a very gradual rise from the orchestra bar to the back of the house. The orchestra is sunk, on the principle which Wagner was mainly instrumental in starting, between the audience and the stage, in a gallery with a concave floor, we presume for the purpose of reinforcing the sound. One of the special constructive features is that a coved ceiling to the upper circle, having the cove facing towards the audience, is capable of being turned round on its lower edge and dropped to form a cove towards the house and shutting out the upper circle, thus rendering the house smaller if desired: the cove is designed, we are informed, so as to fit into the architectural design in either situation. This is a new idea worth noting. From some sketches of bits of the interior given in the *Inter-Ocean* it would appear that the architects (Messrs. Adler and Sullivan) have developed a certain amount of originality in the treatment of detail. An organ is placed adjoining the proscenium arch, and flanking the end of the orchestra chamber; but

apparently masked behind a decorative screen. It furnished an important addition to the opening proceedings, however, the ceremony being opened by a Triumphant Fantasia for organ and orchestra composed for the occasion by M. Dubois, a French organist and composer. The building is intended, we gather, for either musical or dramatic performances as desired. No scale is appended to the section, but taking the general heights of boxes, &c., as affording a rough scale, it would seem that the house must be too large for anything but spectacular drama. However, it is evidently a building worth attention, though we wish the exterior architecture had more to recommend it. "The Auditorium" is the name by which the building will be known.

A PROTEST has just been made by a number of Stockholm architects against recent jury decisions, the step being due chiefly to the result of the recent competition in respect of the new Houses of Parliament and Treasury Buildings to be built in Stockholm, to which we have referred on several occasions, and which caused a keen competition, some 120 designs having been sent in. Two of the competitors, Messrs. Ulrich and Melander, some time back lodged a protest on their own behalf against the decision, but no steps were taken by the authorities in the matter. Now, however, a protest has been drawn up, signed by fourteen leading Stockholm architects, in which the step taken by their two colleagues is fully approved, the chief ground of complaint being that the juries in architectural competitions, when judging the plans sent for competition, do not adhere to the principal conditions laid down in the programme, whereby those competitors suffer who have followed these conditions most strictly. The protesting architects, therefore, demand a strict adherence to the conditions of the programme in architectural competitions. This protest is signed by such leading Swedish architects as Messrs. Clason (designer of the new National Museum), Ekholm, Holmgren (architect of the new Upsala Museum), Lindgren, &c.

THE Secretary of the London Electric Supply Corporation publishes a significant letter in the *Times* of Thursday containing a quotation from Mr. Musgrave Heaphy's report on the causes of the fire at 8, Grosvenor-square, which arose from the electric lighting installation. Mr. Heaphy's report said:—

"I have made an examination of this installation of Mr. Amherst, at 8, Grosvenor-square, as far as it was possible under the circumstances. I found the work in the house was certainly not in accordance with any fire-insurance rules with which I am acquainted, nor with the specification of the London Electric Supply Corporation. The conductors were in contact under the floors, they were unencased, and fastened by metal staples. Among the few places that I was able to examine, I found that a staple had cut into the insulation. The conductors in another place were in contact with the bell wires."

It was at a date subsequent to this evidently most careless piece of work that the Electric Supply Corporation very rightly determined to refuse to supply their current into any buildings until, by inspection, they had first satisfied themselves that the work had been properly done and in accordance with their specification. They added that had they known of the facts now brought out by Mr. Heaphy's inspection, they would never have connected the installation at 8, Grosvenor-square to their mains, as with work done in the way that was, "a fire sooner or later was inevitable." This is an important lesson to private owners to be very careful whom they employ to fit up electric lighting in their houses. If all the companies which have concessions to supply London districts adopt the same course which the Electric Supply Corporation have taken, and refuse to connect with any residence until a competent electrical engineer has made a satisfactory report upon the fittings, the danger to private owners from their own carelessness will at all events be minimised.

THE serious accident on the Chesapeake and Ohio Railway, near White Sulphur Springs, is said to have been occasioned by "the spreading of the rails" while a train was going at high speed to make up for lost time. This, we presume, is one of the results of the American expeditious system of laying down railways in an incredibly short space of time, of which we hear every now and then. It is not an accomplishment to be very proud of. English railways occupy more time in construction, but the rails do not burst open under high speeds when they are once down.

SHORTLY after the death of Dr. William Chambers, the restorer of St. Giles's Cathedral, Edinburgh, it was resolved to erect a monument to his honour. The question was raised as to the shape which the memorial should take. One proposal was that a built-up chapel, to the east of the north transept, which had been used as the Session-house of the High Church, should be thrown open, put in proper order, and a monument with a recumbent figure of the deceased placed therein; another proposal was that a bronze portrait statue should be placed upon a suitable pedestal in an appropriate site in the open-air. The latter course was adopted, and Mr. Birnie Rhind, sculptor, was entrusted with the commission; the site fixed upon being in Chambers-street, immediately opposite the Museum of Science and Art. The question as to restoring the closed-up chapel has again cropped up, and it has been resolved that it should be converted into a memorial chapel to Dr. Chambers, with a stained-glass memorial-window therein. There will thus be five chapels attached to the cathedral, two on the south side and three on the north. The two former, comprising the Moray chapel and the Montrose chapel, are sufficiently supplied with appropriate monuments, but the three latter are empty. It would greatly add to the attraction of the cathedral, and give it an air of greater completeness, were these chapels furnished with canopied tombs; and there seems no reason why the appropriation of one of them as a memorial to Dr. Chambers should exclude from it any appropriate memorial to another. The walls of the aisles have, since the restoration, received numerous memorial-tablets, principally brasses, and care seems to have been taken that these should not be incongruous with the surroundings, and one of the best of these has been placed in the Montrose chapel beside the fine monument recently placed there, which was designed by Dr. Rowand Anderson.

THE Tudor Exhibition at the New Gallery has a higher interest than the Stuart Exhibition of last year, inasmuch as one of the principal figures among the Tudor Sovereigns, Henry VIII., as well as a good many of his subjects, had the good fortune to be painted by a great artist, whose works are now, by the irony of fate, more valuable for his own name attached to them than for the names of the eminent persons of the day whose portraits he painted. The Holbein portraits of Henry VIII. are numerous in the West Gallery; none perhaps so interesting and characteristic as the unfinished cartoon (42) representing Henry VIII. standing with his legs apart and with that kind of general look of a bully which was an essential part of his character. Among other Holbeins may be especially mentioned the portrait of himself (52), the "portrait of a man" (67), belonging to Sir John Millais, and before seen in the Burlington House loan exhibitions, the magnificent full-length of the "Duchess of Milan" (92), one of the finest female portraits ever painted; and the "Sir John Moore" (100). These, and the artist's small studies of heads and figures, are alone worth a visit to the exhibition. The Queen Elizabeth set of pictures in the North Gallery are of less interest, because Queen Elizabeth had no Holbein, nothing better than Zuccherro, to paint her. The portraits of her very very much in physiognomy, and only one or two make her

really handsome; but the horribly-constructed ladies' dress of the period was enough to destroy any degree of natural charm. There is a fine collection of armour in the hall, and the cases in the rooms contain some objects of decorative art of great beauty and interest, in particular some of the cups in the case in the centre of the West Room. The cup belonging to Corpus Christi College (812), and that given by Henry VIII. to the "Barber-Surgeons" Company (814) are beautiful work. Some of the decorative work and armour we shall give illustrations of shortly.

PAPERS have been read at the recent meetings of the Northern Architectural Association at Newcastle by Mr. W. H. Dunn and Mr. J. H. Morton, on the subject of "Architects as Scientists," the latter gentleman's paper being apparently a reply to the former one, in which Mr. Dunn urged that the scientific and technical side of architectural practice should be more developed and attended to by the architect, who should be the chief workman. "The chisel, the hammer, and the plane would have to enter largely into the work of their young men if they were to keep the position of the architects in the nineteenth century." So far as this is possible it is no doubt advisable; but one man and one lifetime are not sufficient for everything, and we fear the fumes of chemistry may have a tendency to clog the brain of the designer. Architecture has been too much mere design, or even mere drawing; now there is evidence of a reaction in which design in the proper sense may be snuffed out. The practical reactionists are in danger of forgetting that, after all, the intellectual interest of the architecture of the past is mainly in its design; in its outside quality. Turn over such a *résumé* of the subject as is given in Fergusson's history, and it must be evident that what makes the subject worth a great book on it, with hundreds of illustrations, is the various forms of architectural design and expression employed in different times and in different countries. The practical construction employed, though indissolubly connected with the subject of design, is not that side of architecture which has rendered the subject perennially interesting to educated minds of all times. It is the design and artistic element of the architectural monuments of Athens and Rome, Florence and Venice, that renders them sacred shrines; it is not the construction which draws us to look at them, interesting though this is as the basis of the design. The *Newcastle Daily Chronicle*, in a generally sensibly-written leader on the subject of the two papers, unconsciously points to one of the most apt illustrations of the danger to architecture from the artisan side of the study being developed at the expense of the architectural, viz.: the Scott Monument of Edinburgh. This is an old example often quoted before, of what the studious artisan can accomplish. It is so in more senses than many people are aware of: it is a very clever and ambitious design, as a whole, for a self-trained artisan to have produced; but the detail is coarse and bad to a degree, and has been a source of annoyance to thousands of those whose eyes are trained to know what good detail means. It is in detail that the hand of the really cultured and artistic architect, and the difference between him and the artisan, is especially shown. Many people could rough out a general sketch of a powerful design, who would ruin their own work when they came to detail it: and they will never learn refinement in detail from practising with "chisel and plane" and "the fumes of chemistry."

The Potsdam Mausoleum.—The work on the mausoleum now being built at Potsdam, which is to contain the remains of the late Emperor Frederick, is actively progressing, and it will be finished in the Spring. The interior of the cupola is to be lined with Italian mosaic, manufactured in Venice.

LETTER FROM PARIS.

FOR some days the world of art in Paris has been disturbed over a conflict that has arisen within the Société des Artistes Français, and which may lead to serious results in regard to the future existence of that body. This is no less than a proposition for the formation of a new society apart from the existing Society, and having its own annual exhibition, and admitting into its regulations neither "exemptions" nor rewards. If this movement is accomplished,—and latest advices speak of it as certain,—the new Salon will have at its head, besides M. Meissonier, all the masters of the younger school, MM. Puvis de Chavannes, Roll, Gerxev, Carolus Duran, Dagnan-Bonveret, and Besnard, among painters, M. Dalon among sculptors, and among engravers MM. Bracquamand, Walter and Pannemaker. This will be a very dangerous rival to the old society, which has been led by MM. Bouguereau and Tony Robert-Fleury on a course that seems very ill-advised and impolitic.

What has happened is this. In regard to the recompenses decreed by the International Jury of the Exhibition, a certain number of artists, discontented no doubt with the results of the awards, proposed that they should be disregarded and should not figure in the book of the annual Salon. Naturally, M. Meissonier, in his position as President of the Jury of Fine Arts, energetically combated this proposition, which is absolutely contrary to established usage. It may be as well to add that M. Bouguereau figures in all the Salon books with the detailed list of honours he has received in the previous universal exhibitions of 1855, 1867, and 1878. M. Meissonier, at a very stormy meeting, endeavoured to convince the artists that they could not now take a step that would diminish the value of the awards given in the most recent of these exhibitions. His efforts were in vain, the coeteries of the ateliers prevailed over his reasoning, and M. Bouguereau's proposition was adopted by a large majority of votes. M. Meissonier has accordingly withdrawn from the Société, followed in his retreat by a great number of artists, who have signed a strong protest against what they consider as an absolute want of courtesy not only towards the French Government but towards foreign artists. What will be the precise result, and whether the new society will endeavour to retain a hold on the Palais d'Industrie, or seek a footing in M. Formigé's new building on the Champ de Mars, cannot be predicted at the moment. Possibly the State, which has been directly insulted by the existing Société, will feel itself at liberty to withdraw the use of the Palais d'Industrie, and hand it over to the recalcitrants. Whatever the result, the action of the existing Société is in very bad taste, and much to be regretted.

While there is this dissension among the artists of the sterner sex, it is a curious coincidence that the society of lady artists, "Union des Femmes Peintres et Sculpteurs," seems in a way to be more prosperous than it has previously been. It is directed by a very able sculptor, Madame Léon Bertaux, and does not quarrel about awards, but is devoting itself seriously to the artistic education of women; and in consequence of its efforts there is talk of creating presently at the École des Beaux-Arts a special course of sculpture and painting for women, and admitting them to compete for the Prix de Rome, &c. This feminine emancipation in art has already produced appreciable results, for in the Universal Exhibition the Fine-Art Section counted ninety-two lady artists who received medals, among whom fifty-one were Frenchwomen. Twenty-three members of the "Union des Femmes" were among the awarded, of whom seventeen were French and six foreigners; and of the four gold medals awarded to lady artists, two were given to members of the "Union," Mmes. Demont-Breton and Léon Bertaux.

Nothing has yet been positively decided as to the treatment of the various exhibition buildings, though it is high time it were, if the Champ de Mars is to be got into order within a reasonable period. Its present aspect, in the dull December weather, with its half-dismantled porticoes and galleries, is melancholy in the extreme.

The two large palaces of Beaux-Arts and Arts Libéraux are now nearly empty, and the Cairo street is dismantled. Here and there heavily-laden waggons circulate amid the mass

of débris. All the buildings on the quays are gone, but on the Esplanade des Invalides most of the structures are still standing. The foot-bridges which connected the various parts of the Exhibition have been removed; that over the end of the Pont d'Alma, which formed a kind of triumphal arch over that approach to the Exhibition, is to be re-erected at Calais, at the new central station of the Chemin de Fer du Nord.

Various new monuments or works of art have been inaugurated during the past month. The first to be noted is that of the two decorative groups in bronze placed at the entry of the abattoirs of La Villette. These groups, which during the Exhibition were erected on the Champ de Mars, opposite the Ville de Paris pavilions, represent the one "Fâturage," and the other "Abatage des Bestiaux," and are the work of M. Albert Lefevre and M. Lefevre Dostonchamps. Then came the opening of the new Mairie of Suresnes, designed by M. Bréasson, who has done well with the conditions and the site assigned to him. The new building has a façade towards the Seine with a large central pavilion, containing the Salle des Fêtes, flanked to right and left by the lower pavilions, containing respectively the Salle du Mariage and that of the Conseil Municipal. Internally a large vestibule paved with mosaic and decorated with marble columns gives access to the rooms of the principal story, by a fine double staircase with a wrought-iron balustrade. On the ground-floor a circular gallery communicates with all the administrative offices.

On the hill of Montmartre there has also been opened the large reservoir intended to supply the higher grounds on the right bank. This reservoir, which is to contain 6,200 cubic metres of spring water, and of Engineer-in-Chief Seine water, is the work of Engineer-in-Chief Beehmann. The façade has been built after the designs of the architect M. Diet, adjoining the Church of the Sacré Cœur. Speaking of this church, we may observe that M. Abadie's fine building is now freed from its exterior scaffolding. The work of the vaulting is now being actively carried on, and the church will probably be covered in by the end of this year. The formal opening of the building is fixed for the end of the year. The mass of the building has now a very striking effect at the crown of the hill on which it stands. The cost up to the present date has been 22 million francs.

Various new monuments are in course of execution. M. Dalon has completed the model of the statue to be erected, by public subscription, to the memory of Victor Noir, the young journalist who was killed in 1870 in a duel with Prince Pierre Bonaparte, and whose death was the beginning of the public excitement that led to the fall of the Empire. The statue, of life size, will be executed in bronze by the *cire perdue* process. The artist has represented Victor Noir at the moment when he was about to fall from his mortal wound. The head is very expressive, and the attitude natural. The work, when completed, will be placed in one of the Parisian cemeteries, either Montmartre or Père Lachaise.

M. Crank, on his part, has commenced for the town of Lille the monument to be raised there, also by public subscription, to her great citizen General Faiderbe. The close of the year is announced for the inauguration of this monument, which is surmounted by a figure of Faiderbe and flanked at the four corners by figures representing the constituent elements of the old "Armée du Nord,"—an infantry soldier, a sailor, a dragoon, and a member of the national "Garde Mobilisée."

Lastly, M. Tony Noël has completed for the town of Versailles a very fine statue of the sculptor Hodon, who was born in that town in 1741. The pedestal for the statue is the design of M. Favier, architect.

M. Louis Dumoulin, a young artist who became known some years ago for a series of pretty views of Paris, is exhibiting at the Galeries George's Petit a hundred pictures and studies brought from Japan and China, where he was sent by M. Castagnary, then director of Fine Arts. The exhibition is the result of a two years' sojourn in the far east, scenes from which are illustrated with evident attention to nature and not in the spirit of conventional illustration. Nevertheless, the artist's earlier manner was better on the whole, and perhaps he will return to it now that he has come back to his native country.

The Société Centrale des Architectes has just constituted its new Council as follows: M.

Charles Garnier, president; MM. Alfred Normand and E. de Joly, vice-presidents; M. Loviot and M. Rons, principal secretaries; M. Boileau, editing secretary; M. Harel, archivist; M. Bartaumeux, treasurer; MM. Bailly, Hermant, and Danmet, "censors."

At the Ecole des Beaux-Arts the awards have been given for the exercises in the History of Architecture executed by the pupils of the second class. Medals have been awarded to M. Guimard, pupil of MM. Raulin and Genyus; M. Labouret and Perkins, pupils of MM. Danmet and Girault; MM. Beauvois and Francon, pupils of M. André; M. Debat, pupil of M. Pascal; and M. Parize, pupil of M. Gimain. Twenty-nine "mentions" were awarded.

The French architects who are competing for the Achilles Leclère prize, which is to be decided on March 1, have been given as a subject, "An arena for bull-fights." In a programme chosen by the French Academy for French artists, a "plaza de toros" was certainly unexpected. It seems to be a last reminiscence of the exhibition time, when a futile attempt was made to introduce into Paris this pastime, little in accordance with French taste and feeling.

The epidemic of influenza which has for two or three weeks caused us much anxiety has been the cause among other things of the death of the painter Jules Garnier, an artist of much talent, of a peculiarly Parisian cast. In his short career he unfortunately wanted fine talents and a great facility in composition on subjects of a more than doubtful taste, which brought him a popular renown through the reproduction of photographs and engravings of such works as the "Droit du Seigneur," "Borgia S'Amuse," &c. He was also the author of a well-known picture entitled "Le Libérateur du Territoire," representing Thiers amid the acclamations of the Assembly of Versailles. He produced also the drawings for a series of engravings for an edition of the "Contes de la Reine de Navarre," and some very clever illustrations to a book which appeared lately under the title of "Jeux de Cirque." Few painters had a better knowledge of the types and costumes of the sixteenth century, and he had composed a series of 160 illustrations for the "L'ite of Rabelais," which are now to be seen in the galleries of the Boulevard de Madeleine.

Another artist, William Wyld, who had a certain degree of celebrity under the Second Empire, died a few days since, aged eighty, at his atelier in the Rue Blanche. Wyld was born in London, but had passed more than fifty years of his life in France. He obtained a troisième médaille in 1839, and a deuxième in 1841, and the cross of the Legion of Honour at the Exhibition of 1855. He had been a pupil and intimate friend of Bonington; later he became the travelling companion of Horace Vernet, with whom he went to Rome and to Algiers. He was mainly instrumental in introducing into France the taste for water-colour painting. The Luxembourg Museum possesses two of his pictures, one of them a very fine view of Mont St. Michel from Avranches.

THE ENGLISH IRON TRADE IN 1889.

It would be difficult to point to any year in which the conditions of improved trading were of such a generally satisfactory nature, both to manufacturers and their workmen, as during the twelve months which we have just left behind us. For 1889 will long continue to be remembered as the year which, opening under the most favourable auspices and full of promise, has by far exceeded the expectations formed at its beginning. This is true of trade in general, but more particularly so with regard to the iron industry of this country. It does not matter from which point of view we look upon things as they presented themselves in 1889. The production of iron and steel was larger than during any previous year. The export trade was excellent, and to say that the home demand was full but feebly describes the state of trade. But what is by far the most satisfactory feature of the year's trading is that prices rose irresistibly, yet steadily, in sympathy with the growing requirements both of crude and finished material from beginning to end, the only exception being that fit of speculation which set in towards the end of October, lasted throughout November, but died out again in December. Trade was too sound to be upset by this spell of feverish buying, which only tended to inflate prices for a time, but soon gave place to the more rational conditions with which the year closed. It was stated in these

columns a twelvemonth ago that a flood-tide set in in the third quarter of 1888 which would carry the iron trade well on into the year 1889. How this has been verified has just been briefly indicated, and will be somewhat more fully described in the review of the year which follows.

The figures of the total production of iron and steel in the British Isles in 1889 will not be known for some time to come; but the returns for the first six months of the year show a very respectable increase over the corresponding half of 1888, in which year, it will be remembered, the output exceeded any previous year. As being the most complete returns, we merely quote the figures given for pig-iron, of which 4,083,597 tons were produced in 1889, against 3,902,804 tons in 1888. As the activity of the iron trade was greatest in the second half of last year, it may be assumed that the whole year will show a large excess of production. That this surplus of output, and more, was all utilised is demonstrated by the stocks of pig-iron at the end of the year being considerably reduced. The decrease of stocks in Scotland alone amounts to 208,593 tons, as compared with the stocks at the end of 1888. While the Scotch output of pig-iron decreased 28,846 tons, the local consumption increased by 173,636 tons, and the shipments by about 22,000 tons. In the North of England the reduction of stocks is estimated at 250,000 tons, the same increasing by about 152,000 tons. Although the production of pig-iron in the North-West has been greatly increased by the lighting of furnaces which had long been idle, the consumption and shipments have quite overtaken the output, stocks showing a decrease of about 52,000 tons. In other districts the decrease has been correspondingly large, while in some localities stocks have almost entirely disappeared. In this respect, 1889 compares most favourably with 1888, at the end of which year heavy stocks still exerted a depressing influence upon the market. The monthly returns published by the Board of Trade present an equally satisfactory picture. According to the returns for the eleven months ending November 30 last, we exported iron and steel of the value of 26,945,374, compared with 24,946,089, and 22,808,857, in the corresponding eleven months of 1888 and 1887 respectively. The improvements in the last two years, and in 1889 more particularly, has consequently been steady, indicating a healthy state of trade. It has already been shown that the consumption of crude iron for manufacture into finished products was all that could be desired.

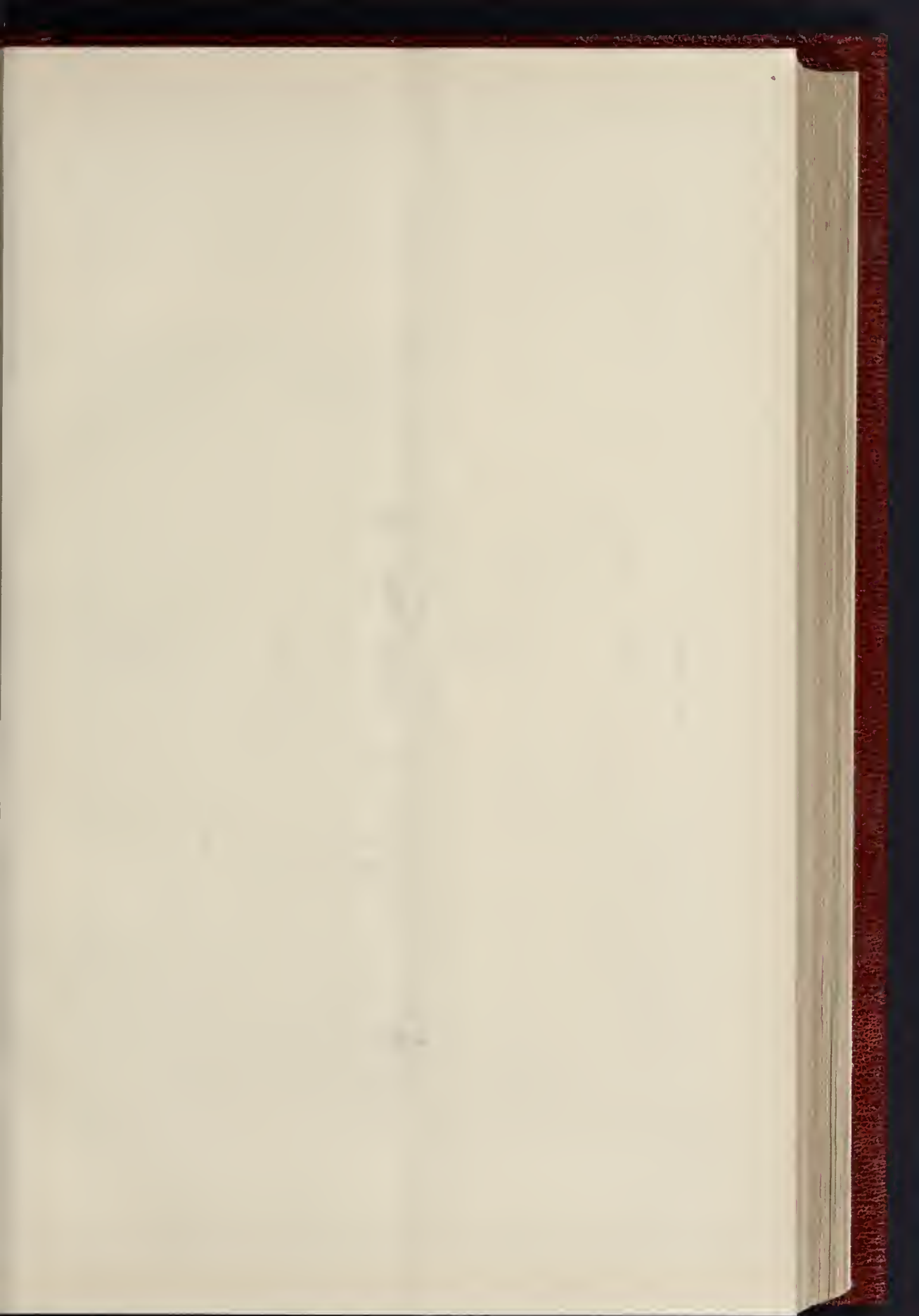
But the best criterion of the prosperity of the iron trade in 1889 is the great advance in the Scotch pig-iron warrants were quoted in January at 42s., and they closed the year at 62s. 6d., or just 50 per cent. higher. Scotch makers' iron advanced more than 30s. per ton on the year. No. 3 G.M.B. Cleveland iron was quoted 34s. at the beginning of the year, and at its close 60s. 6d. for prompt and 62s. to 63s. for forward delivery. The increase in this class of pig-iron was consequently nearly 75 per cent. The most remarkable circumstance in connexion with the Scotch and Cleveland pig-iron trade occurred at the end of October and the beginning of November, the period of the greatest inflation, caused by speculation, when warrants of Cleveland iron rose to 68s. and even 69s., an increase of 100 per cent., and Scotch warrants to only 64s. (the highest of the year), or 50 per cent. Bessemer iron sold in the North-West in January at 45s. to 45s. 6d., and on November 19 it was worth 78s., reaching subsequently to 77s. 6d., but it closes the year at 79s. to 80s. for mixed numbers of Bessemer. It need only be added that in Lincolnshire pig-iron advanced 35s. per ton, in Lancashire and Derbyshire 30s., in Staffordshire 27s. 6d., and in South Wales about 18s. a ton, in order to show to what an extent prices were sent up by a healthy and growing demand and consequent scarcity, speculative influences causing an abnormal rise only during a very brief period.

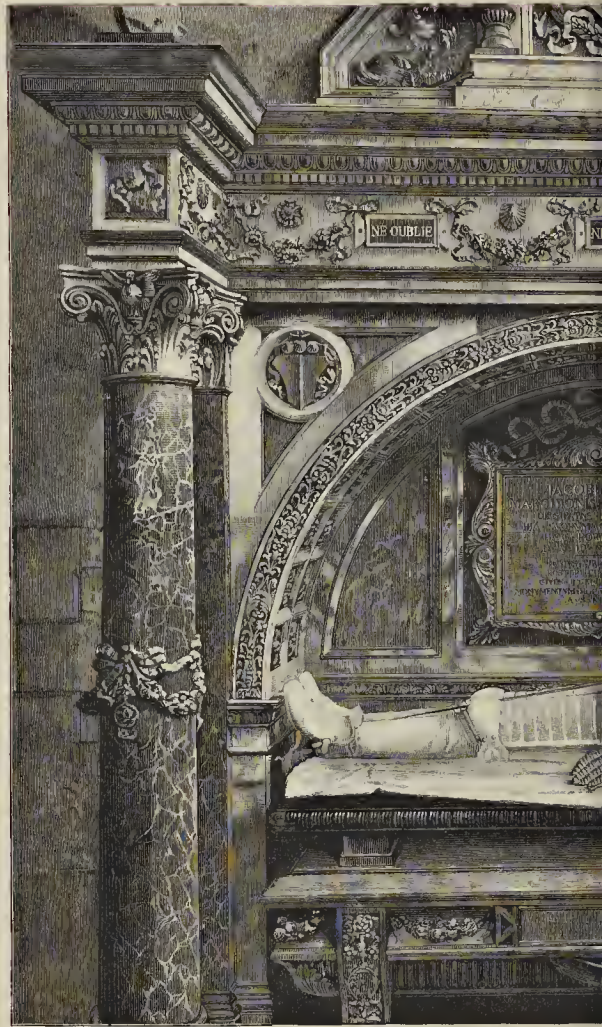
There was a very large production of a very heavy consumption of manufactured iron. In the North of England alone the output was 425,000 tons, or 35,000 tons more than in 1888, which was far larger than was expected. Prices in that important centre experienced a very substantial improvement, the average advance being about 2l. 10s. a ton. Common bars rose in the North from 5l. 2s. 6d. to 8l. plates and angles rising in a corresponding degree; in Scotland, from 5l. 7s. 6d. to 8l. 7s. 6d.; in Lancashire, from 6l. 10s. to 8l. 5s., and black

sheets from 7l. 5s. to 9l. 15s. In Staffordshire, marked bars were sold in January at from 7l. to 7l. 10s., while in December they fetched 9l. 10s. An advance in marked bars of 10s., or, perhaps, 12s. a ton is fully expected in January. Welsh bars have risen 2l. 10s. per ton on the year, their present prices ranging from 7l. 10s. to 7l. 15s., compared with 4l. 17s. 6d. to 5l. in January last. With the advance in iron, finished hardware has begun an upward movement at first slowly, owing to stronger competition, but in the latter half of the year more in keeping with the higher prices of iron. At the present time manufacturers of hardware are able to obtain full rates, and are provided with an abundance of work, which augurs well for the future. The tinplate trade has not been as prosperous as other branches of the iron industry. Although the output is estimated to have been larger than in any preceding year, and there was, consequently, full employment, while exports were more than ever before, manufacturers of tinplate have begun a great difficulty in obtaining prices more in accordance with the advanced cost of the raw material. The advance for some descriptions of tinplates has been no more than 1s. 6d. per box, while for other brands it has reached 3s. per box.

Owing to an exceedingly bountiful foreign demand from all quarters excepting the United States, which have almost ceased to buy steel in our market, but no less to home requirements which could only with difficulty be met, the steel trade of the country has passed through a year unequalled in prosperity. The output has been large, beyond any previous record. The export trade chiefly included rails, while the home demand came, first and principally, from shipbuilders, but also from railways, the engineering and other auxiliary branches of trade. In this respect the past year resembles its predecessor, for in 1888 the principal run was also upon shipbuilding material for use at home and rails for export. So well are steelmakers booked with orders that the majority of them have at the present time twelve months' work in hand, and this has been secured at prices which cannot be described as otherwise than remunerative, notwithstanding the increased cost of the raw material and fuel. At the same time, it is not at all unlikely that rates for steel will go on improving for some time yet. The advances in the value of steel products have been quite as pronounced as those of finished iron. In the north-west of England, the great steel centre of this country, the increase has been about 65 per cent. Steel rails, which were 4l. in January last, are now not obtainable under 7l. There has been a large output of shipbuilding material, quite a new industry in the district, and, along with a heavy production, there has been a substantial increase in price. The advance has ranged from 6l. to 10l., ship angles from 5l. 5s. to 8l. 15s., and boiler plates from 8l. to 11l. The other manufacturers of the district have participated in the rise; a staple product, tinplate bars, having gone up from 3l. 17s. 6d. to 6l. In South Wales steel rails are now sold at 7l. to 7l. 10s., against 4l. 10s. at the commencement of the year, while tinplate bars fetch 7l. 7s. 6d. to 7l. 10s., compared with 4l. 15s. in January. In the North of England, steel rails, which were worth only 3l. 17s. 6d. to 4l. a twelvemonth ago, now realise 6l. 17s. 6d. and 7l., while steel ship plates cannot be obtained at under 8l. 15s., against 6l. 15s. at the beginning of 1889. In Scotland, ship plates have gained as much as 3l. 10s., having reached 10l., compared with 6l. 10s.

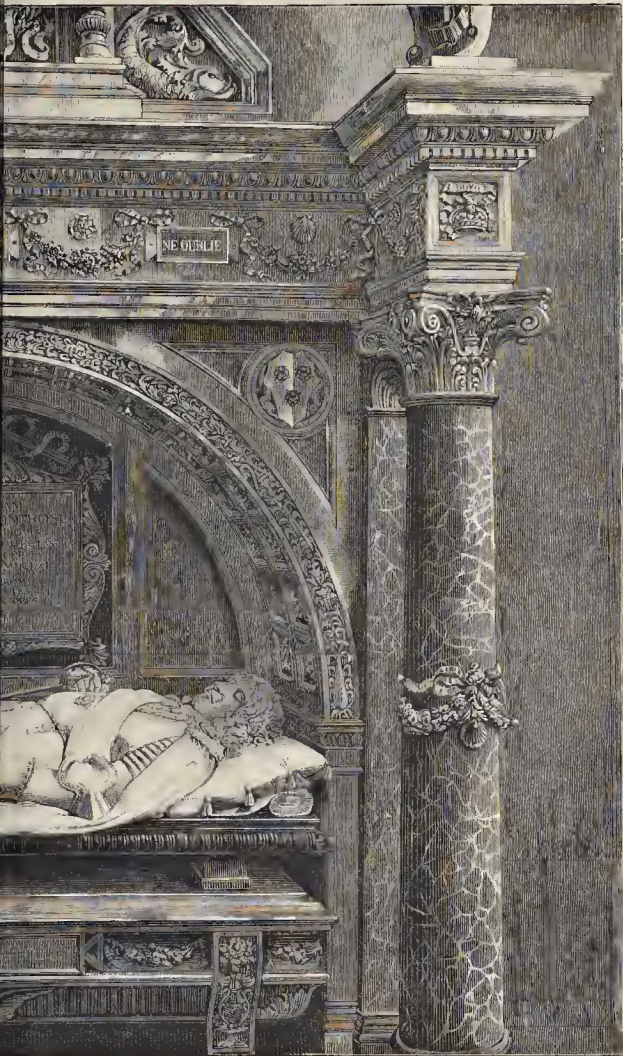
We have already referred to the large consumption of iron and steel by shipbuilders, and we now know that the out-turn of new tonnage has been simply immense. The production of our shipyards in 1889 amounts to the colossal total of 1,270,000 tons of new shipping, which is by 20,000 tons larger than the best shipbuilding record previously, — viz., in 1883, when the tonnage launched was 1,250,000. In 1888 the tonnage of new ships amounted to 994,000, so that last year the improvement over 1888 was 366,000 tons. The chief centres of shipbuilding contributed to the 1889 total as follows:—Clyde, 335,301 tons; Tynes, 281,710 tons; Wear, 217,336 tons; Tees, 110,436 tons; the Hartlepool, 84,109 tons; Belfast, 80,000 tons; Marsey, 35,000 tons. There is every prospect that 1890 will be as good a year for shipbuilders as its immediate predecessor, especially as large contracts have been placed by the Admiralty, most of which will be completed





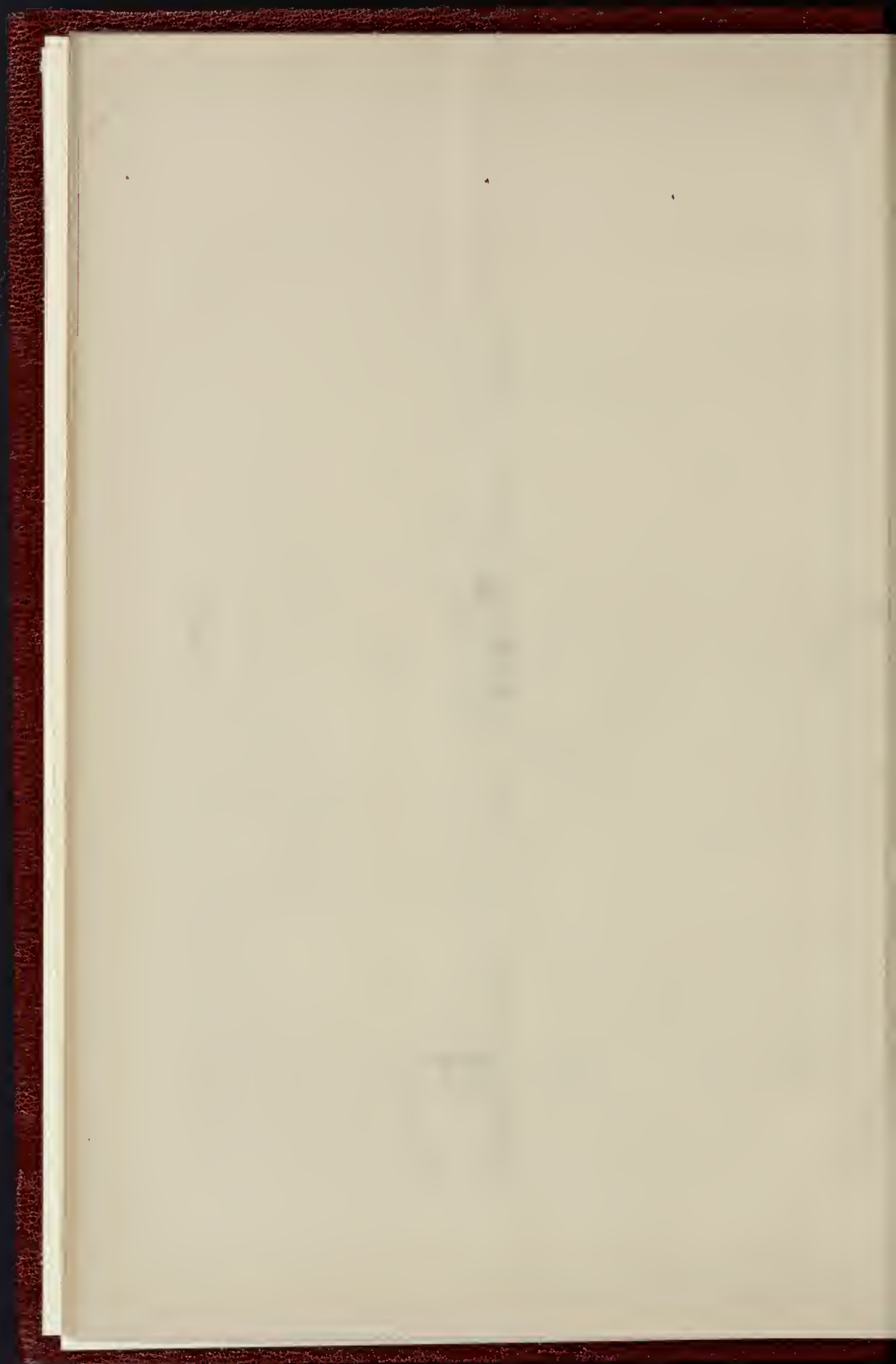
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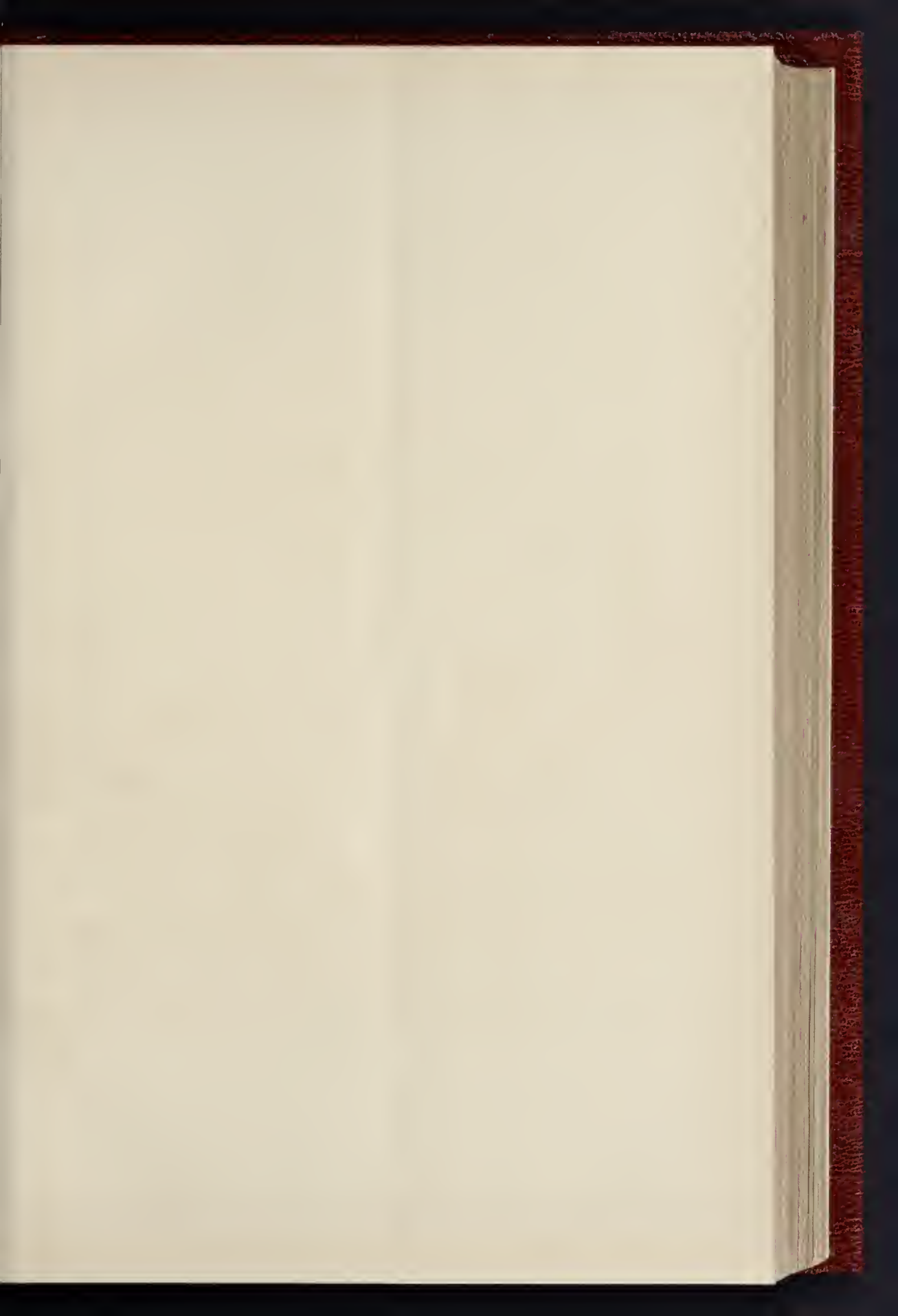
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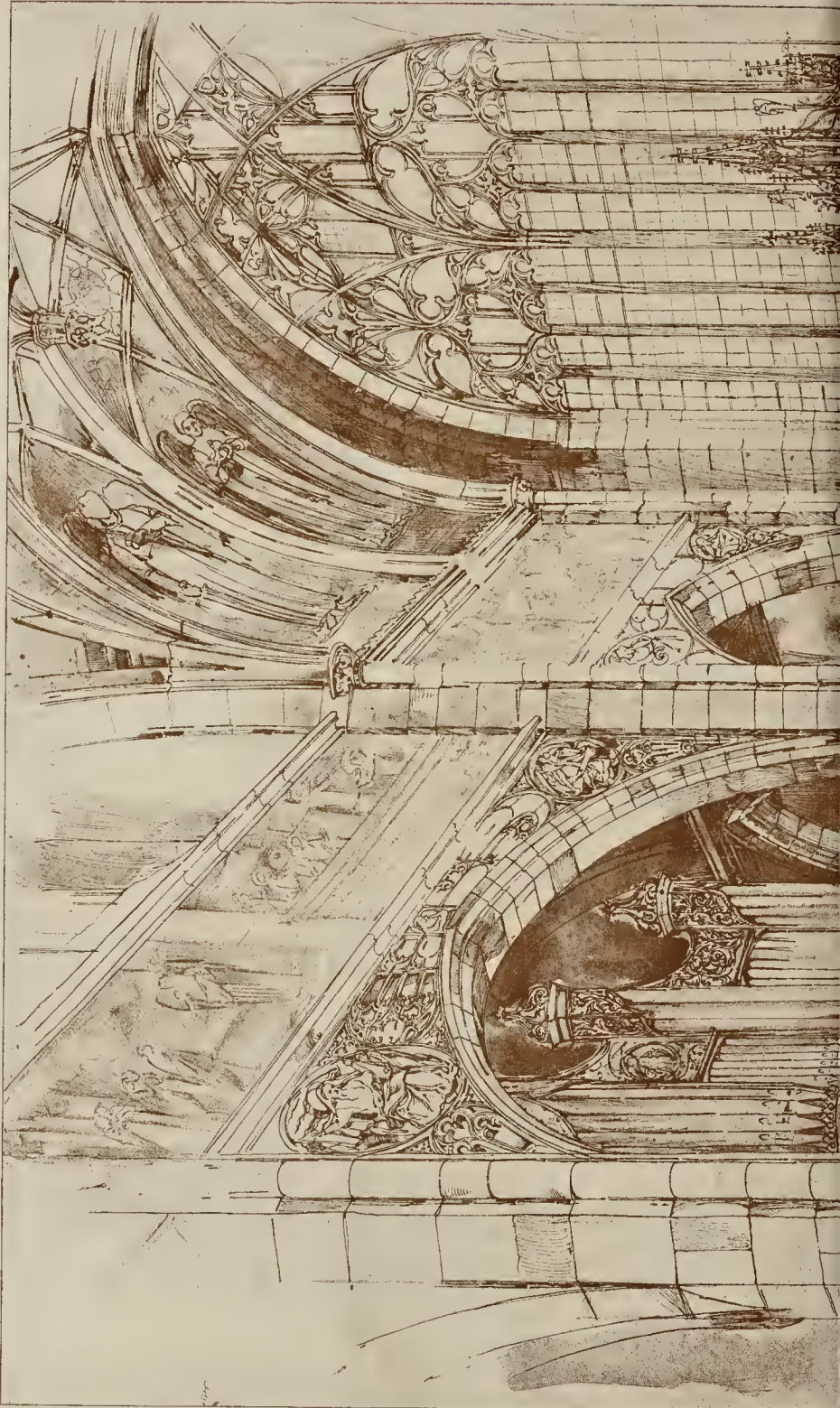
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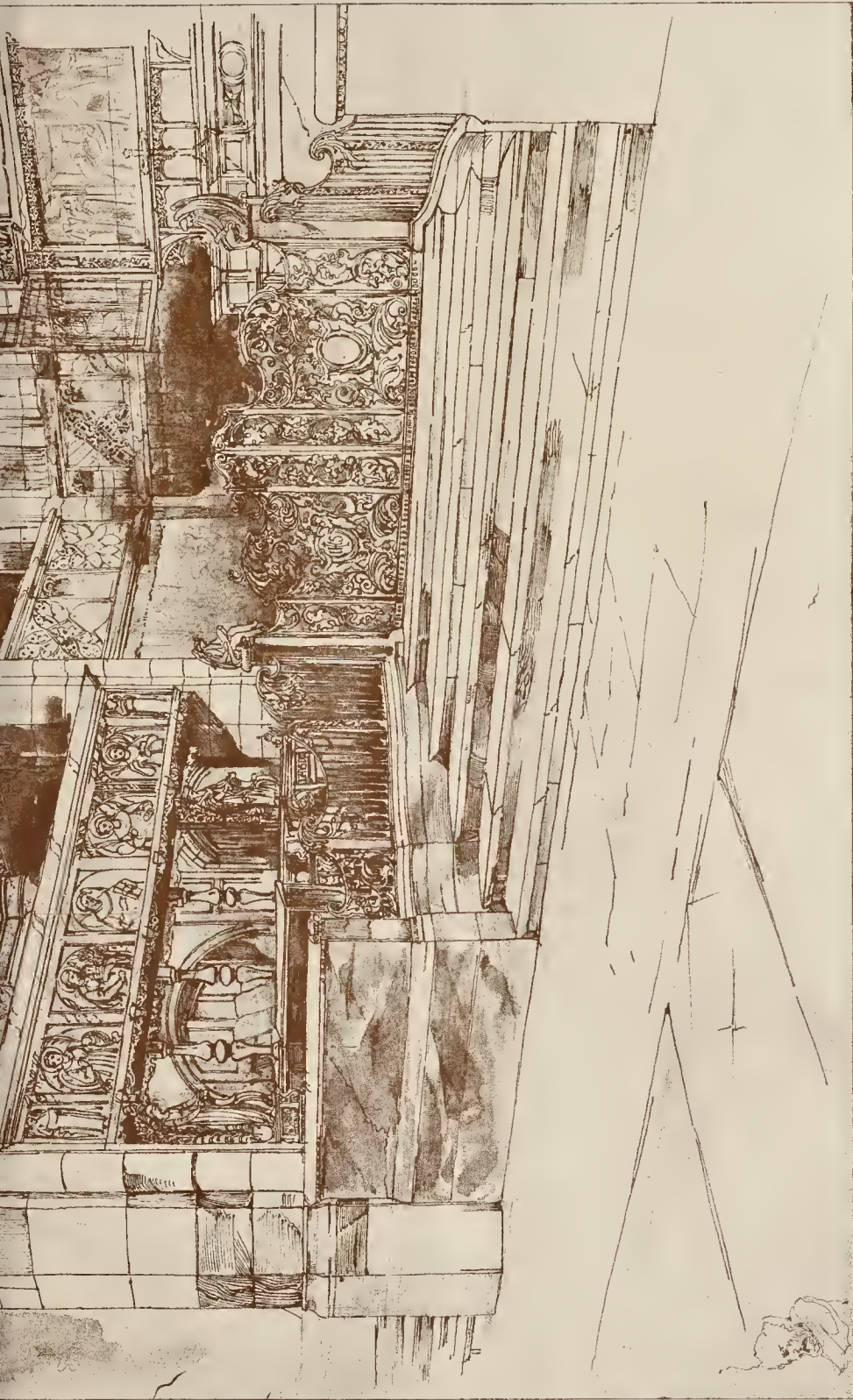
DESIGNED BY MESSRS. J. & W. B. RHIND, SCULPTORS.





THE BUILDER, JANUARY 4, 1890.

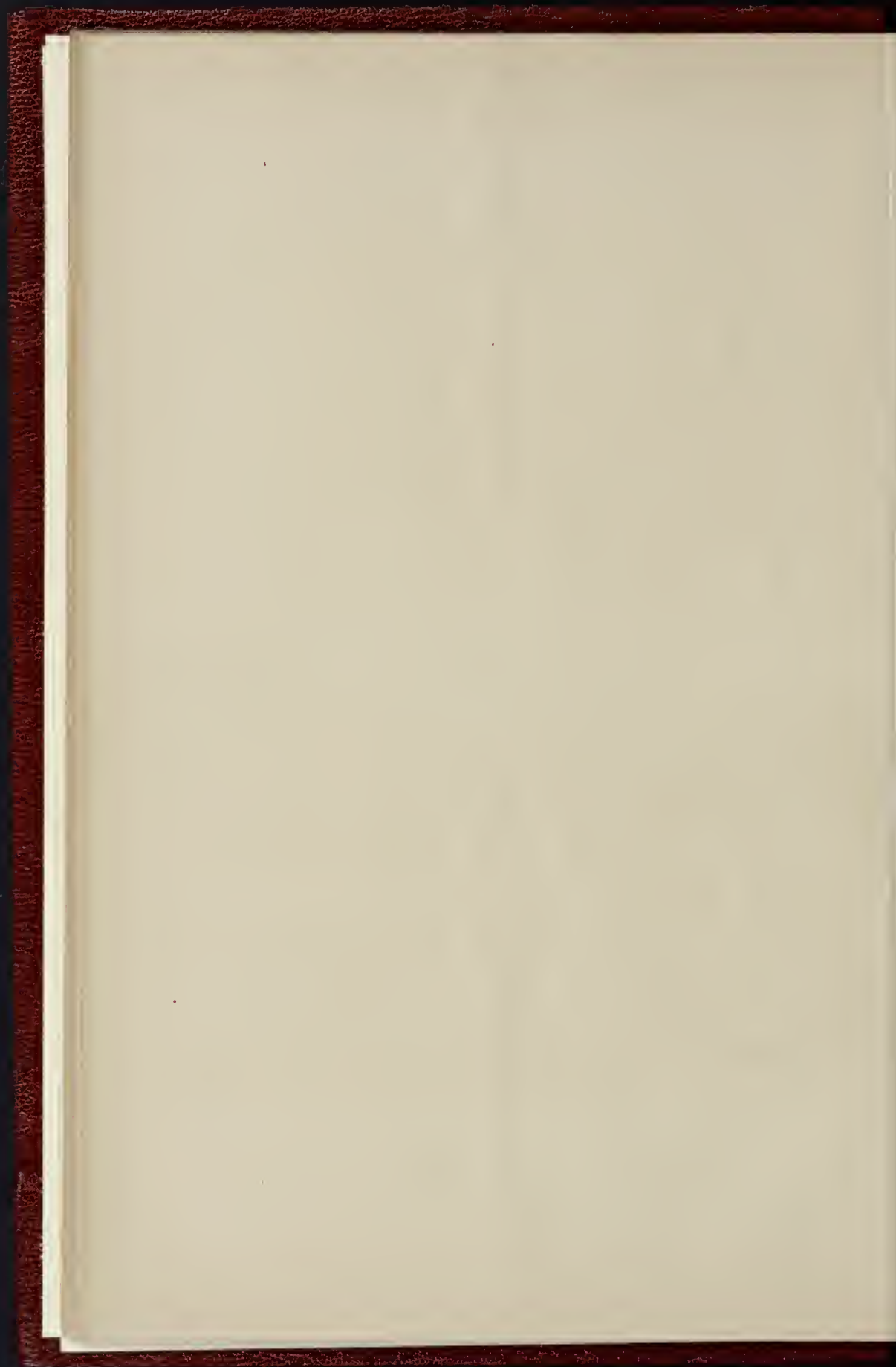


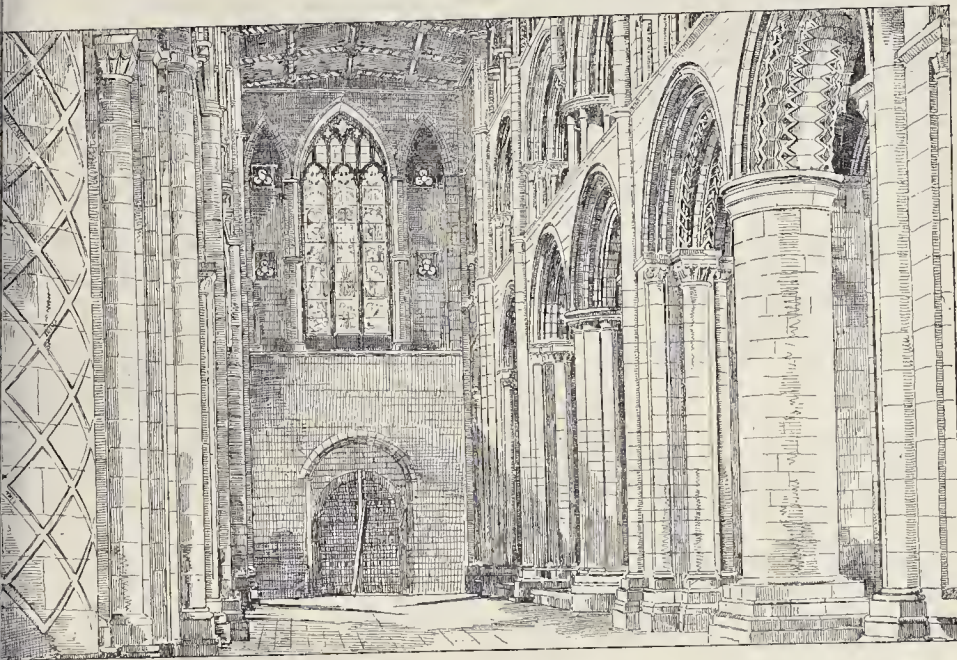


1/4 IN. PHOTO. SPENCER & CO. 44, MARTIN LANE, LONDON, E.C.

SKETCH OF CHANCEL, HOLY TRINITY CHURCH, CHELSEA: SHEWING DESIGNS FOR CHANCEL-SCREEN, GATES, &c.

MR. J. D. SEDDING, F.R.I.B.A., ARCHITECT.





View in Nave, Selby Abbey.

year, while good bookings have been made for the next few months for the mercantile marine. The engineering trades of the country have been as prosperous this year as at any previous year, marine engineers, of course, taking their share; but other departments of engineering have also secured good portions of orders offering both on home and foreign account. It is a highly satisfactory sign of the times that the recent reports of the trade union committees on the state of trade reveal the fact that not more than one per cent. of its members are present out of work—a residuum which will never disappear, even if trade were more prosperous than it is now. It is only natural that workmen should have shared to some extent in the prosperity of trade, and it is gratifying to be enabled to place it on record that, so far, no serious troubles have arisen, and that wages having in most cases been judiciously arranged. But it cannot be doubted that should the present condition of trade continue, there will arise differences as to remuneration which will require much mutual forbearance to smooth over.

Having arrived at the conclusion of what has proved a more satisfactory task than it has been on several previous occasions, a few words may be added as to the future of the iron trade. It is that future is bright cannot be denied by impartial observers, the elements of prosperity being still in evidence. There is at present no lack of money, and to whichever quarter of the globe we look, there are signs that it will be forthcoming to assist in those developments of industry which are the helpmates of civilisation. It is well known that in opening up new countries the iron trade and its related industries play a great part, and from this section, at any rate, benefits to the world will result. As has been pointed out, the year upon which we have just entered will provide ample work for shipbuilders, and these in their turn will make large demands for material. Another fact, and an important one, should not be overlooked. The prosperity of the iron trade of this country is participated in, to a greater or less degree, by the iron industries of foreign countries, and bears the same promise of permanency. Under these conditions, the prediction may be ventured that 1890 will not be far behind 1889, if it does not feel one of the most prosperous years of the present decade.

OLD TABLET IN PRINCES-STREET, WESTMINSTER.

We give this as an addition to the illustrations list of old street tablets in London, of



Old Tablet in Princes Street, Westminster.

which several sketches were published in the *Builder* for December 14 of last year.

Society of Arts.—The meetings of the Applied Art Section of the Society of Arts will commence on January 28, when Mr. Edward C. Robins, F.S.A., will read a paper on "The Relation of the Fine Arts to the Applied Arts." At subsequent meetings papers will be read on "Cast Iron and its Treatment for Artistic Purposes," on March 3, by Mr. James Orrock, R.I., on "The Claims of the British School of Painting to a thorough representation in the National Gallery," when pictures by illustrious English masters whose works are not included in the National Gallery will be exhibited by the reader of the paper; on March 25, by Mr. H. Arthur Kennedy, on "Glass Painting"; on April 15, by Mr. C. Purdon Clarke, C.I.E., on "Modern Indian Art"; and on May 13, by Professor W. C. Roberts-Austen, F.R.S., on "The Use of Alloys in Art Metal-work."

Illustrations.

VIEW OF SELBY ABBEY.

SELBY Abbey was referred to by Sir Gilbert Scott as the only one of the Yorkshire Abbeys not wholly or partially in ruins. The restoration carried out under Sir Gilbert Scott's direction left the nave in a safe state for many years to come; but the choir is now in so dilapidated a state that it has been thought necessary for safety to remove the services into the nave, and the expenditure of a few thousand pounds will be necessary merely to put the choir into a state of security against downfall.

The following quotations are taken from a recent report on the state of the building by Mr. J. Oldrid Scott:—

"It is more than two years since I drew up a specification, at the request of the churchwardens, for the restoration of the north transept; its condition at that time was very serious, but it was found impossible to undertake the work at once, and in the meantime the mischief has increased. Cement tests, which were then placed across the cracks, have given way, showing that there is a movement towards the north actually going on.

The walls are bulged to a very dangerous extent, and the condition of the great window is such that a calamity may occur at any time.

I therefore venture to urge on the inhabitants of Selby, as well as on others interested in the Abbey, the absolute necessity and duty of taking prompt measures to arrest the evil which is at work, and to place the transept in a condition of safety.

The plans I have already prepared include the restoration of the gables and pinnacles, as well as the addition of an outer roof of higher pitch, such as the transept once had. I fear it may not be possible to raise the funds now for this part of the work, and although it is most desirable that it should be carried out before long, yet it may be postponed for a time, and the restoration limited to the essential works of underpinning the foundations, rebuilding the window, and securing the walls, roof, and ceiling.

Until this has been done, the Abbey cannot be looked upon as secure, and a very heavy responsibility must rest on those charged with its maintenance.

Besides this work of repair, there are various other parts of the Abbey which call for attention. Among these the choir certainly takes the first place. It is of the finest possible design, its scale is magnificent, and the beauty and richness of its details almost unequalled, and yet owing to the

injuries it has received and to the accumulation of whitewash and dirt, it has an air of neglect which is very depressing. It suffered considerably from the fall of the tower in the seventeenth century, one bay of its groining being destroyed, and the western part of the south aisle, as well as the cloisters, being ruined. It was this that led to the insertion of the very hideous windows which are such a serious blot on the beauty of the choir. Whether it will be possible to remedy all these defects now I do not know, but I understand that the cleaning and repair of the stonework of the choir will be taken in hand at once, and I would strongly plead that at least the reinstatement of the missing part of the groining and the restoration of the south-west cloister window should be done at the same time. . . .

It is earnestly to be hoped that a vigorous effort may at once be made to place the north transept in a secure condition, and also to deal with the choir. The one work will make but little difference in the appearance of the Abbey, but it is absolutely necessary and will carry great and lasting satisfaction with it. The other, on the contrary, will have a most striking effect on the whole interior, bringing out the great beauties of the building, and removing for ever that heavy cloud of neglect which for the last three centuries has shrouded one of the finest of all the Yorkshire Abbeys."

In a further report, dated Nov. 9, 1889, Mr. Scott says—

"In my report dated Sept. 17 last, my remarks are confined to such works of the north transept as I expressed your hope of being able to accomplish. Since then I have had an examination made of the condition of the roofs of the choir and its aisles, and beg to put before you the result of that examination."

Although some of the timbers of the choir roof appear to be in fairly good condition, others have defected, and the ends of many of the rafters appear to be decayed. The whole construction, from want of a longitudinal tie, has inclined to the east, exerting a thrust against the east gable. It is probable that when the roof is stripped, some of those timbers which, from the underside, appear to be sound, will prove to be more or less decayed, as leakage in the lead covering must have been going on for very many years. The tie-beams are nearly all defective, and need to be renewed.

The boarding on which the lead is laid is in great part decayed and broken. The lead covering is very faulty, there being holes in many places. Some sheets have slipped down to such an extent that they no longer lap, and the whole surface has been patched and repaired with solder, which has since cracked. The rain admitted by this defective covering is not only causing decay in the roof itself, but is doing mischief to the oak groined ceiling below.

It is most important that the choir roof should be made watertight before any improvements are made to the floors and fittings below. To effect this the whole roof must be stripped, repaired, and re-covered, the present lead being re-cast and re-mast.

The roofs of the aisles and choir are in much the same condition, though here the construction needs strengthening by the insertion of additional timbers, besides the repair of the defective rafters and plates.

The whole of the external masonry, including that of the transept, needs pointing, and in some places the renewal of carvings. Fragments of the tracery and carving frequently fall, doing injury to the roofs, from want of this attention."

The Vicar, the Rev. A. G. Tweedie, is endeavouring to interest the public in this, which may be called a national work, the resources of Selby itself being limited. The Vicar, we understand, takes an entirely conservative view of the matter, and is desirous mainly to preserve the church and put it in proper repair, not to enter upon "restoration" in the sense in which the word is too often understood. It is partly with the desire to aid in this work by calling attention to the grand style of this ancient building that we have made it a prominent feature in the illustrations to this number.

The view, showing the exterior of the choir from the south-east, was drawn expressly for this occasion by Mr. Arnold B. Mitchell, from studies and sketches made on the spot.

We add also a view of a portion of the nave, drawn from a photograph.

"THE PALACE."

ALTHOUGH we know pretty well what a Mediaeval cathedral was like in the days of its splendour, and we can realise the dignity of an abbey and the sombre and solid sternness of an ancient castle, yet we are rather puzzled and confused in our notions of an old Gothic palace. Undoubtedly this arises from the fact that the examples of Mediaeval palaces in an unaltered condition are so extremely rare,—in fact, it may be said, without exaggeration, that we do not possess,—in Northern Europe, at any

rate—a single specimen of a Mediaeval Gothic palace of the first-rate magnitude. We can, of course, find amongst the great palaces of our own country, of France, Germany, and the Netherlands, portions of buildings, and features left from the Middle Ages, but these are surrounded by works of a later time, so that the harmony of the old design is lost. This is exactly the case with the great palaces of Prague, Salzburg, &c. When seen from a distance, with the towers and pinnacles of the Cathedral and Benedictine Church, both of which are enclosed within its walls, rising over it, the palace of the Hradscchin at Prague does indeed give us some notion of the splendours of a Mediaeval Royal palace; but, unfortunately, upon close inspection it will be found to be nothing but a huge architectural patchwork, the greater portion of which is made up of seventeenth and eighteenth century Renaissance erections. The great Hall of Ladislaus, with its vast vaulted roof, and the tower of Daliborka, seem alone to have escaped the botching and plastering-over of the late Renaissance men.

In our article upon Mediaeval Paris, in January last, we showed how the ancient palaces of that city had almost entirely disappeared, and we have also accounted for the disappearance of the palaces of our own Kings in London and Westminster. Of the courts and suburban residences some remains are still to be seen. The hall at Eltham is, indeed, a noble relic, and the old gateway at Richmond not uninteresting. Hampton Court, at least as far as its ancient portion is concerned, can scarcely be looked upon as a "Royal Palace" architecturally considered, for it was constructed to be the dwelling of a churchman, and possesses, in a marked degree, an ecclesiastical character. Much has been said of Wolsey's magnificence and love of ostentation, but it must be acknowledged that they do not display themselves at Hampton Court, which is a singularly sober and quiet example of Tudor architecture, the only very elaborate portion being the Dining Hall, which is known to have been erected after Wolsey's disgrace, and does certainly give us some idea of palatial architecture. Of the old places of Deptford and Kennington we know nothing, Placentia, at Greenwich, and "Nonsuch," in the parish of Cheam, are represented in old drawings, and would appear to have been elaborate buildings. No remains, however, of them at present exist. In the dearth of examples of old Royal palaces, one is thrown back upon descriptions of them, and here none is certainly more interesting than that given by Chaucer in a poem called "The House of Fame," from which we take the following extracts:—

"When I was from the Egle gone
I gan behold upon this place
And certayne or I further passe,
I wold you all the shape devise,
Of house and citee, and all the wise,
How I gan to this place approche,
That stood upon so hie a roche . . .

"The gan I on this hill to gone,
And found on the coppe a wone,
That all the men that been on live,
Ne haue the coning to descrive
The beaute of that like place,
No coud caste no compase,
Such another for to make,
That might of beaute be his make (or "mate")
Ne so wonderly wrought,
That it astoneth yet my thought,
And maketh all my wite to swinke
On this castell for to thinke,
So that the great hoantie,
The caste, craftes, and curiosite,
Ne can I not to you devise,
My wite ys maye me not suffice . . .

All was of stone of Berle,
Both the castell and the toure,
And eke the hall, and every boure,
Without peeces or joyntings,
But many subtell compassings,
As habouries and pinnacles,
Inuageries and tabernacles,
I saw, and full eke of windowes,
As flakes fallen in great snowes,
And eke in each of the pinnacles
Weren sundry habitacles
In which stodeen all withouten,
Full the castle all abouten."

Here follows a description of the statues occupying the various niches, which were so numerous that he says that if he were to describe those

"Of all the people that I sey,
I could not toll till Domesday."

A fine description is given of the palace gate:—

"I gan forth romen till I fonde
The castel gate on my right honde,
Which so well carven was,
That never such another n'as,
And yet it was by aventure
Ywrought by great and subtil our;e
It needeth not you more to tellen,
To make you too long dwellen,
Of these gates florishinges,
Ne of compases, ne of karvings,
Ne how the hoking in masonrys,
As carbettes, and imageries."

This long quotation, which is taken from Chaucer's "House of Fame," gives one some idea of a Mediaeval palace of very extraordinary splendour, and the question arises to one's mind, is the palace here described purely imaginary, or does it, to a certain extent, describe some building which was in existence in Chaucer's time, making allowances for poetical colouring and fancy, such, for instance, as the building constructed of "Beryl stone" without jointings, and its standing upon a rock composed of ice? Of course, it must be remembered that Chaucer had a considerable practical experience of palaces, for in July, 1385, he was appointed "clerk of the works" to the palaces of Westminster, and that within the Tower of London, and of certain works being carried out in the Royal manors of Kennington, Eltham, Clarendon, Cheam, Byfleet, Feckenham, and Windsor. It is true that he filled this office for only two years, according to Sir Harris Nicholas, yet that period, though it might not have given him the experience necessary as a practical builder, or a superintendent of works, would account for his knowledge of architecture, and would suggest the idea that his description of a palace might be founded upon ideas derived from existing edifices. Chaucer, moreover, was a good deal on the Continent. In early life, he got into trouble by joining the Wickliffites, and had to leave the country. He was also sent upon diplomatic missions to Lombardy and to France, and at various times he had visited Hainault, Zealand, and other parts of the Low Countries. We are not aware whether he was ever in Bohemia, though it is not improbable that he knew Prague, at any rate by description, as he was a protégé of Anne of Bohemia, Queen of Richard II., and his wife was a foreign lady attached to her household.

In the drawing we publish we have attempted to portray the sort of building which might have suggested to Chaucer the architectural description which he gives of "The House of Fame." With regard to the dome in the centre of the building it is certainly an unusual feature in Gothic architecture, but domes of this description, though uncommon, were certainly occasionally erected in the Middle Ages. That which crowns the tower of the Cathedral at Frankfort, and the one over the crossing of the minster church at Roëmond, are cases in point.

H. W. B.

MONTROSE MEMORIAL, ST. GILES'S, EDINBURGH.

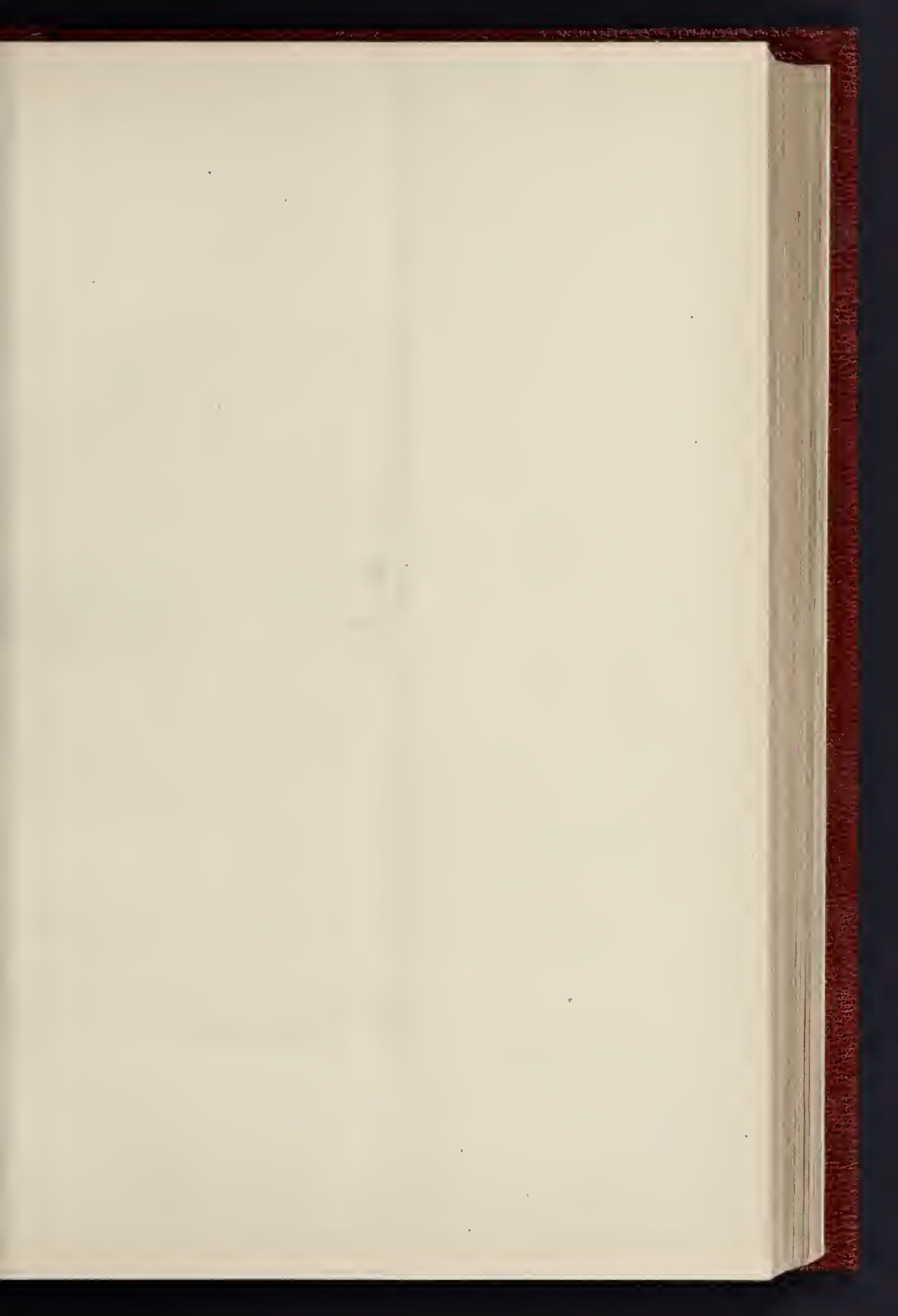
WE gave some description of this monument at the time of its erection (*Builder*, October 13, 1888, page 264). The engraving here given, made by Mr. J. D. Cooper from a photograph, shows the figure and some of the architectural detail contiguous to it; a sketch of the whole monument is added also.

The architectural portion was designed by Dr. Rowand Anderson, and the figure is the work of Messrs. J. & W. B. Rhind; so we are informed, though we do not well understand how two sculptors can be joint artists of one figure. However it was produced, the figure is fine and impressive in its attitude of armed repose; the architectural portion of the monument is effectively designed, and the whole is not unworthy of the remarkable man to whom, so long after his death, it has been erected.

A SCHEME FOR DINING ROOM DECORATION.

THIS is reproduced from a highly-finished water-colour drawing by Mr. Thomas W. Hay, which was exhibited in the Architectural Room of the last Royal Academy, when we commented on it in mentioning the architectural drawings. The design is mainly Greek, though there is a Pompeian flavour about the frieze

* The Memoir of Chaucer, by N. Harris Nicholas. Pickering, 1845.





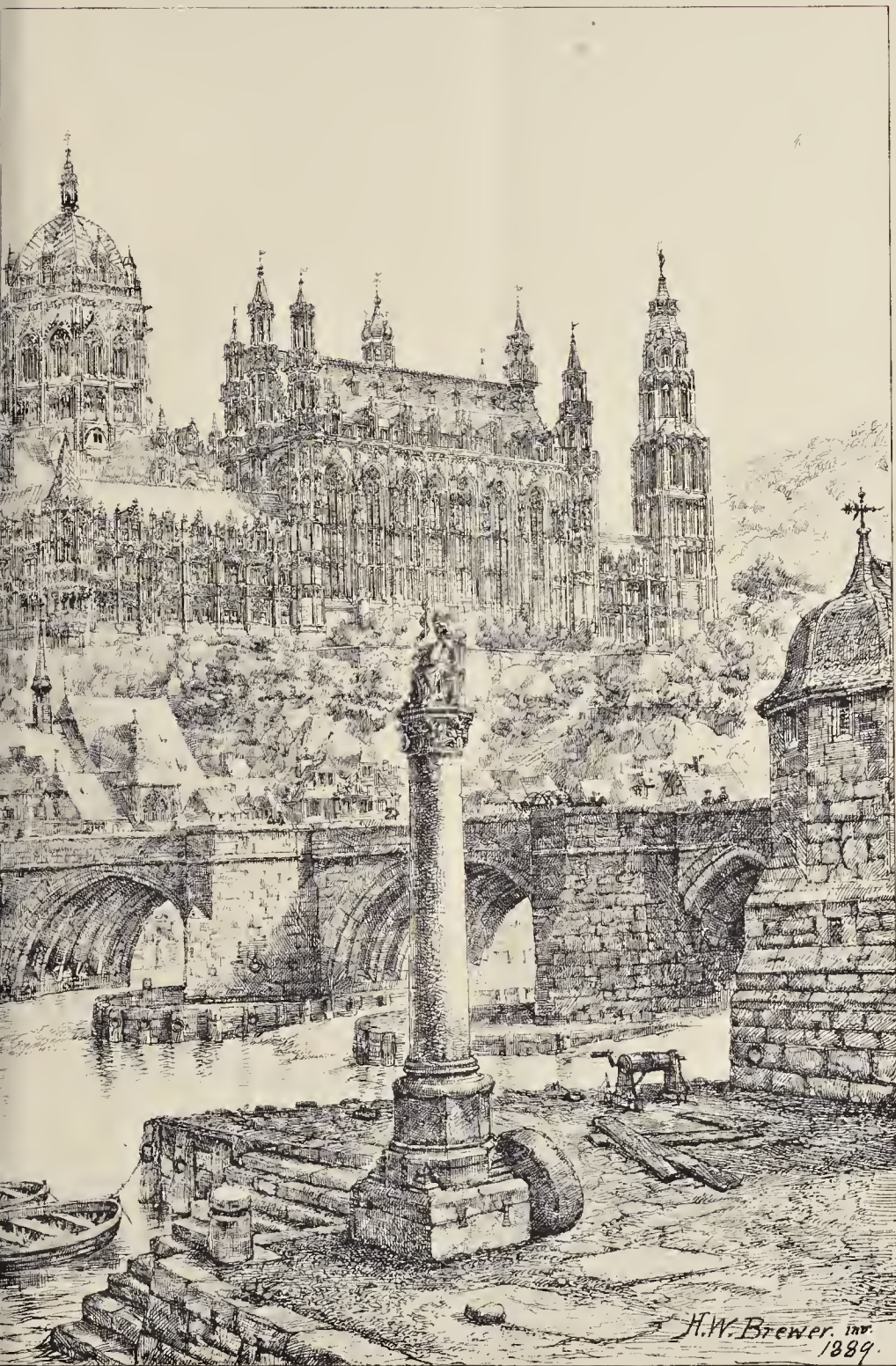
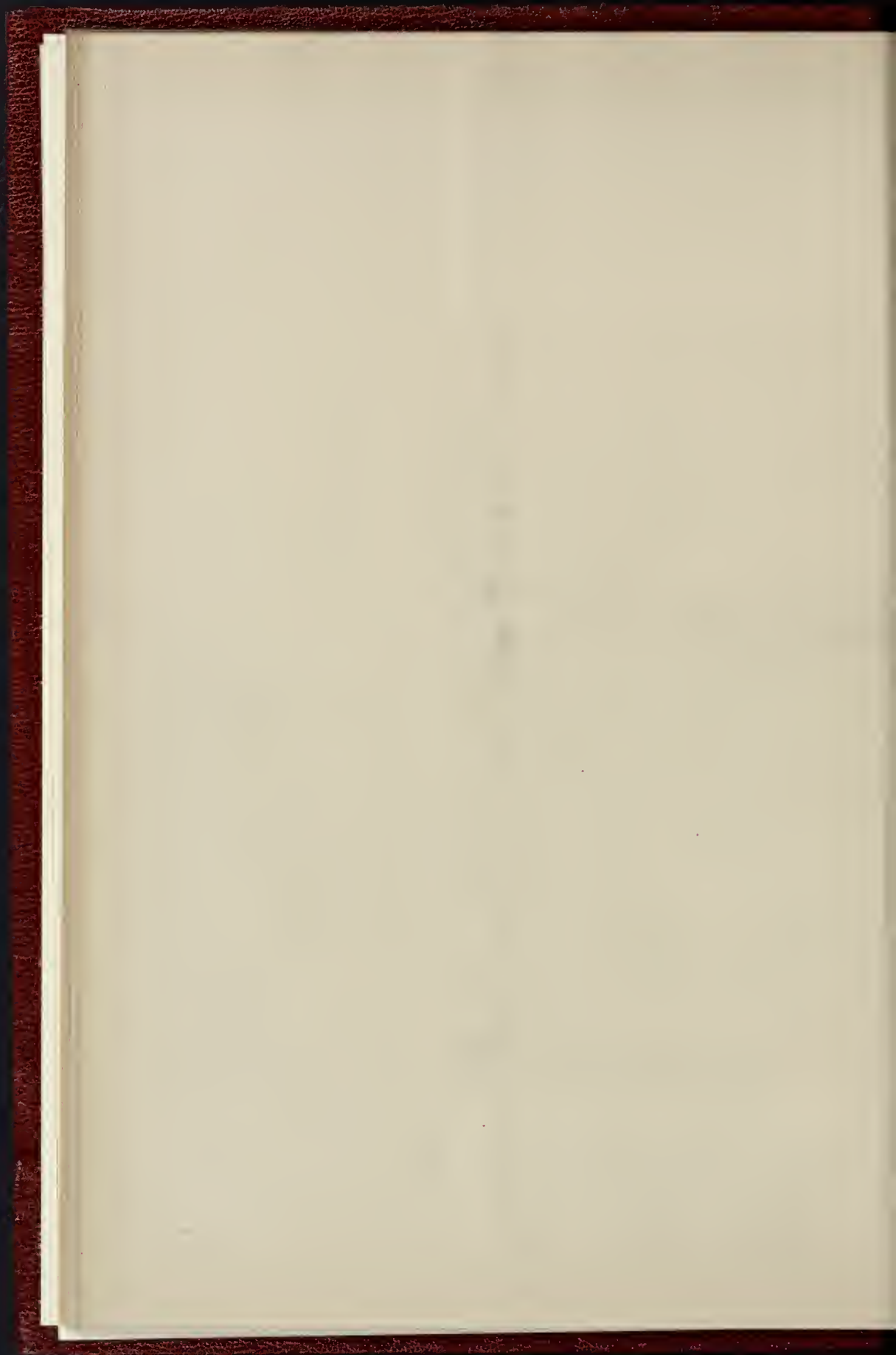
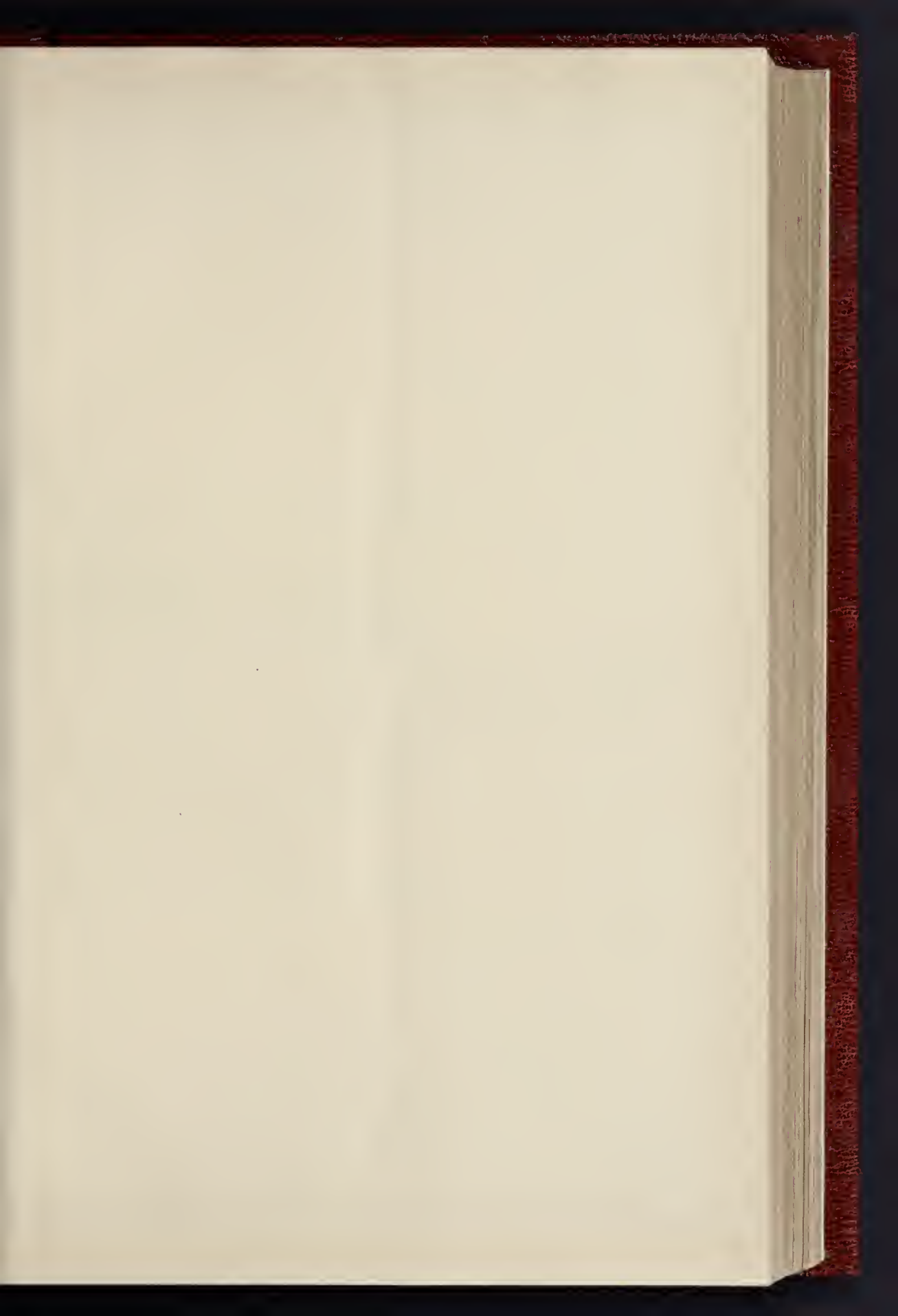
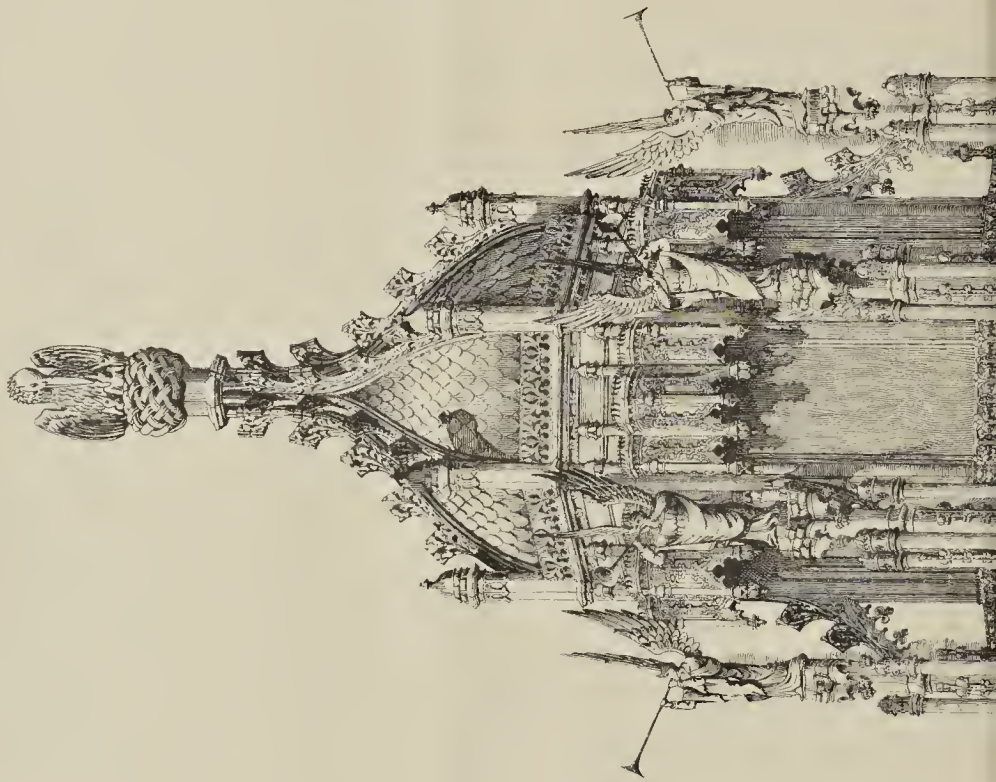


PHOTO LITHO SPRAGUE & CO. 22 MARTIN LANE CANNON ST. LONDON E.C.





THE BUILDER, JANUARY 4, 1890.



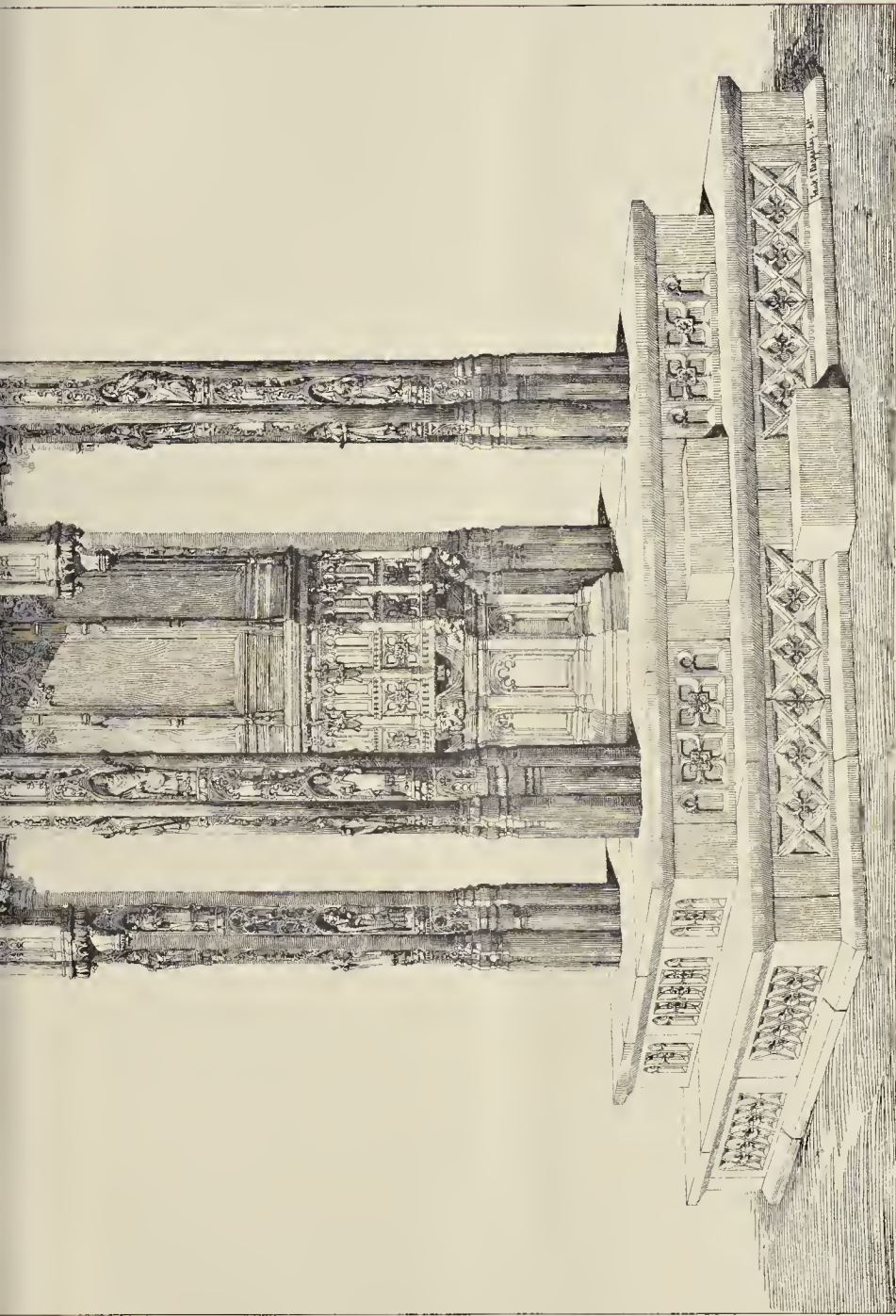
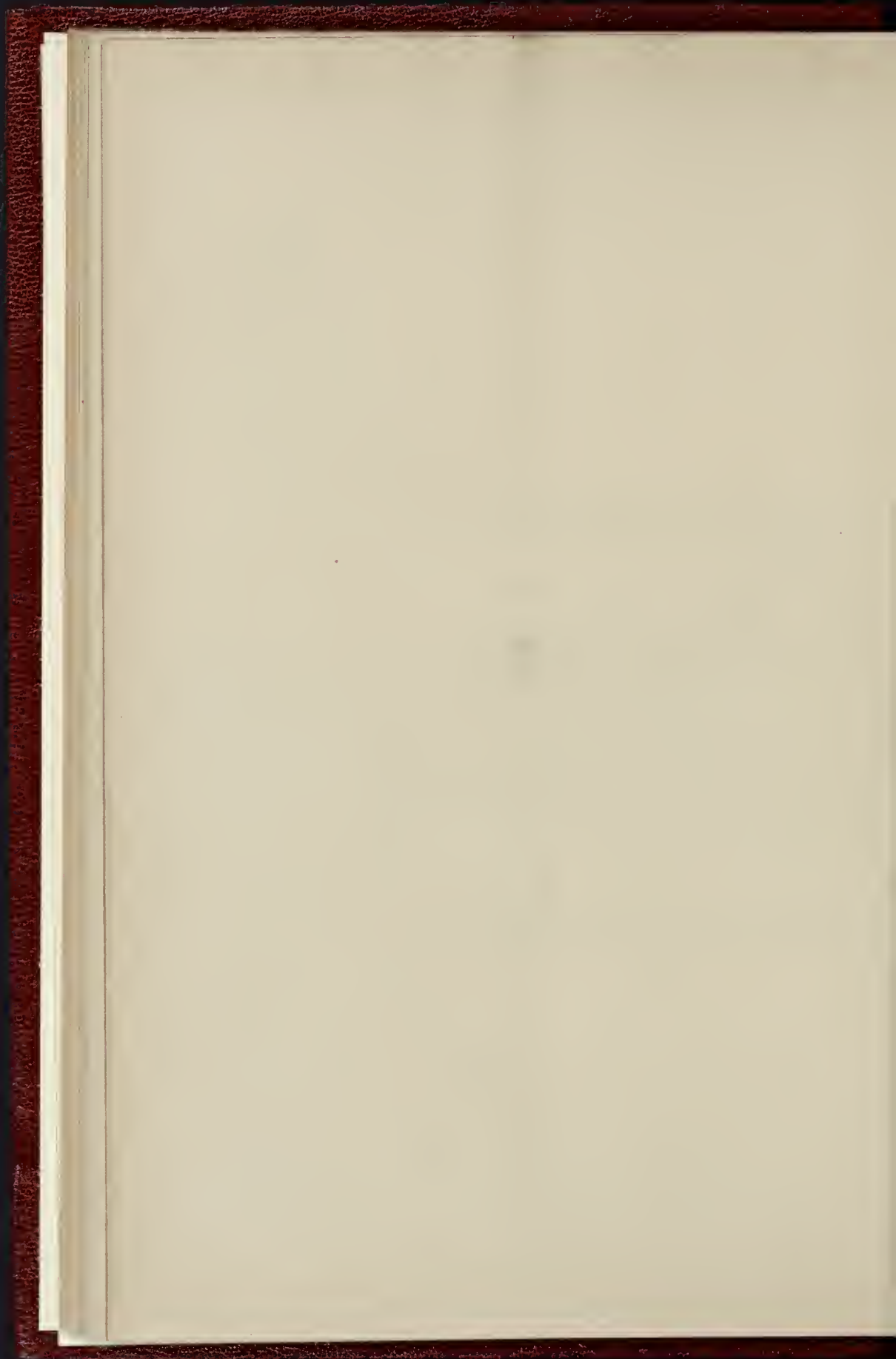
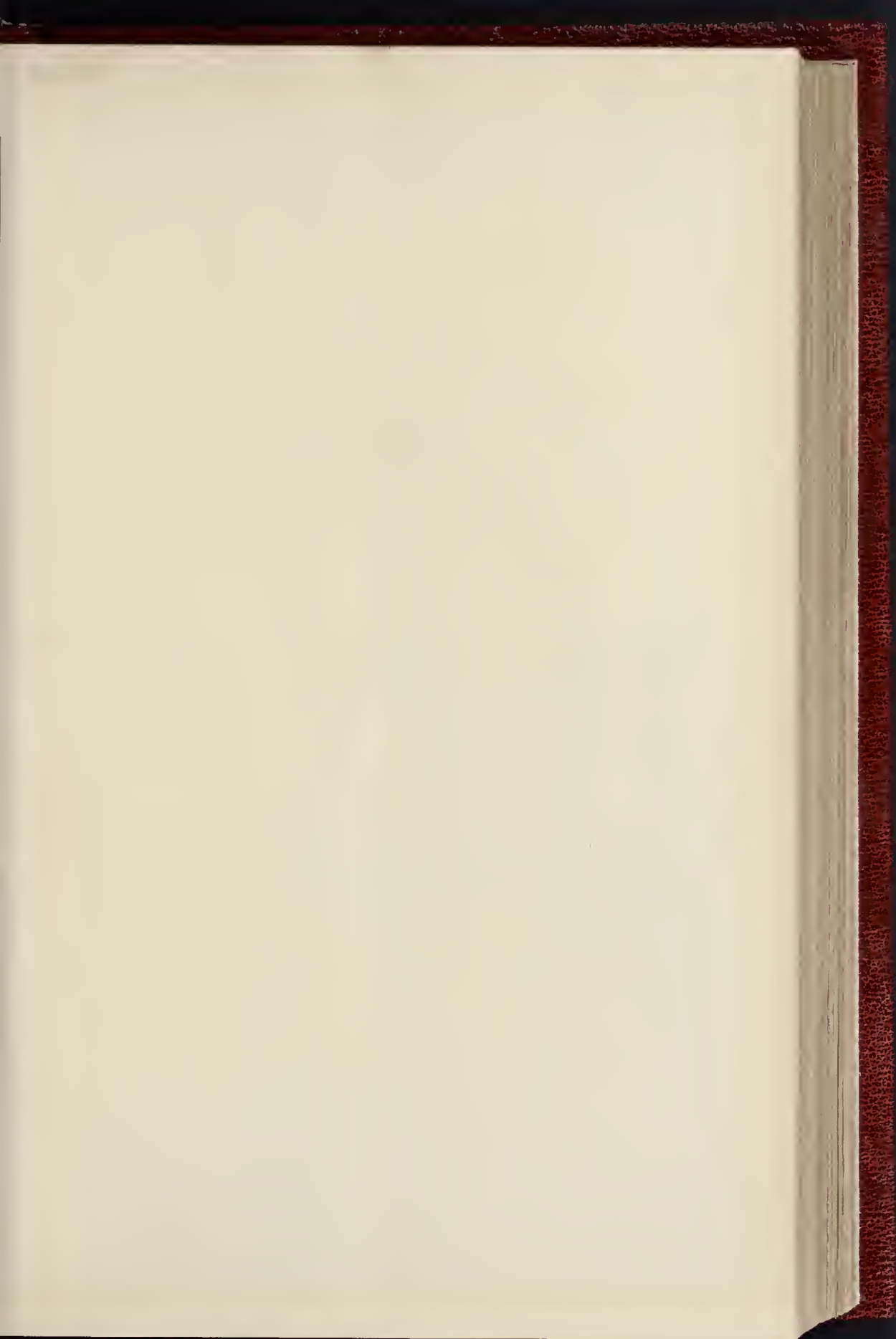
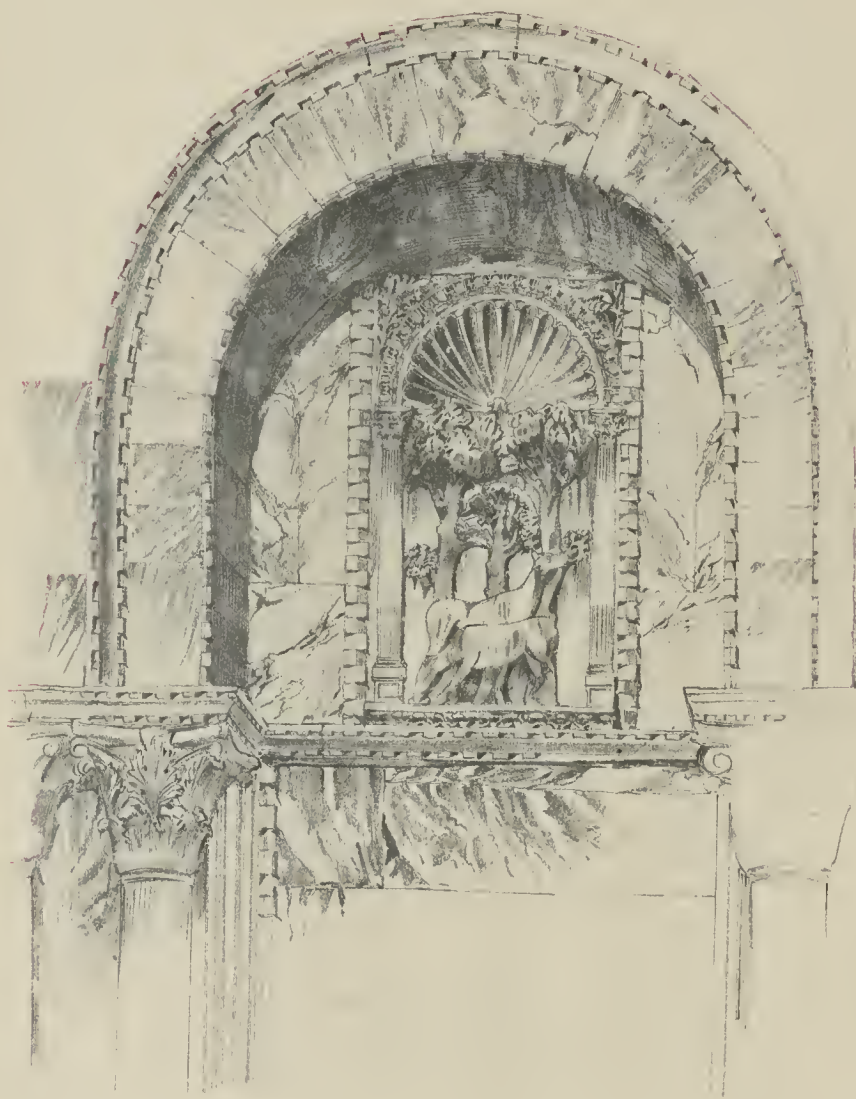


PHOTO LITHO. BRASIER & CO. 22, MARK LANE AND CANNON ST., LONDON.

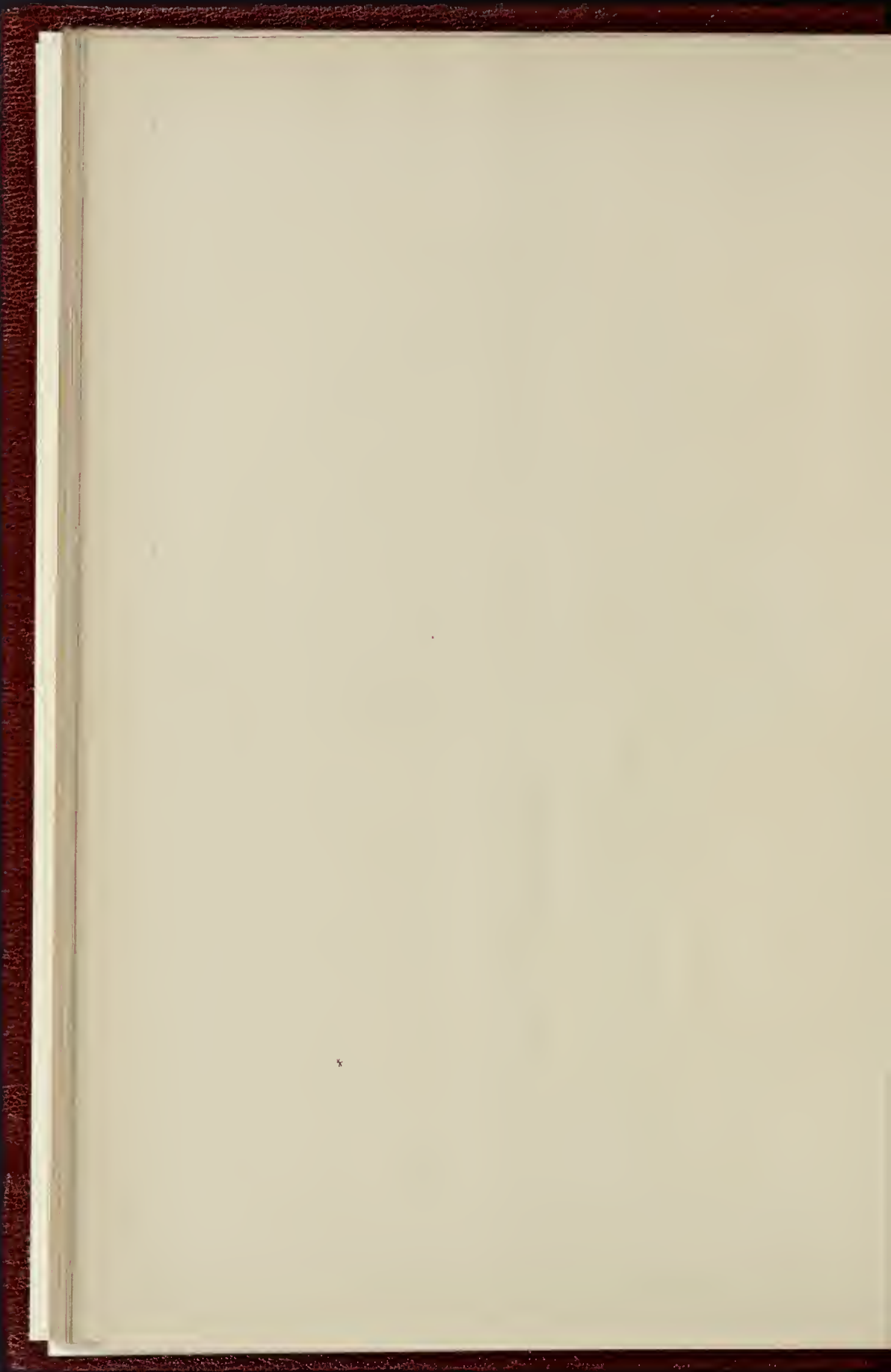
THE FONT AND CANOPY, ST. PETER MANCROFT, NORWICH, AS RESTORED.—MR. FRANK T. BAGGALLAY, F.R.I.B.A., ARCHITECT.

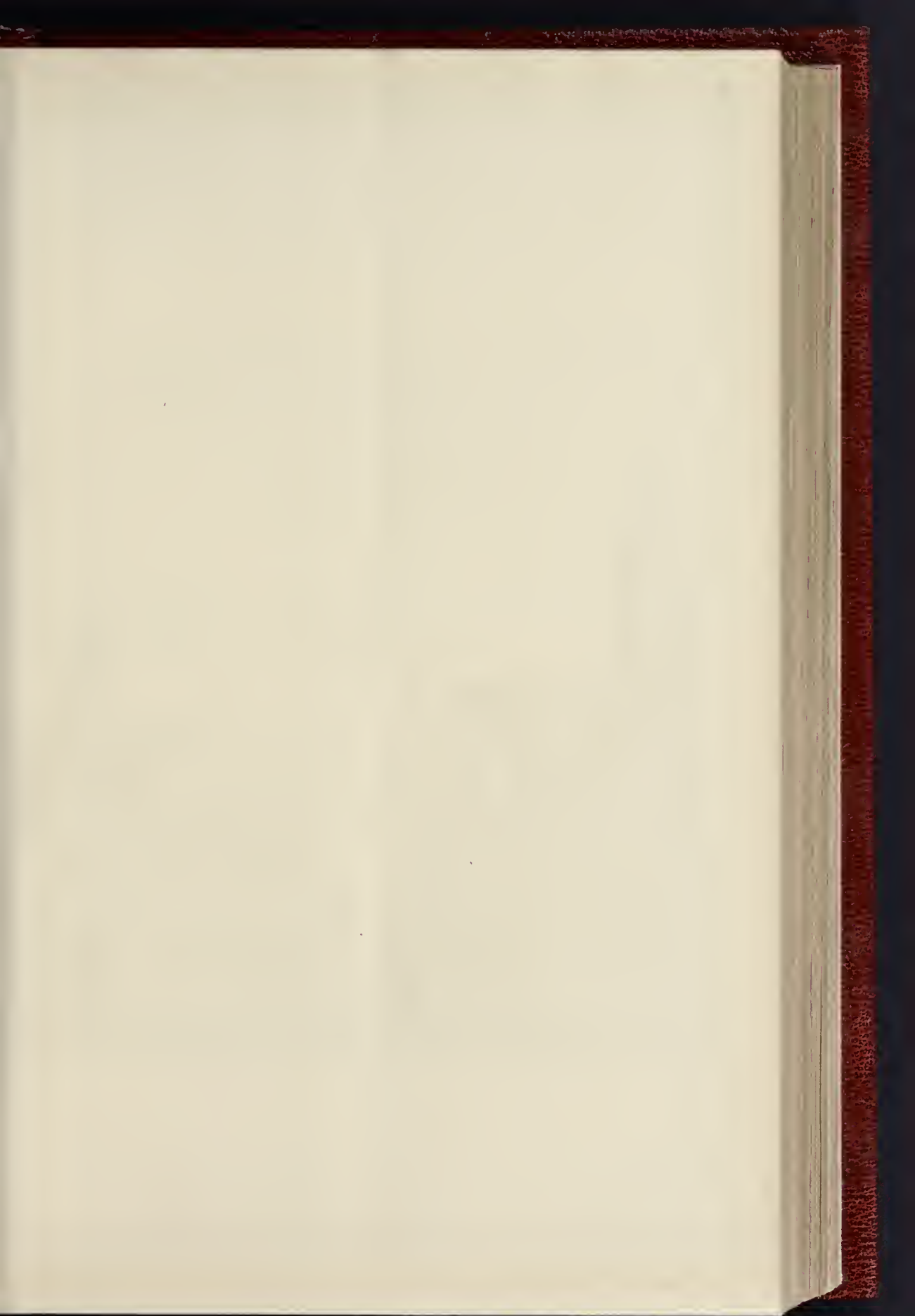






n. front S. Marks.
Venice. ++
Oct. 1887. * [initials] *







Stall & Chapel by G. E. Street. R.A. →

UPPINGHAM SCHOOL · NEW CLASS



OMS & MOUSE FOR THE HEAD-MASTER.

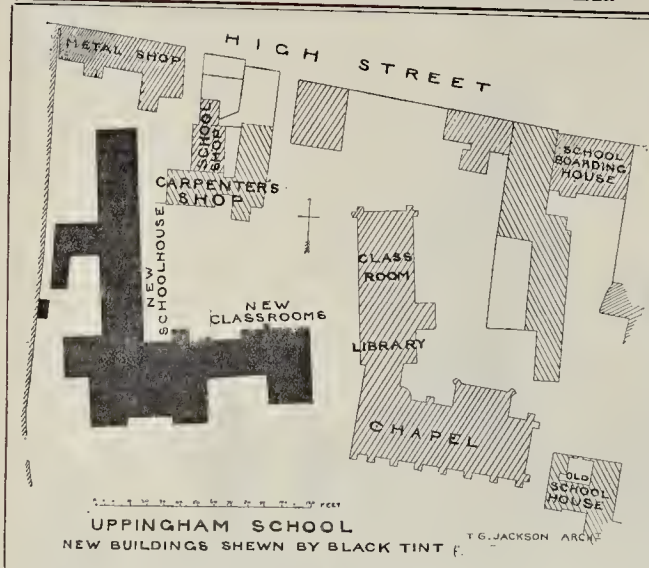
J. P. Jackson, Architect - Nov. 19, 1889

PHOTO. SPRAGUE & CO. 22, MARTINS LANE, CANNON ST. LONDON, E.C.



THE MONTROSE MONUMENT, ST. GILES'S CATHEDRAL, EDINBURGH.

(See engraving for figure and architectural detail.)



decorations. The coffers of the ceiling are decorated in gilding on a blue ground.
The drawing was one of the most effective of its class in the Academy Exhibition.

DETAILS, ST. MARK'S, VENICE.

The drawing of the capital, by Mr. Gerald Horsley, was exhibited in the Royal Academy Architectural Room, the year before last. The cap crowns a marble column in the north transept in St. Mark's; the carving is gilt; the ornament of the abacus is inlaid; and the soffit of the arch which it carries is decorated in mosaic. The other drawing, also by Mr. Horsley, represents a niche and emblematic sculpture in the north front of St. Mark's.

CHANCEL, HOLY TRINITY CHURCH, CHELSEA.

The drawing gives a sketch of the chancel of this church as it is intended to be finished, with the chancel screen and gates. The front screen is to be of marble, with wrought-iron gates and copper enrichments. The architect is Mr. J. D. Sedding.

UPPINGHAM SCHOOL, RUTLAND.

The new buildings for Uppingham School now in progress, from Mr. T. G. Jackson's design, consist of a school-house for the head-master, with accommodation for thirty-five boarders, and six class-rooms for the use of the school. They are so arranged as to form a quadrangle in conjunction with the hall and chapel, built by Mr. Street about twenty-five years ago.

The present head-master's house is a picturesque building, but inconvenient for its present purpose; it was originally the hospital for hedgesmen, which formed part of the foundation of Archdeacon Johnson in 1584. This ancient building will, of course, be preserved, though converted to other uses.

The general contractors for the new work are Messrs. Parnell & Son, of Rugby; and the heating and ventilation will be carried out by Messrs. Haden & Son. Mr. Evans is the clerk of works.

FONT AND CANOPY: ST. PETER MANCROFT, NORWICH.

The restoration of this well-known font-canopy was undertaken at the expense of a Norwich gentleman (who, unfortunately, did not live to see the completion of the work), as a memorial of her Majesty's Jubilee. The lower part of the structure, consisting of the octagonal platform, as well as its cresting and the four posts and four corresponding pendants, are original. Before the restoration they were thickly covered with black paint, and the

figures in the niches had been hacked out. A slight structure of no interest, which had once taken the place of the original font-cover, had long been out of use, and was roughly propped upon the platform, over the octagon opening through which the original cover must have slid up and down. Although a careful search was made, no drawing or description of the original upper part of the canopy could be found, and the restoration of the upper part and of the font-cover, which can be slid up into it when the font is in use, is purely conjectural, although founded upon the canopy at Trunch Church in the same county, which is believed to be the only similar structure in the country. The material is oak, and when the black paint was cleaned off it was found that the wood had been at one time coloured, though apparently very roughly, in red, green, and white, with gilt crockets, finials, &c., as is usual in late Medieval woodwork. The old font had lost, evidently by violence, every trace of ornament or moulding, and was replaced by a new one. Mr. J. E. Knox, of Kennington, executed the work with exceptional care and skill. The architect was Mr. Frank T. Baggallay.

ST. PAUL'S CATHEDRAL.

STR.—Hearing that Mr. Watts' design for another of the spandrels in St. Paul's had been executed in glass mosaic, I went round to see it on Saturday, but the day was so dark that the gas had to be lit. The composition seems to me to be very fine, the long sweep of the angels' scroll binding the whole composition together.

I was happy to learn that the remaining five were to be finished in mosaic as rapidly as possible; three more from the designs of the late A. Stevens, and the two others of St. Mark and St. Luke from those of Mr. W. Britten. Some years ago two beautiful dancing figures of his were engraved in the *Art Journal*, and so much did they please that they were at once annexed by an enterprising manufacturer, and we have seen in the last few years figure friezes of his in the exhibitions, so that we may confidently hope that his compositions will not be unworthy of their companions. It is a great deal to say, as the rest are the compositions of two of the great masters of their craft.

It is to be hoped that the rest of the decoration will be now taken in hand. A drawing, or, better still, a painted model, should be prepared, so that the whole tone of colour may be made, not only harmonious, but dignified,—no easy task, when the whole of the architecture is of a very light warm grey. If the composition of the parts were entrusted to able men, and the designs, when done, were submitted to the Royal Academy for criticism and

approval, we should be sure to have something worthy of the metropolis.

Jan. 1, 1890.

G. AITCHISON.

LIMITING THE HEIGHTS OF BUILDINGS

STR.—Mr. Somers Clarke (p. 463 in last week's *Builder*) writes in some dismay at the prospect of 70 ft. being fixed as the limit of the height of front walls in London, thinking that it would be better to arrange for gables and give-and-take adjustments in clause 70 of the new Bill. The clause must be regarded as the first step, and only the first step, in a new direction. The heights of new buildings in new streets of less width than 50 ft. are already determined by sec. 85 of the Act of 1862. Their height cannot exceed 49 ft. 11 in. in a street of that width if the front wall is brought out to the footpath. If it is set back, then the width of the forecourt may be added to the width of the street, in order to give the height of the parapet, or eaves, of any building, "except a church or chapel."

The principle of Mr. Whitmore's Bill once adopted, and the regulation of the heights of buildings in old streets and streets over 50 ft. in width once sanctioned by Parliament, many details will no doubt be dealt with logically as time goes on. We shall, however, all agree that the first step may as well be taken in exactly the right direction.

It will probably be considered undesirable to stop at the mere regulation of the height of front walls, for then ingenious persons will have no hesitation in arranging for roofs out of all proportion. If there are no limits to the heights of roofs, 70 ft. of front wall may occasionally be surmounted by 40 ft. (or more) of curb roof, sloping at the rate of 1 in. to the foot,—3 ft. 4 in. out of the vertical in four stories. This would be looked upon with nearly as much dislike as 110 ft. of vertical wall by the passer-by, and with much disfavour by many others.

Public opinion seems ready for the limitation of the number of dwelling-rooms in roofs,—although, perhaps, not ready for the prohibition of them, as in Vienna. Fearful events, due to large combustible roofs, may startle the world some day, and then, in place of placid acceptance of new legislation, there will be frenzied shrieks for it. Cannot something be done at once in Parliament, without the assistance of the shrieks?

A suggestion has been made that the limit of height should be the top of the topmost story (habitable), and that only two stories in roofs should be allowed. The practical working of this would be that, although the front walls might take any form which the building-owner desired, they would not be carried far above the top ceiling, except by people anxious to contribute to the adornment of our streets. Eccentricity of some sorts is a great trial, but might be tolerated for the sake of the better sort. Additional variety would also result from the London County Council allowing, under special circumstances and proper conditions, habitable rooms to be put at greater heights above the street (but only two stories of them in the roof in any case).

If the height to the ceiling of the topmost story was made the limit, an addition to 70 ft. might be argued for,—70 ft. is, however, no trifling height. It means, at least, six stories above the street level in a good dwelling-house, and reasonable people do not ask for more in any numbers. Rights of light, opposite and around, have to be controlled, and will probably always control, aspirations in many situations; but where there have been no fetters there has rarely been shown a desire for the fatigue of too much freedom. Public buildings must always be regarded as exceptional; and flats, probably,—though their future is as yet very uncertain. The whole subject of the general policy and details should receive careful attention from the profession, and all who are interested in the welfare of cities.

While recognising the comfort and efficiency of a consolidated Act, let me venture to suggest that the supplementing of existing Acts may prove, for the present, a prudent course for the Council. Each amendment is an experiment, and it may be well to obtain authority for novelties, and see the result; and a body new to the work may be pardoned for making haste slowly with heavy tasks. The pruning off of obsolete, and the introduction of new, provisions, the making of one Act, thrown into a

logical form, out of several Acts, is, however, to be hoped for.

It may be desirable in the future to have a new Act at periods of about fifteen years. If the Bill of 1870 could have been altered and passed in 1871 (sixteen years after 1855, when the Act was passed), we should have been entitled, at that rate of change, in 1885 to another consolidated and amended Act. In these quickly-moving days Building Acts should not be kept going after many defects have been discovered. A DISTRICT SURVEYOR.

10, BOW-CHURCHYARD.

Sir,—I observe in your last week's issue a "Note" on No. 10, Bow-churchyard. I described this house in the *Antiquary* for May, 1889, under the sign of the Maidenhead. I am aware that Messrs. Sutton & Co. used to print on their billheads the Royal arms and a bear's head, which they affirm to have been the sign of the house before the present system of numbering came into vogue, but I am inclined to think they are mistaken, as it seems unlikely that the title of a well-known and successful place of business would have been changed without apparent cause. At any rate I await further proof. I have examined the sign very carefully, and it bears no resemblance to a bear's head. One may be tolerably sure that the date is 1669. We know that this part of the city was consumed in the Great Fire, and the date on the eastern is corroborative evidence.

Here is another advertisement inserted from this house; it is inserted in the *London Journal* of 1724:—

"To all Shopkeepers.—At Cher's Printing Office, at the Maidenhead, in Bow Churchyard, shopkeepers' bills and bills of parcels are carefully engraved on copper plates. . . . Titles for Hungary water, directions for Duffey's elixir and the spirits of scurvy grass, funeral tickets in curious borders engraved on copper-plates, may be had the ready printed.

Also receipts for the King's taxes are printed and sold there, wholesale or retail."

I should like the question of the sign to be solved, and I believe the early deeds are non-existent. P. N.

CHURCH BUILDING NEWS.

Bournemouth.—New carved oak choir-stalls and reading-desks are shortly to be placed in St. Michael's Church, Bournemouth, from designs by Mr. Eginald Pinder, F.R.I.B.A. A contract has been entered into with Mr. Holmyard, carver, of Bournemouth, for the first part of the work.

Jesmond (Northumberland).—The chancel of St. George's Church, Jesmond, has now been elaborately decorated. According to the *Newcastle Chronicle*, the entire available wall space has been covered with mosaic, somewhat after the manner of the famous fifth and sixth century mosaics in the churches of Ravenna. On the north and south walls are ranged the twelve Apostles, on a line as to height with the three mosaic figures of Our Lord and the Archangels Michael and Gabriel, which form part of the original decoration of the east wall. At the south side, at the east end, the first figure is that of St. Peter with the keys; next comes St. Andrew with a cross; then St. James the Major, with a staff; next St. John, holding a chalice with a serpent issuing from it, alluding to the legend of his driving the devil in that form from a cup of poison; then St. Philip with a staff and cross; and last St. Bartholomew with a laying-knife, with which he is supposed to have been killed. Following on the north side first comes St. Jude with a halberd; next St. Simon, with a saw, with which he is supposed to have been cut in two; then St. Thomas, with a builder's rule; next St. James the Minor, with a club, with which he is supposed to have been killed; then St. Matthew, with a purse; and lastly, St. Paul (instead of Judas), holding a sword, thus completing the twelve. The background to these figures and to all the forms of ornament embraced in the scheme is of a deep blue, slightly varied in tone over the surface, giving a quality to the colour not possible when such tessera is of a precisely similar tint. The blue ground is carried above the figures for a distance of 2 ft., isolating the figures to some extent from the elaborate composition applied to the higher part of walls, and thus giving form and distinctness to the human element of the scheme. Above the plain surface of background comes a deep band of enriched conventional foliage, disposed in almost imperceptible gradations of colour, so that no part is aggressive, yet the flowing forms of ornament retain their value, and complete the decorative intention up to the wall string, level with the sills of the

clearstory windows. From this point to the roof cornice the space is covered with conventional ornament. On the east wall the same motive underlies the design. The spandrels over the arches to the organ chamber and the morning chapel are filled with figures of angels, having in each one wing outstretched to fill the triangular space of spandrel. The first angel bears the sword and crown symbolical of martyrdom and its crown; the second bears an orb and cross, symbols of Christianity dominating the world; the third and fourth angels represent acts of praise. The massively-pannelled wooden ceiling of the chancel is richly painted in a scheme of blue, ivory, and gold, each panel containing a separate design embracing the legends of the Pelican, the cross of Constantine, and the ingenious arrangements of freely-treated Medieval foliage, &c. The deeply-moulded ribs are overlaid with gold, the combinations giving a most sumptuous decorative result. The entire scheme of decoration is the work of Mr. T. R. Spence, the architect for the church, with the exception of the Apostles, the designs for which were prepared by Mr. C. W. Mitchell. The mosaics have been executed by Messrs. Rust & Co. of London, and the painted ceiling by Mr. C. S. Wardropper, of Gosforth. The whole cost has been defrayed by Mr. Mitchell, of Jesmond Towers, the munificent founder of the church. The cost of the church up to the present has been at least 20,000*l.*

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—I.

INTRODUCTION.

THE following articles are written for those who are already acquainted with such elementary facts and phenomena of electrical science as are fully explained in the many excellent little text-books now published on the subject, but who are desirous of acquiring, in an elementary form, some further knowledge of those branches of the science which are more intimately connected with "Electricity Supply" on a large scale.

Perhaps the simplest method of electrifying bodies, or charging them with electricity, is friction. If two dissimilar bodies are rubbed together, under proper conditions, they become electrified and will attract each other, but if a third body is electrified by contact with either of the rubbed bodies, it will then be repelled from the body with which it has been in contact.

Theories of Electricity.—To account for these facts Symmer suggested the theory that all bodies contain an imponderable fluid, which is a combination of two kinds of electricity—positive (+), and negative (—).

When these two kinds of electrical fluids are present in precisely equal quantities they exactly neutralise each other's effects; but, when a body becomes electrified, it possesses an excess of one or the other of these fluids, and is said to be positively or negatively electrified according as there is present an excess of positive or negative electricity.

This is known as the *two-fluid theory*. Between two bodies similarly electrified there is repulsion, but between a positively and a negatively charged body there is attraction.

It was observed, however, that positive electricity could not be produced without the production of an equal quantity of negative electricity. This fact led Franklin to propose the *one-fluid theory*, and to regard the process of electrification as the transference of electricity from one body to another. A neutral or unelectrified body must, by this theory, be regarded as possessing a certain normal amount of electricity (generally assumed positive), and when a body becomes electrified it is by a second body transferring electric fluid to or taking some from it, hence the expressions positive or negative, implying excess or defect.

Fauly as both these theories may be, they have at all events provided terminology for speaking of and describing certain electrical effects, while avoiding the necessity of any very precise explanation of what electrification really is. But the insufficiency of the old fluid theories is immediately felt the moment the effects, external to charged bodies or to bodies in which electricity is in motion, are considered.

If two bodies, A and B, are placed under the

exhausted receiver of an air-pump and charged, say positively, they repel each other, although there is no material connexion between them. The idea that A can act on B across absolutely empty space, in other words, "action at a distance," becomes the more inconceivable the more it is thought about; to a metaphysician the conception may be possible, but to a thinking physicist such a conviction becomes less and less possible. The real means of communication between A and B may as yet be undiscovered, but that a connexion does exist is felt to be a certainty by at all events the vast majority of those who have given careful thought to the question.

Modern theories of electricity are unhappily far from complete, nor can any attempt be made in a short elementary paper to discuss them; but the following theory is at least nearer the truth than the older ones, and will prove useful by affording some explanation of the electrical phenomena to be hereinafter described.

Electricity may be regarded as an incompressible continuous fluid, which permeates not only all matter,—solid, liquid, or gaseous,—but which fills all space. As matter is built up of material molecules and atoms, so may this fluid be conceived as consisting of electrical molecules and atoms; but though these molecules are absolutely incompressible, they are capable of distortion, and when distorted tend to recover their normal condition. Thus, while a given quantity of electricity cannot change its volume, it is capable of *strain*, and possesses *elasticity*.

In space these molecules of electricity are entangled with one another, or are connected like the surfaces in friction gearing, so that free translation, or the slipping of one molecule past another, is impossible; one molecule cannot even rotate without rotating those next it, but this entanglement or friction is modified by the immediate presence of matter; hence the set of electrical phenomena that can be produced by the aid of suitable arrangements of material, such as, for instance, different kinds of metal in an acid solution, effects that cannot be produced in a vacuum or air alone.

How this continuous incompressible fluid can permeate all matter, and above all how matter can freely move through it, it is difficult to see. These difficulties, however, must not condemn such a theory, for we believe in the truth of many things that are just as difficult to understand. Light comes to us from the sun by means of vibrations in the ether, and recent experiments seem to prove conclusively that all electrical effects are due to this same ether,—briefly, that electricity is ether.

That we can see the sun through a solid piece of glass or feel the heat from a fire through a solid piece of crystal are strange facts, but we nevertheless have no hesitation about believing them. In the same way, then, must be accepted the facts that ether or electricity can go through solids and that solids can go through ether or electricity.

The general and apparently contradictory properties of ether have been well-known and accepted for many years, but the connexion between electrification and ether is a comparatively recently-developed theory.

Returning to the three cases of attraction and repulsion by which alone electricity at rest makes itself manifest. In case (a) (fig. 1,

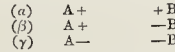


Fig. 1.

suppose A to be a body, say an insulated pith ball, charged positively; that is, the pressure of the electricity within it has been increased above its normal value, so that the pressure on the entangled electricity in the space around it is increased on all sides, though equally; it does not, therefore, tend to move in one direction more than another. The pressure, or "potential" as it is usually called, in the surrounding medium falls to its normal amount as we recede from A, and does so at an equal rate in all directions.

If a second positively charged body, B, is placed near A, the pressure in the space between A and B does not fall as it does in going in any other direction from A. In other words, the electricity in the space between A and B is more squeezed up than in any other direction, and, being in an entangled state, it is not free to re-establish uniformity of pressure; the result is that A is pressed outwards from B, and, since

matter can pass freely through electricity, A moves away from B unless prevented mechanically from doing so. In case (B) B is charged negatively—that is, the pressure of electricity in B has been lowered, and the electricity between A and B is squeezed together less than in any other direction, and A is pushed more from the side farthest from B than on the side nearest to B: hence if A is positively and B negatively electrified A is attracted to B. Finally, in case (γ), since excess of pressure in A causes it to be urged towards B, defect of pressure or negative electrification will cause it to be repelled from B.

It may be here stated, once and for all, that what might be called the full working details of electricity are not yet understood, and any one who is for the first time regarding electrical phenomena as due to the action of the ether must not feel discouraged if he cannot exactly picture to himself how the ether produces the effects that, with little doubt, it does produce. When two bodies or parts of a system act on one another any theory which supplies a connecting medium must be easier to understand than "action at a distance," which is un-understandable, and it will be seen that this idea of an all-permeating incompressible fluid affords very beautiful explanations of the magnetic and electro-magnetic effects with which these papers will chiefly deal.

Books.

Encyclopédie de l'Architecture et de la Construction. Directeur, P. PLANAT. Vol. iii., premier fascicule. Paris: Dujardin et Cie.

THE first portion of the third volume of M. Planat's dictionary takes us to "châteaux" (monuments), including the important subjects "château" and "chapiteau"; the former written by MM. A. de Rochas and G. Espitalier, the latter by M. Adrien Joly. As in the case of other historical articles to which we have referred, the article "château" is treated from a purely French point of view. In regard to the earlier development of the château into a mansion there is no doubt some excuse for this, as the peculiar type of the Francis I. château, a mansion retaining some castellated characteristics, was in the first instance a French development imitated in other countries. But as the article comes down to later periods the reader is still to be left under the impression that there are no buildings of this class worth taking account of out of France. In the later developments of the word "château" signifies the same class of building which in English is designated as "mansion," but not a single English or German mansion is alluded to or illustrated in any way; such monuments as Heidelberg and Kenilworth have no existence apparently for the French editor, and the Villa Caprarola is the only Italian one that is named. Under "château militaire" it is just the same, only a few French examples are given, and even a building so historically important as the Tower of London is not alluded to. On the other hand, "Chantilly" has fourteen pages to itself as a separate subject, the article being written and the illustrations furnished by M. Horace Daumet, the restoring architect.

The article "Chapiteau" is very well treated in regard to the Classic or antique portion of the subject; that is a class of subject which a French architect always goes into *avec amour*. But the Medieval capital is much less fully treated, and here again every example is from French Gothic, and the student will never learn from this book that English Gothic had a very distinct character of its own in the treatment of capital foliage in Transitional and Early Gothic periods; and the characteristic types of Norman and Early English moulded capital are entirely left out of sight and no hint or illustration of them given. In short, M. Planat had much better frankly alter the title of his publication before going further, and call it "Encyclopédie de l'Architecture Française." As such it will be, we have no doubt, a most full and admirable work of its class; but it is rather a misnomer to give the title of "Encyclopédie" to a work which, except in regard to Classic antiquity, recognises no architectural style and no architectural monuments except those of the Editor's own country.

The Science of Building. By E. WYNDHAM TARN, M.A. Third edition, 1890. Crosby Lockwood & Son.

THIS book contains many useful suggestions

practically expressed, and is one of the best elementary hooks upon construction suitable for the requirements of architectural students. The second edition underwent a thorough revision, and to the present edition tables of the strength of timber, steel, and stone are added. Rules for finding the strength of iron struts and struts of the most usual form of section are given. The friction of water in pipes and principles of ventilation are also alluded to. The work supplies instruction in general mechanical principles; construction of retaining walls, arches, cupolas, and spires; classification, composition and strength of building stones, timber, iron and steel; in short, it may be said that while the book is not exhaustive, it contains in an intelligible manner a very fair epitome of information which could otherwise only be obtained by a perusal of various large and expensive works. Wherever possible, an example of the practical application of a theorem is introduced.

The author's investigations of the thrust of Gothic arches, he reminds us, were first published in the *Builder* for March 31, 1866, and his geometrical process for approximately obtaining the thrust of an arch and the requisite thickness of a pier, was published in our pages, dated December 28, 1867.

The author deserves credit for quoting his authorities, and a copious index concludes the volume.

A Primer of Sculpture. By E. ROSCOE MULLINS. With illustrations. Cassell & Co.; London, Paris, New York, and Melbourne; 1889.

THERE is a great inclination among many people at present, young people especially, to dip amateur hands in the mysteries of sculpture; and we presume it is for the benefit of these aspirants that a *Primer of Sculpture* is called for. Considering that there is perhaps no form of art in which mediocrity is so entirely intolerable as sculpture, and few which make such demands on those who would gain any real excellence in it, we feel some doubt as to the wisdom of offering this kind of encouragement to amateurs to fancy themselves sculptors. The book may, however, serve well as a first instructor for a beginner who wishes to test, or whose friends wish to test, his possession of any such natural powers as would justify him in devoting his life to sculpture.

General principles of working are very clearly and simply set down, and clear directions are given as to the practical requirements in working in clay, building up a life-size model on a proper foundation, plaster casting, &c.,—all this is useful to a beginner who is going to try his hand without a teacher, if there are any so bold. How completely "primary" is the little treatise may be judged by the fact, that the subject of "anatomy" is disposed of in a page and a half, with references to one or two books by the help of which it may be studied.

Taking it for what it is, however, it is well done, and probably the talented sculptor who is the author of it knows as well as any one else that no one will become a sculptor by this means, as indeed he implies in his opening sentence. Perhaps the best recommendation of the book really is, that it gives in a clear manner some general information concerning the process of an art about which many people, even without aspiring to practise it, feel an interest and a desire for knowledge, which Mr. Mullins has imparted in a very agreeable and readable form.

Blackie's Modern Cyclopædia of Universal Information. With numerous pictorial illustrations, and a series of maps. Edited by CHARLES ANNANDALE, M.A., LL.D. Vols. iii. and iv. Blackie & Son, London, Glasgow, Edinburgh, and Dublin; 1889.

THE fourth volume of this Cyclopædia, the earlier volumes of which we have previously noticed, takes the reader well on into the letter I, and from the prompt way in which the successive volumes are appearing we may expect that this Cyclopædia, issued in successive instalments, will really be finished, and within a reasonable period, in which point at least it will have the advantage over some more ambitious works of the same class. The work seems to be quite keeping up to the standard of the first two volumes. The articles on various subjects connected with architecture, though necessarily brief, are well and correctly done as far as they go. Under "Gothic Architecture" a little too much stress is perhaps laid on

the window design of the various English styles, correct illustrations of which are given as identifying the separate styles, which is however perhaps the readiest kind of landmark for the general reader in a dictionary where space cannot be afforded for more varied illustration. It is not quite correct to say that William of Sens introduced the Pointed style into England; it was introducing itself in the transitional abbey arcades before that. Under the head of Greece there is a very fair sketch given in a short space of the characteristics of Greek architecture, and the subject of the correction of optical effects by curvature of the architectural lines is mentioned; a kind of detail not generally found in a popular cyclopædia. The short definitions of "Doric" and other architectural terms are also sufficiently attended to. For its size and scale, the Cyclopædia will be a very useful work.

Mensuration Made Easy; or, the Decimal System for the Million. With its application to the daily employments of the artisan and mechanic. By CHARLES HOABE, Nineteenth Edition. London: Effingham Wilson & Co. 1889.

THE author of this work advocates the use of the decimal system, and has endeavoured, as he states in his preface, "to divest the subject of every difficulty," so as to render it available to the most humble aspirant, and especially to adapt it to the daily employments of the artisan class. Tables of a copious nature are appended at the end of the book, with an explanation of the terms employed,—"terms" being defined by the author as the "Alphabet of Science." We think that, as the author has taken the pains to show on page 83 the method adopted for finding the geometrical mean between any two numbers, and has exhibited the application of such a calculation on page 49, that he would not have exceeded the scope of his object by adding to the Table of Square Roots and Cube Roots the methods by which these results are arrived at. The author expresses the belief that decimal coinage must eventually come into operation in this country.

VARIORUM.

"THE Insurance Year-Book, 1890" (London: Simpkin, Marshall, & Co.) is the fifth annual issue of a very useful work of reference. The present edition more than maintains the excellence of its forerunners, of which we have had occasion to speak in terms of commendation. With regard to the cheap edition, its usefulness would be somewhat increased by printing its title on its back.—"The Gas Engineer's Pocket Almanack and Lighting Table for the Year 1890," issued by Messrs. William Sugg & Co., Limited, London, is a very useful production, and notwithstanding the fact that it is largely occupied with descriptions and illustrations of Messrs. Sugg's many meritorious appliances, it also contains a great variety of information which should certainly be known to all gas-engineers, if not to all gas-fitters and gas-users. We hardly know, though, whether we are right in using the phrase "gas-fitter" now, for just as the plumbers have dubbed themselves "sanitary engineers," the gas-fitters are beginning to call themselves "gas-engineers."—"Sprague's Pocket-book and Diary for Architects and Surveyors" for 1890 (London: Sprague & Co., Martin's-lane, Cannon-street) appears this year in a slightly different cover, but its very useful contents are similar to those of previous issues.—From Mr. Robert Dunthorne, of Vigo-street, we have received a tiny "Calendar for 1890," for carrying in the purse or waistcoat-pocket. Small as it is, it is an admirable specimen of "art-printing" in colours. Opposite to the calendar for each month is a well-executed wood-cut with the appropriate zodiacal sign, treated heraldically. This miniature production is described in the "imprint" as "Made by W. H. Hooper for Robert Dunthorne. Printed by R. & B. Clark, Edinburgh."—The *Field Club* is the name of a new threepenny monthly magazine, edited by the Rev. Theodore Wood, and published by Mr. Elliot Stock, 62, Paternoster-row. Its sub-title is "A Magazine of General Natural History for Scientific and Unscientific Readers." No. 1, for January, contains some interesting articles, and it is nicely printed on good paper. It deserves to succeed.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

106, Chimneys, Chimney-top, &c. E. Hutchins.

According to this invention, a cowl which revolves is so fixed that it, or part of it, may be raised or lowered by a chain which is designed to act as a cleaning chain and to remove soot or obstructive deposit which would otherwise prevent the perfect action of the apparatus.

1,268, Saws. W. Lorenz.

The body of the saw, which is the subject of this patent, only acts as a holder or carrier for changeable cutting edges, which are fixed in grooves or upon heads on the saws or cutters by sliding upon cylindrical-formed ribs or seats on the saw. No springs, screws, pins, or other fastening is employed, and the teeth are preferably made to hump in their rear ends against the next tooth-holder, the front end being left free and formed at an angle suitable for the particular cutting operation.

1,732, Drying or Seasoning Timber. J. W. Scott.

This invention consists in the employment of novel devices whereby a current or currents of air of any desired temperature is, or are, compelled to circulate in such a manner that the air is forced into contact with all the outer surfaces of the pieces of timber or other substances placed in position to be operated upon, and that without depending upon the natural laws governing heated air. Suitable air chambers, with perforated covers, are placed in a building, and air forced over the substances by means of fans. In the case of substances of irregular contour, sheets of fabric are used which deflect the current over every part.

1,863, Sliding Flush Bolt. C. F. Hall.

The bolt which is the subject of this patent is provided with a device by which the rod of the bolt can be raised or lowered without injury to the fingers, and can also be made self-locking, so that it cannot be pushed back from the outside. The automatic fastening is effected by a counterpoise, and the opening is effected by moving a finger-bolt, which turns freely, and is in itself part of the fastening.

16,941, Block Paving. H. D. Blake.

In this system of paving a kind of groove or slot is formed laterally around the blocks, which, when the blocks are laid in place upon the roads or ground, enables them to be keyed together in one piece by the introduction into the joints of a suitable cement or mortar. The blocks are portable, and can be quickly and easily laid by inexperienced workmen without the use of special tools or machinery.

17,067, Wood Screws. C. D. Rogers.

The point portion of the screw combines a plain or unthreaded centreing part which first enters the wood or material into which it may be inserted, and a screw thread, which commences at the base of the plain part of the point, and extends backwards in a gradual increasing curve, till it reaches the base of the point where it unites with, and forms part of, the full thread formed on the cylindrical or body portion of the screw. By means of a point thus formed, the screw may be first entered true and centrally into the wood by a slight blow, the resistance offered being very small, after which it is driven home by a screw-driver in the ordinary way.

NEW APPLICATIONS FOR PATENTS.

Dec. 16.—20,175, B. Pyhus, Door-spring.—20,207, R. Painter, Raising and Lowering Windows.

Dec. 17.—20,240, A. Linford and others, Sash-fasteners.—20,254, S. Eaton and others, Chandeliers.—20,279, A. Chorley Butt, Hinge.—20,294, O. Imray, Metallic Fireproof Structures.—20,303, C. Smith, Artificial Asphalt.—20,307, J. Lorrain, Ventilation, &c.

Dec. 18.—20,341, H. Latham, Fireproof Fire-escape.—20,342, F. Wright and T. Gillott, Flooring for Bridges, &c.—20,344, G. Byrdill, Chisels.

Dec. 19.—20,410, W. Cowlin, Opening or Closing a pair of Double Doors simultaneously.—20,452, G. Hayes, Metallic Lathing.—20,454, D. Hunter, Fences and Gates.—20,497, W. Tattersall, Ventilating, &c.—20,470, J. Campbell, Drying Kilns.—20,510, R. Shapland, Drying, Heating, Ventilating, Timber Drying, &c.—20,518, W. Eckersley, Water-waste Prevention Cisterns.

Dec. 21.—20,528, E. Young, Preventing the rattling or shaking of Window-sashes.

PROVISIONAL SPECIFICATIONS ACCEPTED.

4,730, W. Townsend, Chimney-pots.—7,840, B. Boshier, Carpenter's Compasses.—16,715, J. Keighley, Ventilators for Chimneys.—17,243, E. Hollanders, Door Locks.—17,357, D. Bryce, Wall-braces.—18,622, M. Davidson, Floor and Pavement Lights.—18,765, G. Hall, Brick-making Machinery.—18,862, H. Sutcliffe, Water-closets.—18,866, M. Goodwin and W. Doorwood, Flooring.—19,091, F. Rondell, Attaching Sash-cords to Windows.—19,113, F. Lawrence, Connecting Taps with Pipes.—19,468, S. Bott, Sash-fasteners.—19,481, M. Moore, Chimney Dowsels.—19,500, J. Hamblin, Fences and Gates.—19,527, J. and M. Mann, Kitchen Ranges.—19,783, H. Cowan, Window-

fastener.—19,872, J. Bredeland H. Zulau, Closing Doors.—19,885, J. Miller, Door-locks or Latches.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

234, A. Hidge, Opening and Closing Fanlights, &c.—615, A. Day and F. Green, Window-sash Fasteners.—2,692, W. Poole and A. McDonald, Testing Joints and Drainage Pipes, &c.—2,817, W. Laycock, Opening, Closing, and Securing Windows, &c.—2,889, W. Davis and J. Donnell, Grinding and Polishing Marble, &c.—2,946, H. Lake, Brick-making Machines, &c.—2,993, J. W. and R. Mathieson and A. Turnhill, Stoves and Cooking-ranges.—3,190, G. Dickison and W. Brodie, Water-closets and Traps.—4,087, F. Lane, Horizontal Saw-frames.—7,109, A. Rammage, Fireproof Partition for Building Construction.—17,199, D. Mersing, Veneer Saws.

RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

DEC. 18.—By CHINNOCK, GALSWORDY, & CO. (at Taunton).
Taunton, near—The Norton Manor Estate, containing 948, 397, 1, &c. a.c. £38,000
Dec. 19.—By DYER, SON, & HILLON (at Woolwich).
East Wickham—Four cottages and 4a. 2r. 2ip. l. r. £61, 16s. 745
By WISEFOLD & HAYWARD (at Dover).
Dover—49, Military-hill, l. r. £15, 15s. 259
2, Bowling Green-hill, l. r. £15, 15s. 175
14, Down-st., rt. 81 yrs., &c. £2,000 270
Buckland, Oswald-pl.—Three plots of land 140

[Contractions used in this list.—E.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

MEETINGS.

SATURDAY, JANUARY 4.

Association of Public Sanitary Inspectors.—The Rev. Arthur Roberts, M.A., on "Human Homes for the Poor, the Question of the Hour" (Carpenters' Hall, London Wall). 6 p.m.

Royal Institution.—Professor A. W. Ricker, M.A., F.R.S., on "Electricity" (adapted to a juvenile audience). 11. 3 p.m.

MONDAY, JANUARY 6.

Surveyors' Institution.—8 p.m.
Clerks of Works' Association (Carpenters' Hall).—Mr. W. Brown on "The Construction of Treaties." 8 p.m.

Liverpool Architectural Association.—Mr. J. L. Thorncroft on "Monumental Brasses, with special reference to the towns of Lancashire and Cheshire." 7 p.m.

TUESDAY, JANUARY 7.

Royal Institution.—Professor A. W. Ricker, M.A., F.R.S., on "Electricity." 8 p.m.
Glasgow Architectural Association.—Mr. F. M. Miller on "Domestic Furniture."

WEDNESDAY, JANUARY 8.

Civil and Mechanical Engineers' Society.—(1) Annual General Meeting for Presentation of Accounts. (2) Mr. H. H. Parkinson on "Prices for Labour and Material in India." 7 p.m.

THURSDAY, JANUARY 9.

Royal Institution.—Professor A. W. Ricker, M.A., F.R.S., on "Electricity." 8 p.m.
Edinburgh Architectural Association.—Mr. J. Balfour Paul on "Some Early Scottish Architects." 8 p.m.

FRIDAY, JANUARY 10.

Institution of Civil Engineers (Students' Meeting).—Mr. A. Chatterton on "The Irrigation Works on the Canavery Delta." 7.30 p.m.

Miscellaneous.

Competition: Free Library, Notting-hill, W.—In a recent limited competition for the proposed new Free Library at Ladbroke-grove, Notting-hill, W., plans were invited from eight architects nominated by the Commissioners. At the final meeting held to consider the plans, the design bearing motto "Tree of Knowledge" was selected, the authors of which were found to be Mr. T. Phillips Figgis, A.R.I.B.A., and Mr. H. Wilson.

Clock, East Garston, Berks.—A large clock has just been erected in East Garston Church Tower,—the anonymous gift of a parishioner. It chimes the quarters on four bells, strikes on the largest bell, and has a bold face fixed on the south side of the tower. The bells have also been re-hung; Mr. White, Appleton, was the bell-hanger, and Messrs. J. Smith & Sons, of Derby, made the clock.

Proposed New Board Schools for Acton.—Mr. Edward Monson, jun., A.R.I.B.A., has been instructed by the Acton School Board to prepare drawings for the erection of the proposed Beaumont Park Schools, Acton-green, which are intended to provide accommodation for 300 boys, 300 girls, and 400 infants.

The Bristol Building Trade in 1889.—

A correspondent writes—"Inquiries made to ascertain the state of the Bristol building trade in 1889 show that a decided improvement has taken place, and local builders, in addition to work in the immediate neighbourhood, have found scope for activity in a number of towns in the west, such as Bath, Trowbridge, Cardiff, Crosscombe, and Shepton Mallet. In house building in Bristol there has been a distinct advance, and the stagnation of several years is quickly passing away. One feature of the modern residence building is that on the whole the quality is much improved to what in too many cases it was formerly noticed to be. This improvement has been seen not only in the better-class houses, but in the smaller residences, rented at between 18*l.* and 30*l.* a year, in which materials and convenience are more studied than they used to be. One of the most frequent faults still to be found in such properties is the insufficient space and ventilation between the flooring and the ground, a method of procedure conducive to unhealthiness and dry rot in joists and sleeper walls. In the neighbourhood of Bishopston, a middle-class district just outside the Bristol boundary, house building has gone on most rapidly."

The Sanitary Institute.—At an examination for Inspectors of Nuisances, held at Manchester on December 20 and 21, twenty candidates presented themselves. Questions were set to be answered in writing on the 20th, and the candidates were examined *visà voce* on the 21st. The following candidates were certified to be competent, as regards their sanitary knowledge, to discharge the duties of Inspectors of Nuisances, viz.:—Messrs. Allen Cameron, Newbottle by Fence Houses; James Crossley, Salford; Samuel Sandders Dean, Hugglescot, near Ashby-de-la-Zouch; Thomas Edlestone, Great Harwood, Blackburn; Edwin Gardiner, Liverpool; John Macleannan, Dunfermline; William Milner, Preston; Christopher Osselton, Houghton-le-Spring; John Shirrs Robertson, Aberdeen; Walter Sutherland, Walton, Liverpool; James Whitehead, Parkgate, Rotherham; and Charles Edward Wood, Wakefield.

Examinations for Plumbers.—Under the auspices of the Plumbers' Company, examinations of candidates for registration have lately been held in Dublin. Mr. John Smeaton, master plumber, and Mr. H. J. Lyne, United Operative Plumbers' Association of Great Britain and Ireland, were present to represent the London Board of Examiners. The local examiners were Messrs. W. Baird, H. Kerrill, J. Smith, D. P. Curtis, and T. W. Little, master plumbers; Messrs. H. Murphy and J. Shiels, operative plumbers; Messrs. Spencer Harty, C.E., City Engineer, P. F. Leonard, C.E., and W. Kaye Parry, C.E., architect. The examinations included tests of practical work and sets of questions relating to materials, construction, and sanitary arrangements. Forty per cent. of the candidates succeeded in passing the examinations.

Partnerships.—Mr. James Hill, of 101, Queen Victoria-street, announces that he has, from the 1st of January, 1890, admitted into partnership Mr. E. J. How and Mr. H. King, both of whom, he says, have rendered him long, valuable, and faithful services in the management of his business. The name and style of the firm will remain "James Hill," as hitherto.

The partnership hitherto existing under the style of "William Hudson, Son, & Booth," architects and surveyors, Bennet's Hill, Doctors' Commons, having expired by the effluxion of time, Mr. William Hudson retires, and Mr. Arthur B. Hudson, F.S.I., and Mr. A. C. Bulmer Booth, A.R.I.B.A., will continue to practise at the same address under the style of "Hudson & Booth."

Electric Lighting.—The St. Pancras Vestry held a special meeting on Wednesday last, January 1, to consider the unanimous recommendation of its Lighting, Parliamentary, and General Purposes Committees to carry out an installation of electric lighting, under their Provisional Order obtained in 1883. The Vestry, by a large majority, adopted the recommendation, and instructed their engineer, Professor Henry Robinson, C.E., to prepare the necessary plans and specifications for a first installation of 10,000 private lights and ninety public lights, involving an outlay of about 60,000*l.*

Royal Engineer Establishment.—The first annual dinner of the Civil Royal Engineer Establishment staff took place at the Holborn Restaurant on Monday, the 23rd ult., Mr. J. Lewis Thomas, Chief Surveyor, in the chair.

Scottish Society for the Registration of Plumbers.—A discussion on the question of the materials and construction of soil-pipes took place on Dec. 27, in connexion with the Scottish Society for the Registration of Plumbers, in the Architectural Association Hall, Gorgie-street, Edinburgh. Mr. Robert Cox of Gorgie presided. Mr. Thomas R. Proctor read a paper opening the discussion. Treating first of material, the lead pipe, he said, was a thing of the past. Then we had the zinc pipe; and now we had come to the age of iron, in which some plumbers thought they had got a material competent for its purpose. He discussed the subject of the expansion of iron pipes, and the relation which the diameter of air-shafts should bear to that of the soil-pipes. He expressed the opinion that a system of soil-pipes and air-shafts within the house was better than an outside system. They could not have a proper current of air in an outside shaft; and with an inside system the ventilating-shafts could be carried to the ridge of the roof without any difficulty. A building, he said, could be so constructed as to have the pipes inside, and at the same time have them well isolated. For inside piping he favoured lead as a material. Mr. Walter Brodie expressed the belief that a good cast-iron pipe was the best pipe. Mr. Thomas Hume said he was of opinion that the size of the soil-pipe now used was too large. Friction was needed as well as flushing to keep pipes in order. As to material, he thought the lead soil-pipe was the best that could be got. No joint could be compared with a solder joint. He expressed the opinion that ventilating pipes should be tested every year as well as soil-pipes themselves. Bailie Russell also argued in favour of a smaller size of soil-pipe. In the matter of material, he expressed a liking for iron pipe compared with lead. Other speakers took part in the discussion, and Mr. Proctor replied. The ventilating shaft, he said, should be of the same size as the soil-pipe itself, in order to prevent the risk of siphonage. The Chairman, in proposing a vote of thanks to Mr. Proctor for his paper, remarked that the points in dispute, and which had been brought up in that discussion, were such as could be readily determined by experiment. A vote of thanks to the chairman brought the proceedings to a close. [We quote the foregoing report from the *Scotman*, but we are entirely adverse to the views expressed in favour of smaller soil-pipes, which we think most mischievous.]

Civil and Mechanical Engineers' Society.—An ordinary meeting of this Society was held at the Westminster Palace Hotel on Dec. 18, the President, Mr. Henry Adams, M.Inst.C.E., in the chair. A paper was read on "Percussive Rock-drilling Machinery," by Mr. Reginald Bolton. After some remarks on the ancient methods of rock-boring, the author traced the history of early English invention in this direction and the gradual development of the machine drill. The busiest period of invention would appear to have been about 1865, when English, German, and American engineers were actively employed on the problem. The parent practical machine drill was "The Burleigh," and the author described the well-known "Ingersoll," "Eclipse," "Mayne," "Schram," and other machines. A number of practical details were given of value to the engineer who may have the charge of such machines. The consumption of power was referred to, and a number of records of good work done by various machines followed as an agenda which will be useful to engineers in selecting a machine for work in certain strata. A list of all the practical rock-boring machines was given by the author, together with diagrams of the leading machines and their details. A discussion followed, in which Sir George Barry and other visitors took part, chiefly devoted to elucidating the best proportions for these machines.

Failures in 1889.—According to *Kemp's Mercantile Gazette*, the "gazetted" failures in the building and timber trades last year were 711 as against 785 in 1888, 761 in 1887, 712 in 1886, and 663 in 1885. The *Gazette* remarks, "It seems pretty certain that we are now entering upon a period of prosperity; or, as we may put it, a cycle of good business. It is hard, if not impossible, to account for these changes in the fortunes of trade; for the risings and fallings in the commercial barometer. They are, in the main, quite inexplicable. But we can judge to some extent by statistics when an improvement has set in, and a steady rise all round the circle of trade is imminent and assured."

Mr. George Jennings's Sanitary Appliances and Materials.—The name of "George Jennings" is known all over the world. The founder of the firm did a very great deal, by his inventiveness and ready perception of what was wanted in the early days of sanitary reform, to help to realise the ideas of the then comparatively few architects and engineers who were fully alive to the importance of maintaining the public health. His sons, called upon to direct a very large and successful business built up by his skill and energy, are evidently not unmindful of the importance of maintaining the prestige of the firm, and they have just issued some new catalogues of hydraulic and sanitary appliances and materials of all kinds. In these catalogues there are figured and described so many appliances that it is difficult to single out any for special mention. Many of them have been tried by the test of years of practical use, and have not been found wanting; others are comparatively new esprits for favour. Amongst these we may mention the "London" grate (George Jennings and E. P. Owens, patentees), which is a "terra-cotta warm fresh air ventilating grate" for slow or quick combustion. Judging from the plan and sections, it must be a very efficient grate, producing little smoke, owing to its comparative perfect degree of combustion. Of baths, lavatories, water-closets, urinals, slop and wash-up sinks, plumbers' brass-work, traps, electric bells, speaking-tubes, stoneware goods, and what not, there is hardly any end, and as, with scarcely an exception, everything is of the best type, the careful perusal of these catalogues will be found very useful by architects, builders, and householders. Supplementary catalogues are devoted to public urinals, and to the architectural and other terra-cotta work manufactured by Mr. Jennings at the South-Western Pottery, Parkstone, Poole. This terra-cotta is a very effective material, capable of producing very good work,—in saying which, however, we must not be supposed to express approval of all the designs figured in the catalogue.

Tramway Extension.—The requisite notices have been given of the proposal to extend the Lea Bridge, Leyton, and Walthamstow Tramways over Lea Bridge westward to the point where the road narrows as it approaches the Clapton-road. There can be no question that this would be an improvement that would be much appreciated by the public, for, in spite of the inconvenience which the necessity of walking to the eastern side of Lea Bridge entails, the tramway is used by many thousands daily in the pleasure season, and in an obvious assistance to the many whose business takes them in that direction at all seasons of the year. We are sorry, therefore, to find that the Hackney Board of Works has taken an objection to the proposal now made, and cannot but think that the position the Board has taken up is the result of misunderstanding. It is true that in the previous Act to regulate the tramway there was a condition involving the widening of the west end of Lea Bridge-road, but it was in consequence of this and similar onerous conditions, we presume, that the tramway was not worked successfully. It has lately been taken in hand by a new company, under a new Act, and we hope the Hackney Board will take this into account, and withdraw their opposition to the new scheme of extension. To insist that the new company should carry out all that the old company proposed, would possibly result in disaster, and the public might be deprived of a means of communication which, from the figures placed before us, is evidently widely appreciated. At all events, Hackney folks should bestir themselves, and exercise the influence they possess to avert action which may have the effect of arresting the extension of a most useful line of communication with the country and Epping Forest.—*East London Observer.*

Very Wide Tendering in South Africa.—The *Johannesburg Star* of Nov. 27 contained the following paragraph:—

"A Barberton paper states that a firm in that town recently had occasion to call for tenders for certain work for which proper plans and specifications were issued. The accepted tender amounted to something under 100l., while one enterprising man's estimate totalled up to over 5,000l. The ambition of some is to make a 'pile' in one grand coup."

We have seen not a few specimens of "wide" tendering in this country, but we certainly never saw a list of tenders in which the highest was fifty times as much as the lowest. Let us hope that the Barberton man whose tender was accepted at less than 100l. will not lose a "pile."

Architects as Scientists.—The second meeting of the winter session of the Northern Architectural Association was held on Monday evening last in the Old Castle, Newcastle, Mr. Joseph Oswald presiding. Mr. J. H. Morton, F.R.I.B.A., read a paper bearing on a paper of Mr. W. H. Dunn, read at the previous meeting, on "Architects as Scientists." In the course of his paper, Mr. Morton said (according to the report in the *Newcastle Chronicle*) he had jotted down some ideas which suggested themselves on reading Mr. Dunn's paper. In Mr. Dunn's paper the merits of engineering had been contrasted with the skill of architecture, to the disparagement of the latter. He (Mr. Morton) thought, with Professor Kerr, that the time had gone by for them as architects to pretend to know all things. Architects had to try to know too much as it was. He might, therefore, endorse Professor Kerr's idea that when any man had work to do to design of any real importance, which was out of the ordinary run of his practice, he need not be ashamed to say that he had called in the assistance of an engineer. On the other hand, why should the engineering constructor not occasionally call in the aid of the architectural designer? Why should all our building operations of the so-called engineering order,—viaducts, bridges, great roofs of railway stations, &c.—be left barren and unfruitful of grace, because the designers of them, professing nothing of the artistic spirit themselves, assumed that it had no connexion with their work?

Memorial of the Royal Stewarts at Paisley Abbey.—The other day Sir Michael Shaw-Stewart, Bart., Lord-Lieutenant of Renfrewshire, unveiled, in the old Abbey grounds, at Paisley, a memorial to the Royal Stewarts buried there. The memorial, which has been erected by the order of her Majesty, the Queen, has been executed by Mr. John Hintonson, R.S.A., sculptor, Edinburgh, and is in the form of a recumbent sculptured cross, similar in style to those which may be seen at Iona and the Western Isles. The base, which measures 8 ft. by 4 ft., is of polished Peterhead granite; on the top of this rests a block of Sicilian marble with bevelled face, upon which is sculptured a Gothic cross of the period of the erection of the Abbey. On the right side is carved an ancient sword with belt entwined,—the symbol of kingly investiture; and on the left side is the Scottish shield with lion rampant, surmounted by a crown, and bearing on a scroll underneath the motto, "Nemo me impune lacessit." The members of the House of Stewart to whom the monument is raised are—Marjory Bruce, the two Queens of Robert I., and Robert III. The monument has been placed on what is supposed to be the grave of King Robert III., which is situated in front of the high altar, at the east end of the ruined choir, behind the present church.

Threatened Water Famine in Bombay.—A special and urgent meeting of the Municipal Corporation was called for on Nov. 25 to discuss the scheme of Mr. Tomlinson, engineer-in-charge of the local waterworks, to provide against a threatened water famine in Bombay. Mr. G. Geary, the President, occupied the chair, and there was a large attendance of members. Major Selby proposed the following resolution:—"That subject to the sanction of the Government of India to the raising of a loan of Rs. 4,55,000, and in view of providing against an almost certain deficiency during the hot weather of 1892, and a possible deficiency during the hot weather of 1891, sanction be given, as recommended by the Standing Committee, to Mr. Tomlinson's scheme for bunding a water supply from Pawa', in the valley below the Vehar dams, and of pumping the impounded water into the Vehar storage reservoir and the mains leading therefrom at a cost of Rs. 4,55,000. That this estimate is exclusive of cost of land, that the land to be submerged will be about 500 acres, which will have to be immediately acquired, and that the question of acquiring the gathering ground may be considered later on. That, pending the raising of the said loan, the cost of this work be paid by advances from available balance to be adjusted against the loan. That, pending the like sanction, sanction be given to the acquisition of the land for the impounded area, the cost in the meantime to be met by similar advances."—*Indian Engineer.*

Removal.—Messrs. Croggon & Co. (Limited) have removed their offices and show-rooms from 200 to 16, Upper Thames-street, London, E.C.

Matheson & Grant's Engineering Traders' Report.—Messrs. Matheson & Grant, in their half-yearly report, issued on the 1st inst., say that there has not been, since the year 1875, so much activity in the engineering trades as during the last few months, and the present improvement is more widespread than in the case of any previous revival; for while on previous occasions export to the United States has been the main factor in determining the prices of iron and steel, such a measure of trade no longer applies. The increased demand for the services of British engineers, and for the products of engineering factories, comes now from all parts of the world. Bridges and structural ironwork are in general demand, and except for the delay in obtaining steel and iron from the rolling mills, manufacturers are well satisfied; for although prices have only slightly advanced beyond what is due to higher costs, the greater tonnage allows a better profit. At home the bridges for the Manchester Ship Canal are being made; the superstructure of the Tower Bridge is commenced; numerous bridges are being built in Dublin, Belfast, and elsewhere in Ireland; bridges are in progress for various new railways in England; while the strengthening and widening of existing bridges on the principal main lines add to the general demand. Market buildings, large hotels, station roofs, and buildings for steel works are examples of other structures now in progress. Competitive designs for the projected high tower in London are being prepared, and this project, if carried out, will surpass the Eiffel Tower in Paris, and render necessary about 10,000 tons of steel. Abroad, bridges and structures for India, Japan, Australia, and South America are being made in the English factories, but the present high prices are likely to restrict new orders for the coming year. Portland cement has been in increased demand during the last few months; prices have risen with the cost of fuel, material, and labour, and are likely to advance further from the same cause. The too frequent reliance of engineers on high tensile tests, rather than on care in the mixing and application of the concrete, has led to some failures in foundations built under such conditions. The specifying of unduly high tests which involve certain risks in quality are being less frequently imposed than formerly, as it is found that cement of the best-known English brands will give, in accustomed hands, the very best results. Attempts to rival such cement in countries where chalk as a material is wanting are made from time to time with unfavourable results.

The City Engineership, Liverpool.—According to the *Liverpool Daily Post*, a special meeting of the Health Committee of the Liverpool Town Council was held on Saturday, to consider the question of selecting a City Engineer in succession to Mr. Clement Dunscombe, who has been appointed Chief Engineer to the London County Council. There were forty-two applications for the position, and after a long sitting the Committee reduced them to seven, as follows:—Percy Boulnois, Borough Engineer of Portsmouth; John Price, Surveyor to the Toxteth Local Board; J. W. Brown, Borough Surveyor, West Hartlepool; A. E. White, Borough Surveyor of Hull; J. B. McCallum, Borough Surveyor of Blackburn; George Broom, Borough Surveyor, St. Helens; and R. E. W. Berrington, Borough Surveyor, Wolverhampton. The salary offered commences at £501 a year. Since this was in type we learn that at a special meeting of the committee on Wednesday the names of Mr. Boulnois, Portsmouth, Mr. McCallum, Blackburn, and Mr. A. E. White, Hull, were selected for further consideration.

Death of Mr. Thomae Oldham Barlow, E.A.—We regret to announce the death of Mr. T. O. Barlow, R.A., which took place at his house in Kensington on Christmas Eve, after an illness of two months. Since the death of Samuel Cousins, Mr. Barlow has been (says the *Times*) regarded as the *doyen* of English mezzotint and "stipple" engravers, and though he was twenty years younger than Cousins, he probably, at his best, came nearest to that eminent engraver in the opinion of his colleagues and the public. Born in 1824, at Oldham, young Barlow very early showed a taste for art; and though he had no artistic friends or interest, his father did not discourage him. At fifteen he was apprenticed to Messrs. Stephenson & Royston engravers of Manchester, and he worked in the then newly-established School of Design in that city.

PRICES CURRENT OF MATERIALS.

TIMBER.	£. s. d.	£. s. d.
Greenheart, B.C. ton	7 0 0	12 15 0
Teak, E.I. ton	12 0 0	14 0 0
Sesquiu, U.S. foot cube	0 2 3	0 3 0
Ash, Canada, load	3 0 0	4 5 0
Birch " " " " " "	3 0 0	4 15 0
Elm " " " " " "	3 10 0	4 15 0
Fir, Dantsic, &c.	2 0 0	3 10 0
Oak " " " " " "	2 10 0	4 10 0
Canada " " " " " "	5 10 0	6 10 0
Pine, Canada red " " " "	2 10 0	3 10 0
" " yellow " " " "	3 0 0	5 5 0
Lath, Dantsic, fathom	4 10 0	5 10 0
St. Petersburg,	5 0 0	6 10 0
Wainscot, Fir, &c. log	0 0 0	0 0 0
Deals, Rhinland, 2nd and 1st. std.		
100 " " " " " "	8 10 0	11 0 0
" " " " " "	7 0 0	9 0 0
Riga " " " " " "	7 0 0	9 0 0
St. Petersburg, 1st yellow " " " "	11 0 0	14 0 0
" " " " " "	9 0 0	10 10 0
" " " " " "	6 10 0	9 0 0
" " " " " "	8 0 0	10 10 0
" " " " " "	9 0 0	11 0 0
" " " " " "	7 0 0	9 0 0
New Brunswick, &c.	6 0 0	8 10 0
Battens, all kinds " " " "	6 0 0	17 0 0
Flooring Boards, sq. 1 in., prepared, First " " " "	0 11 0	0 14 0
" " " " " " " " " "	0 8 0	0 10 0
" " " " " " " " " "	0 6 0	0 7 9
Other qualities " " " "	0 4 0	0 5 5
Cedar, Cuba " " " "	0 4 0	0 5 5
Honduras, &c. " " " "	0 4 0	0 4 4
Mahogany, Cuba " " " "	0 5 0	0 6 8
St. Domingo, cargo average " " " "	0 5 0	0 6 8
Mexican, cargo average " " " "	0 4 4	0 5 8
Tobacco " " " " " "	0 0 0	0 0 0
Honduras " " " " " "	0 0 5 1	0 0 6 1

TIMBER (continued).

	£. s. d.	£. s. d.
Box, Turkey " " " "	4 0 0	13 0 0
Rose, Rio " " " "	15 0 0	20 0 0
Bahia " " " "	14 0 0	18 0 0
Satin, St. Domingo, foot	0 0 9	0 1 3
Porto Rico " " " "	0 0 10	0 1 6
Walnut, Italian " " " "	0 0 4 1/2	0 0 6 1/2

IRON METALS.

Bar, Welsh, in London " " " "	ton	7 15 0	8 5 0
" " " " " " " " " "	"	7 5 0	7 15 0
" " " " " " " " " "	"	8 10 0	9 10 0

COPPER.

British, cake and ingot " " " "	55 0 0	56 0 0
Best selected " " " "	57 0 0	58 0 0
Sheets, strong " " " "	68 0 0	67 0 0
Chili, bars " " " "	59 5 0	60 0 0

YELLOW METAL.

LEAD—		
Pig, Spanish " " " "	14 5 0	14 7 6
English, com. brands " " " "	14 7 6	0 0 0
Sheet, English " " " "	0 0 0	0 0 0

TIN.

Straits " " " "	97 10 0	0 0 0
Australian " " " "	0 0 0	0 0 0
English Ingots " " " "	102 0 0	0 0 0
Bars " " " "	103 0 0	0 0 0
Refined " " " "	104 0 0	0 0 0

OILS.

Linseed " " " "	20 10 0	20 15 0
Cocanut, Cochin " " " "	26 10 0	0 0 0
" " " " " " " " " "	24 0 0	0 0 0
Palm, Lagos " " " "	25 10 0	0 0 0
Kapseed, English pale " " " "	33 10 0	0 0 0
" " " " " " " " " "	32 0 0	0 0 0
Compressed, refined " " " "	31 10 0	0 0 0
Tallow and Oleine " " " "	21 0 0	40 0 0
Lubricating, U.S. " " " "	5 10 0	6 10 0
" " " " " " " " " "	7 0 0	12 0 0
Tar—Stockholm, barrel " " " "	1 6 0	0 0 0
Archangel " " " "	0 15 6	0 15 9

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
Designs for Galleries or Balconies, Two-hall New Baths, Winter Gardens, &c.	Leeds Corporation Harcrofte Corporation	£01. and 25l. 150l. 100l. 75l. & 50l.	Jan. 31st Mar. 1st	ii. ii.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Removal of Dust, &c. (one year) Regent's-pk	Crown Estate Paving Commissioners	Official	Jan. 8th	ii.
New Workhouse	St. Pancras Guardians	A. & C. Hartston	Jan. 9th	xiii.
Gorseley Granite Spalls	Norwich Corporation	P. P. Marshall	Jan. 11th	ii.
Temporary Infectious Diseases Hospital	Hendon Local Board	S. S. Grimley	Jan. 13th	xiii.
Purchase and Pulling-down Building Mat.	School Bd. for London	Official	do.	xvii.
Filter Presses, &c.	Tottenham Local Board	J. E. Worth	Jan. 14th	xvii.
New Roof and Repairs to Schools, Edmonton	Strand Union	W. S. Cross	do.	xv.
Works and Materials.	Wandsworth Bd. of Wks.	Official	do.	xv.
Heating School of Art	Canterbury Corporation	do.	do.	xvii.
Making-up Roads, &c.	Wimbledon Local Bd.	do.	do.	xv.
Slop Carls	Beckenham Local Bd.	do.	Jan. 20th	ii.
Enlargement of Post Office, Cardiff	Central Lond. Sch. Dist.	H. Jarvis & Son	do.	xv.
Concrete Paving	Com. of H. W. Works.	Official	Jan. 21st	ii.
	Gt. Yarmouth U.S.A.	J. W. Cockrill	Jan. 23rd	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Road Foreman	Hornsey Local Board	48s.	Jan. 6th	xxiii.
Chief Surveyor of Main roads	Stafford C. C.	800l.	Jan. 8th	xxiii.

TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

CROYDON.—For rebuilding Messrs. Gould's premises, corner of High and Park streets. Mr. Alfred Broad, architect, 27, Dingswall-road, Croydon. Quantities by the architect.

Garlick & Horton, Limited, London	£2,313 0 0
Higgs, Loughborough Junction	2,257 0 0
Crouch, Worthing	2,240 0 0
King Bros. & Co., Norwood	2,193 0 0
Akers, Norwood	2,103 0 0
J. Smith & Sons, Norwood	2,082 0 0
Cook, Crawley	1,987 0 0
F. Becking, Croydon	1,965 0 0
Marriage, Croydon	1,960 0 0
Holt, Croydon	1,959 0 0
Batley & Linford, Croydon	1,939 0 0
Martha Taylor, Croydon	1,928 0 0
J. & C. Bowyer, Norwood	1,894 0 0
Good, Walthamstow	1,892 0 0
Wright, Sutton	1,857 0 0
Wyatt, Sutton	1,847 0 0
Heywood, London	1,792 0 0
Stephenson, London	1,750 0 0
A. M. May & Co., Norwood	1,751 0 0
Smith & Buller, Croydon	1,750 0 0
Harris, Sutton	1,722 0 0
Veale & Co., London	1,719 0 0
Stephens, East Grinstead	1,389 0 0

* Accepted.

BIRMINGHAM.—For coffee-house and hotel, Station-street, Birmingham, for Mr. J. M. Shalley, Messrs. J. P. Sharp & Co., architects, Martineau-street, Birmingham.

S. Taylor	£4,061 0 0
Moffat	4,001 0 0
W. & J. Webb	3,999 0 0
Whithouse	3,993 0 0
Bowen	3,827 0 0
Giles	3,795 0 0
Gill	3,783 0 0
Jones & Mason	3,780 0 0
Harley & Son	3,763 0 0
Britley	3,717 0 0
Robotham	3,694 0 0
J. Webb	3,575 0 0
Gowing & Ingram (accepted)	3,498 0 0

HUYTON.—For heating Huyton Church. Mr. W. D. Caroe, architect:—

John Grundy (accepted)	£160 0 0
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LONDON.—For the erection and seating of the Hamersmith and West Kensington Synagogue, Brookgreen, W. Mr. Belissa Joseph, architect, 17, Basinghall-street, E.C. Quantities by Mr. B. G. Thompson:—

W. G. Hornsey	£5,384 17 6
Harris & Wardrop	3,463 0 0
T. Hussey	3,460 0 0
C. Kynoch & Co.	3,420 0 0
Woodward & Co.	3,420 0 0
W. & F. Crocker	3,316 0 0
B. Hoserford	3,240 0 0
Garlick & Horton, Limited	3,236 0 0
B. E. Nightingale	3,204 0 0
Chamberlain Bros.	3,130 0 0
W. M. Dobbs	3,093 0 0

Revised Estimates on Amended Plans.

W. M. Dobbs	£2,016 0 0
Chamberlain Bros. (accepted)	1,970 0 0

GERRARD'S CROSS (Ducks).—For heating by pure warm air "Bulstrode," Gerrard's Cross, the residence of Sir John Ramsden, Bart.:—

John Grundy (accepted)	£185 0 0
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LONDON.—For new club premises in the Rotherhithe New-road, for the Trustees of the South Bermondsey Club and Institute. Mr. T. L. Aubrey, architect; Mr. Wm. Mills, surveyor:—

Kirk & Randall	£1,783 0 0
Hart Bros.	1,645 0 0
Down, J.	1,628 0 0
Wells, B.	1,610 0 0
White, A., & Co.	1,579 0 0
Gregory & Co.	1,437 0 0
Roome, E. A.	1,430 0 0
Holloway, H. L. (accepted)	1,323 0 0

LONDON.—For pulling down and re-building the "Swan" public-house, Kingsland-road, for Mr. Richards:—

Stables	£1,969 0 0
Walker Bros.	1,938 0 0
Burgess & Algar	1,888 0 0
Abley	1,825 0 0
Todd	1,787 0 0

LONDON.—For providing bathing and other accommodation in wooden hut at the South-Western Fever Hospital, Stockwell, for the Metropolitan Asylums Board. Mr. Keith D. Young, architect:—

Lascelles & Co.	£300 0 0
King Bros.	349 0 0
Haywood	343 0 0
Wall Bros.	334 0 0
Hyatt	324 0 0
Siedel	298 0 0
G. Godson & Sons, Kilburn	245 0 0
Bardell, Peckham	235 0 0

LONDON.—For repairs, and fittings, &c., to No. 31, Holborn, E.C., for the Middlesex Aerated Bread and Restaurant Company, Ltd. Mr. Lawton R. Ford, architect, St. Thomas's-chambers, 24, Railway-approach, London Bridge, S.E.:—

Drew & Cadman	£530 0 0
J. Bullers	525 0 0
F. Britton	455 0 0
J. Marsland	435 0 0

LONDON.—For rebuilding No. 18, St. Swithun's-lane, E.C. Mr. Delisa Joseph, architect, 17, Basinghall-street, E.C.:—

Ferry & Co., Tredegar Works (accepted)	Bow.
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LONDON.—For alterations, 37 and 38, Gutter-lane, E.C. Mr. Delisa Joseph, architect, 17, Basinghall-street, E.C.:—

W. Outley & Son	£160 15 0
A. W. Hammond (accepted)	104 0 0

LONDON.—For sundry works and repairs to premises Nos. 8, 10, 12, 14, 16, 18, 22, 24, 26, 28, and 30, Garden Row, Southwark:—

McCormick and Son (accepted)	£1,047 0 0
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LONDON.—For heating the Church of the Holy Trinity, Dockhead, Bermondsey, for the Rev. Father Huggett:—

John Grundy (accepted)	£130 0 0
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LONDON.—For alterations to drainage and sanitary works and fittings at the Rotherhithe Infirmary, for the Guardians of St. Olave's Union, Messrs. Newman & Newman, architects, 31, Tooley-street:—

W. & H. Castle, Hope Works, Southwark Bridge-road (accepted)	£265 0 0
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[Full list of tenders appeared in the Builder of December 21.]

NORTH WOOLWICH.—For caretaker's house and temporary offices at new premises, Barre House Wharf, North Woolwich, for Mr. J. H. Sankey. Mr. F. H. Rainam, architect:—

W. J. Maddison	£385 0 0
J. W. Wyles	305 0 0
C. Robinson	350 0 0
J. Baxter	340 0 0
J. Nokes	325 0 0
Wm. Ferry (accepted)	294 0 0

SMETHWICK.—For house, Bearwood-road, for Mr. G. Holland. Messrs. J. P. Sharp & Co., architects, Birmingham:—

Lennox	£823 0 0
Gill	810 0 0
James & Mason	808 0 0
Marshall	769 0 0
Light	735 0 0
Blackham	719 0 0
Watson Bros.	716 0 0

* Accepted.

TENDRING (Essex).—For pulling down and erecting two cottages at "Bretts" Hall, Tendring, Essex, on the estate of Mr. D. E. Cardinal. Mr. J. W. Start, architect, Colchester:—

Canham, Weeley	£308 0 0
Samderson & Sons, Dullham	375 0 0
Smith, Wivenhoe	310 0 0
Dupont, Colchester (accepted)	285 0 0

WAKEFIELD.—Accepted tenders for erecting the Science and Art Schools, Wakefield. William Watson, architect, Wakefield:—

Flower Bros. (Excavating, Brick, and Stone)	£3,559 0 0
C. F. Rycroft (slating)	116 0 0
C. Driver (plastering)	125 0 0
Chas. Scuttes (carpenter and joiner)	751 5 0
Saull, Atkinson (plumbing, glazing, iron-work)	450 0 0
Goodall, Lister, & Goodall (painting)	29 18 0

[All of Lower Wakefield.] £5,971 3 0

WESTCOTES.—For heating Westcotes Church. Mr. Ewan Christian, architect:—

John Grundy (accepted)	£155 0 0
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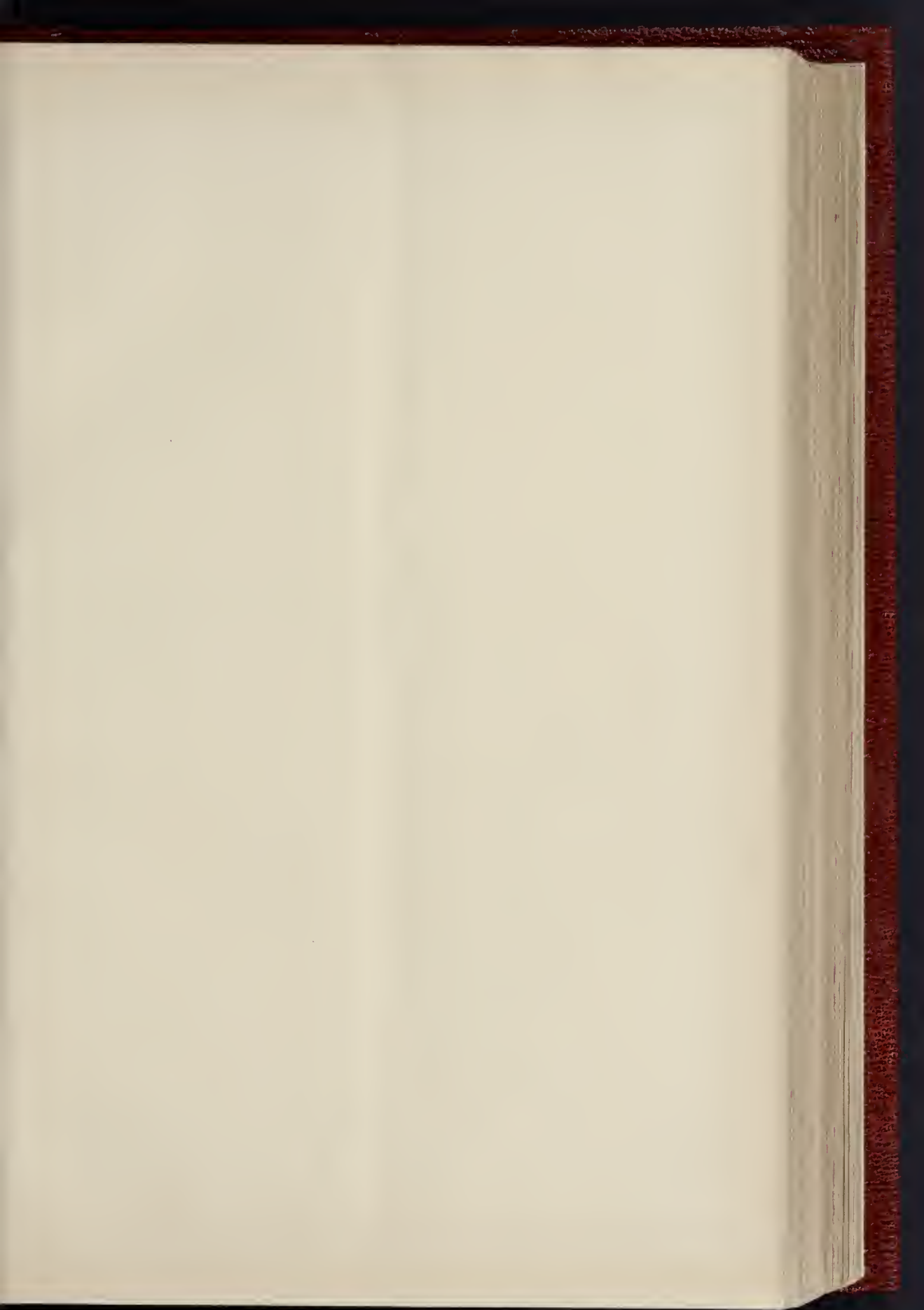
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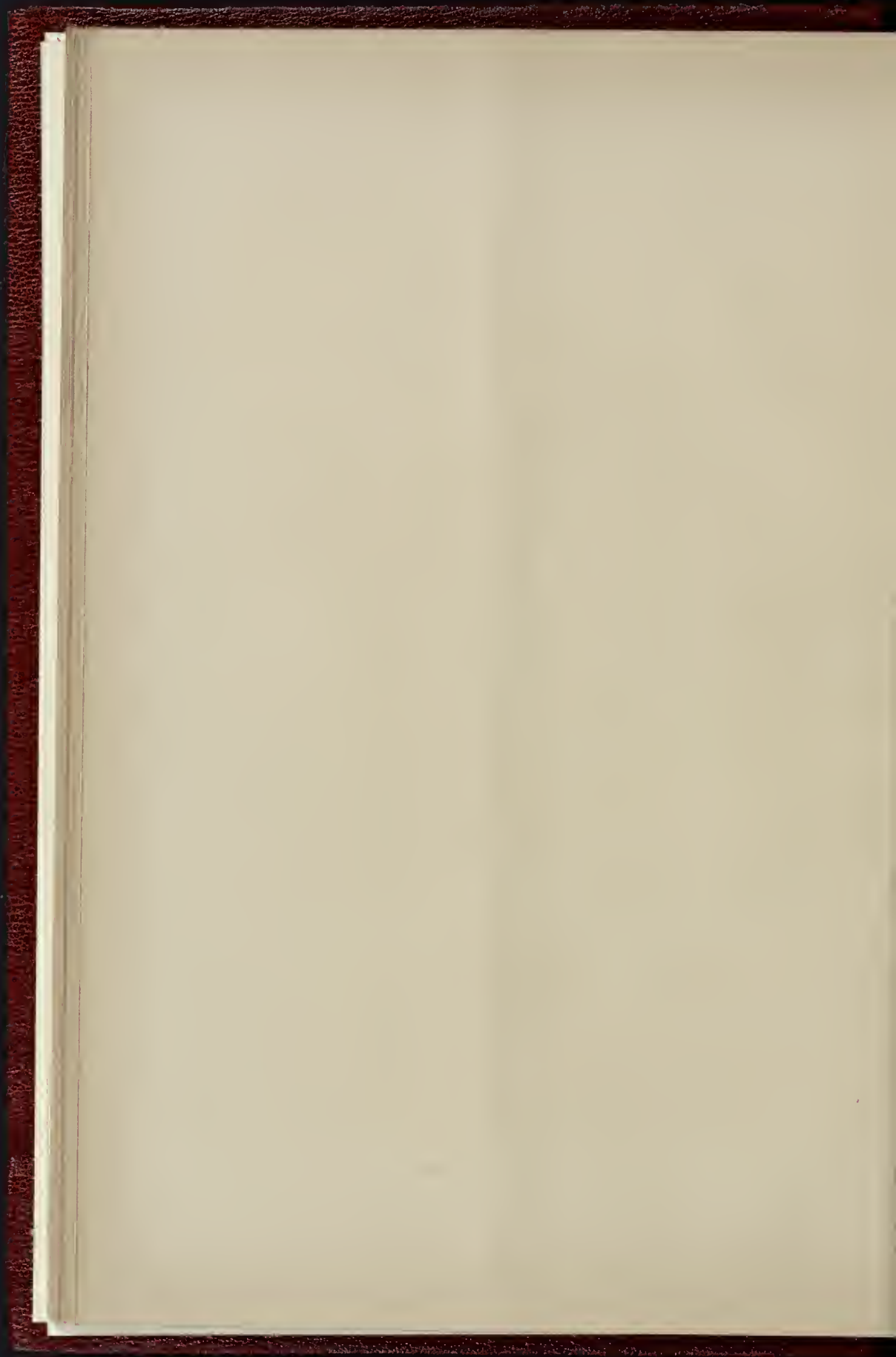


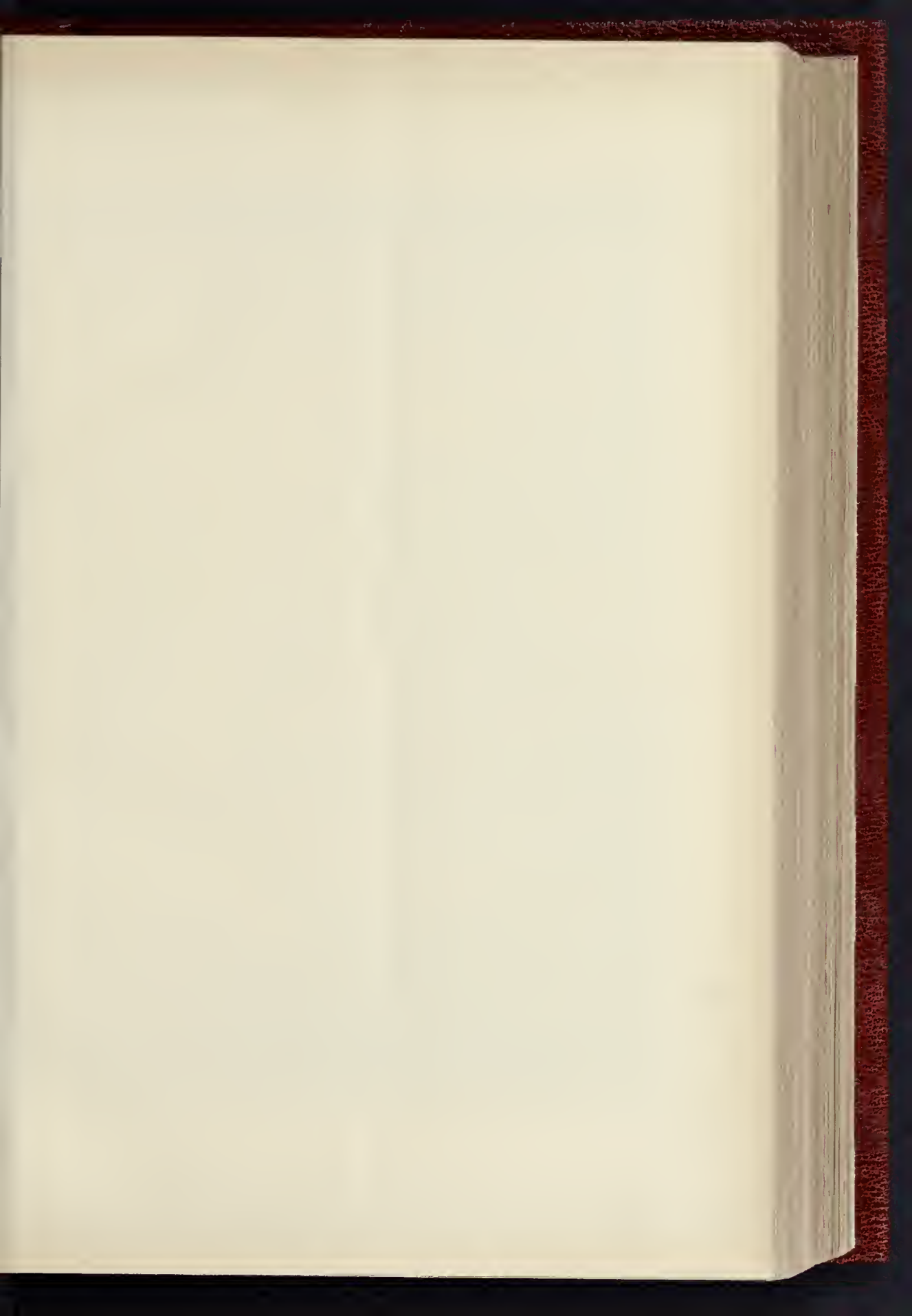
Arnold Mitchell 1847



DRAWING BY MR. ARNOLD B. MITCHELL, A.R.I.B.A.

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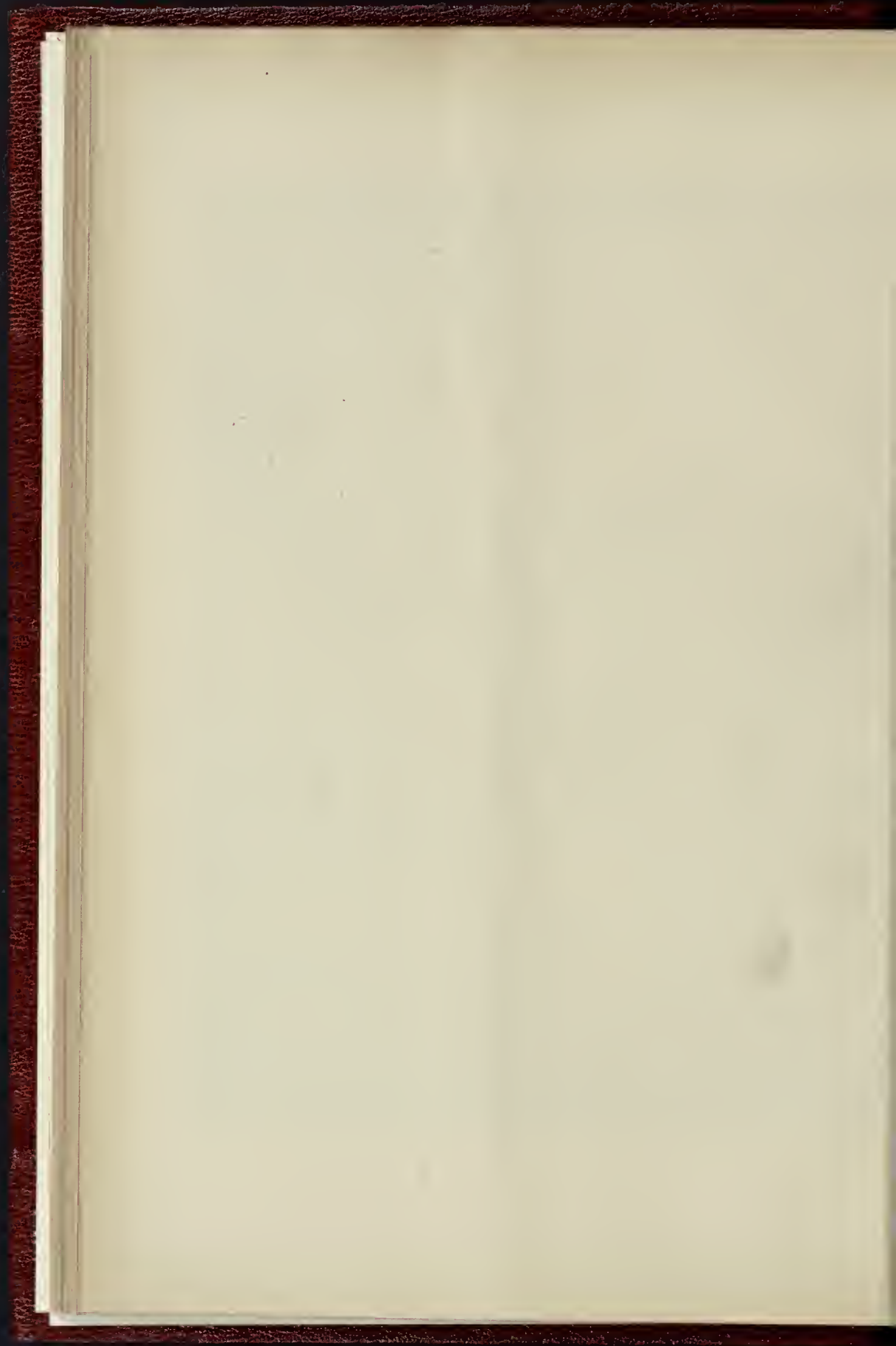




A SCHEME FOR DINING ROOM



The Phototype Co., 893, Strand, London.



flesh, are equally remarkable, though the work is rather a grand sketch than a finished picture. The face seen in the mirror, by the way, is not of the type or make which the back of the head of the figure suggests, and seems to have been put in hastily without any attempt at realism, which of course was not Velasquez' aim or profession in art. The portrait of "Mariana of Austria" (132), a seated figure in preposterous costume, with a hooped skirt like a round table, and a head-dress standing out in a great bag on each side of her head, is remarkable for the expression of insolent hauteur in the features. What Velasquez really thought of the society of Sultans and Sultanas that he painted it would be interesting to know; but the portrayal of that expression of pride and disdain of the whole world which, as we know from historical and literary evidence, represented the natural mental attitude of the Spanish grandees of the period, was at all events a task singularly congenial to the genius of Velasquez. Vandeyck did something of the same kind in his portraits, but not with the power and thoroughness of Velasquez. There is one Vandeyck in the exhibition, however, the armoured portrait of Count Nassau Dillenbourg (153), which goes near to rival Velasquez in force of expression and character, though not in power of execution. Near this is a remarkable Rembrandt, "Portrait of a Man" (151), a formidable man, whose physiognomy expresses a rock-like stubbornness, possibly in brought to it; for Rembrandt seems often to have made a portrait a groundwork for the expression of his own power. It is interesting to contrast this, in which the head is everything, with the portraits of Velasquez in which, with an equally powerful treatment of the head, costume is also so highly elaborated. Velasquez' treatment suited the stamp of persons whom he had to paint, with whom costume was so very important and elaborate an accessory that it would almost have seemed sometimes that the costume was accessory. In the portrait of "Admiral Pareja" (133) the head itself is of sufficient picturesque power to hold its own against the costume. These three, Pareja by Velasquez, Count Dillenbourg by Vandeyck, are three very remarkable examples of the ideal force of artistic expression which a great painter can infuse into the simple portrait of a man; it is rarely that three such examples by three different painters are to be found in the same room together. In female portraits, except Velasquez already mentioned (Mariana of Austria) the exhibition is not strong this year; the most pleasing are Romney's "Mrs. Stalles and two of her daughters" (154), in which the child in her mother's arms is lovely; and Reynolds's "Viscountess St. Asaph and child" (158), a very charming Reynolds a good deal faded and discoloured; there is a lovely semi-Oriental type and *tournaire* about the head and bust of the countess; the head of the infant on her knees is also beautifully painted and full of life. Romney's portraits of "The Hon. Henry Chaplin, M.P." and "Mrs. Chaplin" (41 and 45) are very good specimens of simple portraiture, the latter is also artistically interesting inasmuch as, in composition and in the treatment of the foliage background, it is an obvious and intentional imitation of the manner of Gainborough. Another portrait in the first room is interesting from the name little more) of "Robert Williams" (24), Captain of the Cumberland Fleet, a Yacht Club of which the Duke of Cumberland was president, and which was the precursor of the present Royal Thames Yacht Club; a portrait of a bluff figure in a nautical costume with a telescope under his arm, by "J. M. W. Turner, R.A." whose name suggests, though the hand of Turner is traceable in the treatment of the sky and background.

Generally speaking, the English pictures of the year are not very much. There are two

Callcotts about which much has been said: "The Shrimper" (44), and "Hamstead Heath" (161). The latter is a really grand thing, so powerful and so like Crome in manner that doubts have been suggested as to whether it is not truly a Crome; we never saw a Callcott at all like it before. "The Shrimper," however, shows the same kind of power in sky and composition, but it has been much over-rated; the breaking sea in the foreground is very bad, and is one of the many examples of the extraordinary blindness to the real forms and movement of sea among painters until a very recent period. A wave is not seen flopping on the beach as it were all one piece of stuff, like the edge of a shaken blanket; Callcott never saw that, nor did Creswick ever see waves as he has represented them in a seapiece opposite (14), with all the waves along the shore of the same section, with a sharp edge at the top and the same concave and convex lines before and behind. Among the old painters Backhuysen is as bad or worse; in his large painting in the second room (102) the square-rigged men-of-war sail about in fine style, no doubt, but the stuff they are sailing on is no more like sea than the movable seas of grey paper inflated by bellows that are sometimes seen in models. In the present day we have several sea painters who really look at the sea and paint it as they see it, though each has, no doubt, his favourite aspect of it: but this is quite a modern accomplishment in art. Even Turner's seas are often quite impossible both as regards colour and movement.

The pictures to look at in Gallery I, which may be called the English room, are, besides those already incidentally mentioned, Landseer's capital painting of a white terrier, "Jocko" (15); Webster's picture, well known from engraving, "The Slide" (23) a good example of a kind of humour in *genre* painting that is somewhat out of date now; James Ward's "Cows" and "Horses" (29, 31); Leslie's "Mother and Child" (381), fine both in drawing and expression; and Reynolds's "Miss Penny Kemble" (49), terribly dilapidated but the remains of a most expressive portrait. Danby's once-admired stage effects, "The Ship on Fire" (36) &c., are melancholy examples of work that has had its day and is of no more value to any one; his smaller painting, "The Grave of the Excommunicated" (40), has a certain poetry and truth of effect.

The pictures of the Dutch realists in the second room have been said in the newspapers to be as remarkable as in any former year, which is certainly an exaggeration; they include some very bad pictures that were never worth exhibiting at all; they also include a minority of works that are first-rate of their kind. Among them are Lord Ashburton's Jan Steen "The Carouse" (93), an interior with many figures, less vulgar and repulsive in physiognomy than is often the case with this painter, and full of life and reality. The same owner's two small works by Maes, "An Interior" and "A Woman Sewing" (100, 104) are beautiful examples of works in which the interest consists in a single figure placed under effective conditions of light and painted with unaffected simplicity. In the first-named work, however, we cannot help thinking some change has taken place in the pigments; the flesh is worked up in the warmer portions with small touches of red which, as now seen, appear far too strong and spotty in effect. The Queen's Teniers, "Woman Peeling Turnips" (103), is essentially a study of still life in foreground objects, first rate of its kind; a more interesting Teniers perhaps is the "Village Dance" (84). Van de Velde's rather large cattle picture (107) should be looked at; but a superior work is the small painting of "The Haymakers" (115), a perfect little work both in regard to the figures and the landscape in which they are placed.

Gallery IV, which marks the limit of the exhibition, is filled with a series of portraits in decorative borders, by Daniel Mytens and unknown painters of the Dutch school, from be collections of the Marquis of Townshend

and the Earl of Sussex. They illustrate a special type of portrait-painting, and have a striking decorative effect in combination, but their artistic interest as pictures is not very high.

SUPERINTENDENCE.—II.

IN the previous article* we took it for granted that the architect writes his own specifications, and does not depute the work to a quantity-surveyor or any other person. In fact, we look upon the specification as an explanation and amplification of the drawings, and consider that the production of the two ought to be as nearly simultaneous as possible. It is certainly difficult to see the wisdom of employing another person to explain and amplify one's own drawings. Opinions, however, differ on this point, but there can be little doubt that an architect will be more likely to make alterations in a specification written by another man, who could not be cognisant of all his ideas, than in one written by himself with the full knowledge of the necessities of the work gained by interviews with his client, by inspection of the site, and by the preparation of the drawings; and it is this deviation from the specification against which the architect must be chiefly on his guard.

Many clients are "kittle cattle" to deal with. There is a story,—true enough, we believe,—told of a certain duke, how, on returning home after a short absence, he saw almost completed an entrance-lodge with an arched gate-way, which doubtless the architect thought very fine; but so the duke. Calling the architect to him, he asked, "Why the — have you built such an ugly thing as that? Pull it down!"—the next day the place was dismantled. There are not many architects who enjoy the patronage and humour the whims of dukes, but many have to bear the vexatious intermeddling of clients, who, unlike the afore-mentioned nobleman, object to pay for the alterations which, as the work proceeds, they demand. The best preventive of so many variations from the contract is for the architect to explain the drawings thoroughly to his client before tenders are obtained, and to state the different kinds of material proposed to be used. In many cases it is wise to take a client, if possible, to rooms of the sizes shown on the drawings, as figured measurements give to most people only a vague idea of the real dimensions. In brief, study the client's requirements carefully, and do not be satisfied until he understands with some degree of minuteness what kind of building is proposed to be erected for him. For all variations from the contract are vexatious, sometimes to the contractor, sometimes to the proprietor, almost invariably to the architect.

The architect must be above all suspicion of unfairness or partiality. He must treat an honest contractor with the same consideration he shows to a good client, and must endeavour to repress the unwarranted grumbling of a crotchety client just as he turns a deaf ear to the specious tales of a smooth-tongued builder.

It is frequently somewhat distasteful to the architect to meet committees or bodies of men for whom work is being carried out, as there are sure to be two or three members of such a body, who,—perhaps because they desired the appointment of another practitioner, perhaps because they are born fault-finders, and find it a necessity to exercise the privilege of grumbling,—at any rate, for one reason or another, seek every occasion of throwing stones at their architect. These malcontents must be boldly faced; to their malice the architect must oppose the most transparent honesty and sincerity. He must seek interviews, rather than decline them, must go before such a body of men unbidden, rather than fail to meet them, for his absence will in the eyes of enemies be an acknowledgment of shortcomings, and behind his

* See page 2 ante.

back more bitter things will he said than before his face, and untrue statements may pass uncontradicted. We could point to so many instances of discredit attaching to architects, simply because of their neglect to appear before clients of this kind, that we consider this note of warning by no means unnecessary. Again, it must be remembered that newspapers report the proceedings of many public bodies, and aspersions on a man's character, which pass uncontradicted at the time of utterance, may stare in print before the public, and will then surely prove detrimental to the architect; there are always wiseacres, "Sir Oracles," who say, "where there is smoke, there must be fire," and so a man's reputation may be endangered. To work harmoniously with a committee is a notoriously difficult matter, and needs all the architect's tact, courage, and truth.

There is one other matter (pertaining chiefly to the proprietor) which we wish to mention, and then we will pass on to the most difficult part of our subject,—the architect's dealings with contractors. There are men, all the world over, who wish to get more than their money's worth. The architect will frequently meet with examples of this class, who, after receiving tenders in open competition, manifest a preference for a builder whose tender is not the lowest, but whom they can trust to do good work; instead, however, of offering him the contract at his own price, they wish him to lower his tender to, or, at any rate, towards, the lowest tender received, and beg their architect to see him with this object. It is dirty work; let the architect wash his hands of it, and attempt to dissuade his employer from such a course, for it will surely be prolific of trouble. But if the proprietor himself arrange with the builder such a reduction, the architect has no option but to accept the arrangement. It is almost certain that the builder will feel justified in attempting to "take out" of the work in quality or finish the value of the reduction, and the architect will, therefore, do well, before permitting him to sign the contract, to give him clearly to understand that, as the original drawings and specifications have not been altered, it is only right that they be strictly adhered to; this is justice, but in such a case we should have little hesitation in tempering justice with mercy.

"Mr. Rickman considered that the first qualification of an architect was to possess patience, and, after that, the most essential quality was decision, and in the latter quality he (Mr. Cates) feared architects were often wanting, especially in insisting that the work should be executed as specified." In the previous article we inveighed against all unnecessary deviations from the specification, and the young architect will do well at the very commencement of practice to set his face dead against all variations from contract which the builder without proper instructions makes in carrying out the work. To pass one thing which is not according to the specification paves the way for passing another; the architect's measure is soon taken by the contractor, and the latter, if dishonest, learns to consider a specification as a document very good, perhaps, in its way, but not by any means intended to be enforced. In estimating for future work he acts on this assumption, and tenders at a price for which the work could not possibly be carried out if the specification were to be strictly interpreted. By "cutting low," as he terms it, he takes work out of the hands of more honest contractors, whose consciences are less accommodating, and whose tenders are consequently higher. The evil done by these cheap (and nasty) builders falls to some extent upon the client, for he gets inferior work, but—he gets it at less cost; it falls more, however, upon all other builders, who, through greater honesty, have submitted higher tenders. This, let us say, is no fancy picture. We are acquainted with one respectable builder, who always, on delivering a tender to a certain architect, accompanied it with such remarks as, "I've quoted for 'thirds' deal; you specify 'best'; but the others will reckon for 'fourths' and 'fifths.'"

His remarks were true enough; and it was a bitter thing for him to see work taken out of his hands by dishonest contractors. He himself would not quote for an inferior quality without acquainting the architect with the fact, but his conscientiousness militated in a great many cases against the acceptance of his tenders. For an architect to pass inferior work is setting a premium on dishonesty, and making the battle of life harder for good men. Young architects must beware, for on the conduct of their first commission will depend, to a great extent, the whole course of their future practice.

In spite, however, of architect's care and contractor's honesty, mistakes will occur and accidents happen to render some portion of the work less perfect than it ought to be. Rain may bow a wall, frost may crumble its mortar, inferior material may be used by a workman if it be nearest at hand, the tramping bricklayer may neglect proper bond or omit the pargetting of flues, the rough-and-ready labourer may put mud or clay into the mortar-mill instead of sand, and so on; for all these the contractor is really responsible, but it would be unwisely harsh of the architect to demand in every case the entire undoing and reconstruction of such work. It would often be more satisfactory, under these circumstances, to make a proportionate deduction rather than shake the building and perhaps cause considerable delay by cutting out the bad and inserting new. In such cases the architect will do well, however, to acquaint his client with the inferiority and proposed deduction, for the latter will be disposed to doubt the architect's vigilance if the information be conveyed to him by any other channel, or if he find it out himself. For a client to find fault justly with work or material does to some extent lessen his confidence in his architect. The client may, however, refuse to be guided by the architect's advice to let such work remain and to accept a certain deduction as compensation, and may peremptorily demand the work to be as specified; in that case it is the architect's duty—a hard one, we know—to require its alteration. The contractor must suffer for his own negligence and that of his men.

Where, however, the architect is convinced that the contractor has of malice aforethought substituted worse material, or scamped the work, his duty is plainer. The work must, if possible, be re-executed. A deaf ear must be turned to the thousand-and-one plausible excuses which the wily contractor will offer for his conduct. An architect writes:—"I remember an instance of a small plumber inserting pieces of 4 lbs. lead in flashings for which 5 lbs. lead was specified. At once I wrote to him demanding the removal of all such lead from the building; the next day he came to the office, threw upon the floor about a dozen pieces of 4 lbs. lead, and in a torrent of words told me 'I'd got 'em all,' wanted to know if I thought him a rogue, and declared that he had used all his 5 lbs. lead on the building, and, rather than delay the work, had made out with just so many pieces of lighter weight. For a moment, I really felt that I must have done the man some wrong—he seemed to think himself not sinning but sinned against. However, I merely told him that it would have looked better if he had mentioned the circumstance to me *before* using the inferior material instead of *after*. I had gained my point, and he has since been more careful." But instances might be multiplied indefinitely; they are plentiful as blackberries. It may be wise and will certainly be courteous of the architect to listen to what a contractor has to say *before* executing work as specified, and to consider any suggestions he may make (remembering always, however, that an architect should be predisposed to adhere to his specification rather than deviate from it); but it is almost invariably foolish, a sign of weakness, to take notice of excuses made by a builder after his dishonesty has been discovered. The best advice we can give to architects on this point is—cultivate decision, and having stated your honest opinion that the workmanship is deliberately slovenly, that the

material is of set purpose worse than that specified, maintain your opinion, and, where possible, demand the re-execution of the work. Let your fiat be unalterable as the laws of the Medes and Persians. Do not be wheedled out of it; if you are a young man, do not be bullied out of it; do not, in any case, be bribed out of it. If you once yield, you have established a precedent, to which the contractor will for ever appeal. If, on the contrary, you compel a builder to undo bad work, to remove inferior material, it is a lesson to him and to all others, and will prevent much trouble in the future; it is a precedent to which you yourself can always appeal with satisfaction, knowing that you have acted justly and have not neglected your client's interests.

As already observed, however, it is not always advisable to have inferior work re-executed, on account of the delay and other damages which such renewal might entail. In this case, a deduction must be made from the amount of the contract, but the question arises, how much must be deducted, merely the difference in value between the work as specified and as executed, or more? At first glance, one might say, the mere difference certainly. Is this really fair, however, to the proprietor? This gentleman has, by his architect, asked for a certain excellent material,—say a building stone sound, hard, and of good weathering qualities,—but in place of this he has been supplied with stone very similar in appearance at first, but soon crumbling. The deception is not discovered until the work is so far advanced that a demand for removal of the inferior stuff might practically be a demand for the demolition of the building and the erection of a new one. The sternest architect and the most irate client would probably stop short of that, but to deduct the mere difference in cost between the two stones would assuredly not be just to the proprietor. Some things are dear at a gift, and an ill-weathering building-stone is one of those things, for it soon makes a building appear scarred, as if afflicted with a skin disease, and necessitates continual expense in repairs. But there is still another point to be considered; the great danger of making a proportionate deduction for the bad work which a contractor has deliberately executed, is this—he is not punished for his dishonesty; he loses nothing by the transaction, and is encouraged, if he be so minded, to continue his malpractices, for, even if he be found out, he is not a loser, and if he be not discovered, he gains considerably. For these two reasons, therefore, it is best to deduct for such inferiority more than the mere difference in value between the work as specified and as executed. If the contractor demur, give him his choice—deduction or re-execution. Only, do not leave the settlement of the amount to be deducted until the completion of the contract; it is best to state, in writing, the demand for re-execution or a certain deduction, at the time of complaint respecting inferiority of the work. This course will save much bitter wrangling afterwards.

It may happen that the builder will refuse to proceed with the work rather than replace the inferior material or submit to the architect's proposed deduction. In ninety-nine cases out of a hundred the client will sustain his architect's position in such a case, and will have no hesitation in dismissing the builder according to the terms of his contract, and in placing the work in other hands.

There are architects, however, who worry contractors unnecessarily by their ill-advised clinging to minor details of construction. It may be that in the detailed drawings of a piece of joinery a certain method of framing and jointing has been shown, but the builder, desirous of saving labour and material, attains the same result in a different manner. By all means, let the builder enjoy the benefit of his superior practical knowledge; he has taught the architect a lesson which it will be unwise of him to despise. It bespeaks a little mind if an architect be ashamed to alter a specification even though he learn, before the

work is done, that a better method of procedure can be adopted without increase of cost.

The general conditions of a specification frequently contain a clause to the effect that "no deviations from the drawings and specifications shall be made without the written authority of the architect," but we wonder how often an architect takes the trouble to carry out his own rule of writing his instructions. Better far to omit the clause altogether than to stultify oneself by not adhering to it, for how can an architect expect a contractor to be bound by a specification part of which he himself sets at nought? But, best of all, to insert the clause and act up to it. It is really not a difficult matter, and its advantages are obvious. We are acquainted with an architect who for this purpose carries what is known as a "Commercial Travellers Order-book," in which, by means of a black sheet and an agate style, two copies are obtained at one impression. One of these copies is given to the contractor, the other remains in the book. For convenience of reference every note is classified under one of four heads,—"extras," "deductions," "alterations" (which are partly extras and partly deductions, one or the other preponderating), and "instructions" (the last comprising all orders for re-execution of bad work, removal of inferior material, deviations from contract involving no variation of cost, and so forth). This system keeps the architect in mind of deductions which he might otherwise forget, and shows the contractor for what extras he can justly claim, and thus vastly facilitates the preparation of the builder's account at the completion of the work.

It may be urged that the architect who spends so much time in the superintendence of work will have no time left for preparing designs or for office-work generally. (There might be no great harm done, if the architect did stick to his drawing-board rather too little, and to his buildings rather too much.) In reply to this, we would say that an architect may, and ought to, employ his pupils partly in this work of superintendence, take them to the building, point out those things to which particular attention must be paid, and let them inspect the works two or three times between his own visits. The pupils would thus obtain much valuable practical knowledge, and would be some check,—however slight,—upon the actions of a dishonest builder. There are many youths at the end of their pupillage, and many assistants of several years' standing, who seem never to have seen work in progress; we cannot think that the architects, who received premiums from such, did their duty in return.

The architect's path is narrow and difficult,—a little slip and he may be ruined. An error in calculation, a manufacturer's mistake, a contractor's carelessness may lead to the collapse of a building, and to a consequent loss of practice. But there is another thing which tells even more severely against a man, and that is the acceptance of illicit commissions, or what in plain English should be called "bribes." Modern trade is honeycombed with this system of dishonesty, and builders' merchants have learnt the trick. The young architect is very likely to be tempted by a dishonest contractor; reject the bribe at once,—the larger the bribe the greater the loathing,—and avoid that builder in future, for he has forfeited his birthright of being considered an honest man. This journal has so frequently inveighed against all illicit commissions that it seems a wearisome reiteration to say anything further on the subject, but as the temptation is usually offered to the architect during the erection of a building, we venture to consider it as one of the dangers of superintendence. The architect must absolutely refuse to accept all secret commissions from firms whose goods he has specified or ordered. The commission really comes out of the client's pocket without his knowledge,—is, in fact, filched from him, and the architect has no more right to it than he has to the goods themselves. It would be a good thing if architects, to whom bribes have

been offered by manufacturers or merchants, would absolutely refuse to have any further dealings with such firms,—boycott them until they saw the folly as well as the dishonesty of the system. Let each individual architect, as he values his own good name, and as he loves his work and has the honour of his profession at heart, do his utmost to put a stop to this corruption.

In conclusion: the architect will do well in trying to put work into the hands of contractors of proved honesty, so that in their case the truth may be shown of that trite proverb,—"Honesty is the best policy."

NOTES.

It is with great regret that we hear from Milan of the untimely death of Signor Brentano, the young architect who gained such a brilliant success almost at the outset of his career in winning the competition for the Milan façade; and who, as was remarked in an article in our columns, had begun his professional career where many would have been only too happy to leave off. He died at Brussels a few days since at the age of twenty-seven. A more melancholy instance of the cutting short of a career of brilliant promise has seldom occurred.

At Florence repairs are being executed with great activity, by order of the Government, in the celebrated Church of Santa Trinità, built by Nicolo Pisano in 1250, and famous in the history of art for its frescoes, painted by Ghirlandajo, Andrea del Castagno, Albertinelli, &c. Unfortunately the rage for modernising everything destroyed a great part of its artistic value when Buontalenti repaired the church and reduced it to about its present state. The works which have already been completed are the following: 1. Two marble altars have been placed in the Spini and Ardinghelli chapels. 2. The architectural and pictorial ornaments of the Strozzi chapel have been repaired. 3. A new decoration in the style of the fourteenth century has been painted in the Spini chapel. 4. Decorative paintings have been restored in the transept of the lateral nave to the right. Excavations have been made in the central nave, and the crypt, built in the twelfth century, has been discovered. The discovery took place while the pavement of the church, which was in a very bad state, was being repaired and brought down to the level of the ancient church, such as it was in the thirteenth century. The crypt is built of *pietra forte*, and has three semicircular apses. When discovered, it was found to have undergone considerable damage, especially when the church was rebuilt in the sixteenth century, as we have already said, and when graves were dug in it in a less remote period. The pavement of this crypt or tribune has also been partially discovered; it is composed of a reddish cement, and before the altar of the chapel was a portion of mosaic of small pieces of white marble, evidently the work of the ninth or tenth century. Round the mosaic is an ornament of white foliage on a black ground. Within the border which this ornament forms, are two symbolical figures of dragons looking towards each other. The discovery is particularly interesting, as no other specimens of mosaic had as yet been found in Florence. These fragments, as well as some remains of a very ancient construction in *pietra forte*, belonged, undoubtedly, to the church which, according to the historian Villani, stood in this spot under the name of Santa Trinità since the year A.D. 801. The excavations were continued, and resulted in the discovery of the crypt, of the ancient doorway and of the staircase leading to it; of this, four steps are still to be seen. Between the ancient pavement and the modern one, which has been removed, a large marble slab has been found, on which a recumbent figure, much worn out, is sculptured; we learn by an inscription that

this was the tomb of Roggero Buondelmonti, General, of the Order of Vallambrosa, who died in 1319. Other researches led to the discovery of some remains of the original fresco ornaments on the wall of the nave, covered with a thick layer of modern plaster. The beautiful marble door belonging to the Chapel of B. Bernardo degli Uberti has likewise been found, and behind the modern façade of Buontalenti, the ancient one in Gothic style, of Nicola Pisano, has been discovered; it has alternate stripes of white and *verde di Prato* marble, in the same manner as in many churches of Pisa, Pistoia, and other towns of Upper Tuscany.

The Imperial German Archeological Institute has just issued its second "Ergänzungsheft." It is entirely devoted to the discussion of the recent excavations at Æge, the interest of which has proved to be mainly architectural, and to be of special importance as throwing light on the more prolific "finds" at the analogous hill city of Pergamos. The contents of this volume are so strictly technical that they can only be profitably discussed in connection with the very abundant illustrations. The ground-plan given shows that Æge,—the modern Nemrud-Kalesi—has yielded up three temples, a theatre, a stadium, various extensive porticoes, a market-hall of which there are substantial remains above ground, and city walls in an unusually good state of preservation. All these are discussed in minute detail by Dr. Richard Bohn, and there are supplementary chapters of the history of the city and the evidence of the inscriptions found by Dr. Shuchardt. We may comment in passing on the wisdom shown by the Institute in allowing these supplementary volumes to be bought separately. Subscribers to the other organs of the Institute need not take them, and the general public can. They relieve the text of the "Jahrbuch," and are each of them addressed to a separate section of archeological specialists. We are promised shortly an "Ergänzungsheft" that will be most eagerly looked for,—a treatise by Dr. Dörpfeld and Dr. Emil Reisch on early Greek theatres recently excavated, and the light they throw on the disposition of the Greek stage.

The last number of the "Jahrbuch" (1889, III.) presents a new feature, which will be gladly welcomed by all archeologists. It has always been the custom to publish in this journal a list of the "recent acquisitions" of the Berlin and British Museums. The directors have wisely decided to publish henceforth a similar list for all the smaller museums. Such a publication is, if possible, almost more necessary for small than large museums, because such are more likely to be overlooked. The present number begins with Dresden, and here, as in some other cases, it has been decided to let the summary extend back over several years. The "Jahrbuch" has also ever since its reorganisation led the way in the matter of giving immediate woodcuts of important acquisitions. This plan can scarcely be too highly commended. It now supersedes the detailed and adequate ultimate publication, but its effect is to put that publication into right hands, and in reality to hasten it. Often an important monument remains unpublished because the local director,—who alone knows of it,—does not happen to be a specialist in the particular line it illustrates, and does not feel equal to expounding it. Now, the right man is sure to know of each newly-acquired monument, and equally sure to ask and obtain permission to publish and elucidate it.

In the January number of *Murray's Magazine* is an exceedingly temperate letter from Sir Arthur Blomfield—wonderfully temperate considering the provocation he has had—in reference to the preposterous article by Lord Grimthorpe to which the editorial wisdom of that magazine recently gave currency. His best sentence is his definition of Lord Grimthorpe's "principles of restoration" as

amounting to this—"Whatever I think right is right, and the opinions of all who do not agree with me are not worth consideration." As Sir Arthur observes, "principles such as these possess the undoubted merit of extreme simplicity and of easy application to every possible subject under all possible circumstances, but they have the serious defect of making discussion impossible." We doubt however the advisability of answering Lord Grimthorpe, whose lucubrations are better regarded as those of a person not perfectly sane. If any one could take away the faculty with which he was foolishly entrusted by an ignorant Chancellor, well and good; but that is the only thing it would be any use doing. Nor is it by any means wise to stick to the theory that the old nave roof and flat ceiling might have been preserved. It might possibly have been done with a great deal of piecing and patching, but neither roof timbers nor ceiling were in a condition to make it worth while; we speak from detailed inspection at the time. The ceiling, besides, though it looked well enough from below, had no artistic value; it only required a pair of compasses to design it. Architects weaken their own position by adhering to an untenable position of this kind. The injuries Lord Grimthorpe has done to St. Albans do not consist nearly so much in what he has taken away as in what he has put in its place.

WHERE seems to be a happy inclination at present among very wealthy people to give large sums for works of public beneficence or utility; and the *Pall Mall Gazette* the other day published a list of suggested good works that might be accomplished, in case any more millionaires are thinking of becoming public benefactors. We will suggest one more for London, a benefit perhaps more for the rich than the poor, but one which commercial enterprise has not been equal to. There was a scheme on foot some years ago, of which we heard indirectly, for the construction of a great sea-water swimming-bath for London, of far larger size than any of the existing swimming-baths (300 ft. by 100 ft. was spoken of); the water to be pumped through a main laid to the nearest point on the coast whence pure and uncontaminated sea-water could be drawn. The scheme had been so far seriously considered that an architect had been consulted as to the site and plans; but capital could not be found for it, apparently, as a commercial speculation. Now if any very rich Londoner is inclined to immortalise himself by a great public benefit at his own cost, here is an opportunity for a work which would be an immense boon to many Londoners. The existing comparatively small (?) water swimming-baths in London are, in the summer, inconveniently crowded at the only time when most people can use them, viz., in the morning before the work of the day begins; and at the best these tepid fresh-water baths, in which so many persons plunge during the day, never have the healthy and bracing effect which could be obtained from a sea-water bath of ten times the area, with sufficiently continuous supply to keep it fresh. We make the suggestion in the hope that it will be considered by some modern Croesus who can afford either to give or to risk the money. It might, in the latter case, bring an adequate return. The waste water might be utilised for street watering; an important saving in the ordinary water supply.

IT is edifying to read the opinions of recent correspondents of the *Times* on the subject of London street paving. One wiseacre actually writes to recommend that we should return to granite cubes (unquestionably an admirable form of pavement for endurance and for draught), forgetting that the very essence of the whole difficulty about London pavement lies in the provision of a pavement which shall be at once durable and noiseless, and that wood and asphalt were tried because

the noise of the constantly-increasing London traffic on stone paving, and even on macadam, was becoming an irritation and a nuisance that could be endured no longer. There are streets of dwelling-houses in London, for some years laid with wood or asphalt, which would be emptied of their tenants in six months if, with the present traffic, granite paving were replaced: people's nerves could never stand it. One man writes to say that asphalt is the most injurious pavement for horses that ever was; another that his carriage horses fell over on it and were not hurt, and therefore he thinks asphalt is "not a bad pavement for horses to fall on." We opine that, to a horse falling, asphalt is not quite so hard and cruel a surface as it looks, and that there is a certain amount of give in it; but we have no doubt whatever that more horses fall on asphalt than on any other form of pavement, and that it is the worst of pavements for a horse to get up from, owing to the want of foot-hold. But we are entirely against the recommendation of Sir Robert Rawlinson in Thursday's *Times*, to adopt wood pavement. We quite concur in his remark that much wood pavement has been unsatisfactorily bedded, and that hollows and sinkings in wood pavement are really the result of bad foundations, not of the defect of wood as a paving material. But this does not affect the fact that for a city like London wood pavement is essentially insanitary, and neither Sir R. Rawlinson nor any lesser letter-writers will persuade us to the contrary. It is desirable to avoid as much as possible the use in London of porous materials which hold dirt and "germs," and no one can possibly doubt that wood is one of these. The general acceptance of wood for street pavements would mean that London would be less clean and less healthy than with most other pavements. The suggestion of "J. P." in the *Times*, that asphalt might be covered with a thin sprinkling of dry sand, is practical as far as the result to be obtained is concerned, but the process of keeping up the sand coating over an area of many miles of streets would be a more serious matter than he has realised. Possibly the solution of the difficulty might be found in a new method of permanently finishing the surface of the asphalt so as to leave a sufficiently roughened surface for better foothold.

THE six candidates for the second competition for the Sheffield Municipal Buildings have been selected, but it is not intended that the names should be officially published. From a Sheffield paper we learn that a well-known Sheffield firm are the authors of one of the selected designs; a communication made to the press, we presume, by the architects themselves. As the Borough Surveyor of Sheffield informs us, in a courteous note, that it is preferred that the names should not be published, we have no wish to encourage competitors to traverse the wishes of the Sheffield authorities, who have shown that they understand their business very well and are carrying on the matter with every wish to act fairly towards all concerned. We are informed that there is an intention to exhibit the non-successful sketch designs, provided a majority of their authors give consent. One of the competing architects writes to us to suggest that this is not the right time to do this; that it should not be done till the final selection is made, when the unsuccessful sketches should be exhibited along with the successful ones, for better purposes of public criticism and comparison. He adds that this would in another sense be more fair to the unsuccessful men, as in spite of their non-success many of their plans may contain valuable suggestions which would be thus thrown open to be studied and possibly assimilated by "the six," or some one of them. There is something in both these arguments, in which we are inclined to concur. We may add that there is much more interest in such an exhibition when the successful designs are included. We remember the exhibition of the

unsuccessful sketch-designs for the Manchester Town Hall, when there was the same feeling expressed by many—that there was very little point in it when it was impossible to compare them with the selected designs.

THE promoters of a small competition for local public offices at South Stockton, not to cost more than 2,500*l.*, have been comparatively liberal in premiums, offering three of 50*l.*, 25*l.*, and 15*l.*; but what they give with one hand they seem to wish to take away with the other: they provide that "the three sets of selected plans, specifications, working drawings, and schedules of quantities, to become the property of the Board, who may employ their own Surveyor or any other person to superintend the erection either with or without any alteration therein. The Board, however, desire to know from competing Architects what remuneration they will require if employed to carry out their own plans and give all needful general superintendence, and a letter giving such information should be sent with the plans." This latter clause, which amounts to a proposition to give the commission, if at all, to the man who will do it cheapest, is a most improper one to offer to the members of a liberal profession, and no architect of good position would have any anything to say to it. The demand for specifications and working drawings with a set of competition drawings is so absurd that it may be charitably supposed it is dictated by ignorance.

AN article on "Hoorn and Enkhuizen," written and illustrated by Mr. Reginald T. Blomfield, appears in the January number of the *English Illustrated Magazine*. Coming as it does so soon after Mr. Blomfield's utterance before the Architectural Association the paper is especially interesting; it shows how well he can practise what he preaches. His drawings, eight in number, are indeed quite different from the "wiry, mechanical pieces of work," which he says are conjured up in a painter's mind by the words "an architect's drawing"; but we cannot think that the effective sketch of "The Harbour Gate, Hoorn," is improved by the scrolls which do duty for a sky. The "Water Gate, Enkhuizen," is a pretty piece of work, and the detail of the doorway to the Burghers' Orphanage at the same place is crisply shown. The article is picturesquely written, but will, we think, be of more interest to architects than to that almost, but not quite, omnivorous creature, the general reader. Two short passages are worth quoting for the sake of showing how carefully Mr. Blomfield has studied the buildings of which he writes—"The two lower niches have cannon-mouths carved in stone and painted black, which the guide-books describe as real guns," and again, "In the top stage of the gable are carved two figures of armed men, supporting the English arms. M. Havad gives a tradition that this shield was captured from an English ship in the days of the redoubtable Van Troup, and set up as a trophy. He describes it as the original shield supported by the effigies of the negroes who took it. One would more easily credit this tradition if it were less circumstantial, for the shield is not of wood but of stone, and the figures that support it are not negroes at all."

THE January number of *The Portfolio* is prefaced by a short sketch of the history of the periodical by the editor, whose writing, whether on himself or on other subjects, is always interesting. The first of a series of articles on "The British Seas," with illustrations of sea and shipping, promises well, and the name of Mr. Clark Russell to the literary portion of it is a guarantee that the subject will be treated with knowledge. An article on Mr. Walter Crane and his works is illustrated by a reproduction of his energetic design of the "Chariots of the Hours."

AN appeal is made for contributions to a fund wherewith to meet the cost of repairing and enlarging the parish church,

St. Mary Magdalen, Woolwich. The church was rebuilt in 1728-33; it has a plain exterior, whilst the interior is after the Classic style then prevalent. It is proposed to add a larger chancel, together with side chapel and organ chamber; to construct a more commodious vestry; to replace the windows; and to restore the stone coping, which is pronounced to be in a damaged state; and to fence in and level the churchyard. The western tower, outer walls, and roof were repaired a few years since, and are in good condition.

THE large pasteboard almanac for this year issued by the Stationers' Company bears a picture of the Tower of London, as seen from the Thames, looking towards the north-east, and embracing the river frontage from the Middle to the Develin (Gallichmae or Iron Gate) Towers. This drawing, made and engraved by Mr. Louis Godfrey, delineates the Tower as it appears after the demolition and more or less superstitious restoration which has been effected, within the past four or five years, by the Office of Works. The cupolas on the four angle-turrets of the White Tower are drawn to a rather too lofty and pointed form. The outline of what we take for the Byward Tower—and it can hardly be any else—is indistinct; whilst the Garden (or Bloody) Tower shows battlements, which that tower has not. The large block, containing the guard-room, with the soldiers' school and reading-rooms, seems to be somewhat out of position. This ugly building has replaced the gabled "Seven Houses of Office," of *temp.* Henry VIII., that stood between the Garden Tower and the Coldharbour, and may be seen in the model of the fortress (1841), which is now preserved in the Armoury as recently rearranged within the central keep.

SOME correspondence has been printed in the *Times* *a propos* of modern and ancient mummies, and the supposed head of the Duke of Suffolk, father of Lady Jane Grey, preserved in Holy Trinity Church, Minorities. Mr. Seymour Haden sees a likeness in the features of that relic to two portraits of the Duke in the Tudor Exhibition, and Mr. J. Standish Haly is satisfied that the more popular belief as to the head being the Duke's is authentic. Some say it is that of the Duke of Monmouth. In our columns of Jan. 9, 1886, we referred to a highly-probable theory of its being the head of Edmund de la Pole, Earl of Suffolk, executed in 1513. Mr. Standish Haly insists upon the circumstance that the Duke of Suffolk, executed in 1554, "resided at the Minorities, that establishment having been granted to him on its suppression as a religious house." But the Minorities did not belong to him up to the period of his death. He lived there in part of Edward VI.'s reign; but made it over in 1552 to his two brothers, Lords John and Thomas, with one Medley, and went to Sheen, where he was living at the time of his share in Wyatt's uprising. On the other hand, Edmund de la Pole, whose family had once owned the manor of the Rose, St. Laurence Poultry, was buried in the Minorities, whilst it was still a convent, as were also his daughter, a nun there, and his wife. Curiously enough, the Rose manor was given, after the Earl's attainder in 1513, by Henry VIII. to his brother-in-law, Charles Brandon, Duke of Suffolk, as Shakespeare reminds us:—

"Not long before your highness sped to France,
The Duke being at the Rose, within the parish
Saint Lawrence Poultry."

—"King Henry VIII." i. 2.

IN his little hook upon the Barbers' Hall*, and that Company's treasures, Mr. Shoppee, F.R.S.B.A., gave an interesting account of the large picture by Holbein, which may now be seen in the Tudor Exhibition.

* Description of "The Pictures and other Objects of Interest in the Hall and Court Room of the Worshipful Company of Barbers," by Charles John Shoppee, some time the Company's architect and surveyor. . . . 1883.]

The painting executed reputedly upon canvas, but really on oaken panel, shows Henry VIII., seated in state, delivering to Thomas Vicary, Master and "King's Surgeon," a new charter (1541) to the then freshly-united companies of Barbers and Chirurgeons. The figures comprise Sir John Ayliffe, Master in 1539; Nicholas Symson and Edward Harman, "King's Barbers;" the celebrated Dr. William Butts, and Dr. John Chamber, Warden of Merton College, Oxford, and Dean of the College of the Virgin and St. Stephen, in Westminster. To the extreme right stands J. Alsop, physician to the King. This picture was lent to James I. and his successor, in order that likenesses of Henry VIII. might be copied therefrom. We may add that the Company's records demonstrate that instead of having suffered damage in the Great Fire, as is asserted by Pepys, who was minded to offer 200*l.* for it (see his diary, 28 August, 1668) the painting had been carefully removed into a house in Moorfields, and so was saved. The day before his visit with Pierce (a surgeon) to the Barbers', Pepys had passed from Whitehall to the Matted Gallery, then under repair, and writes—"And pity to see Holben's work in the ceiling blotted on, and only whited over!" Walpole avers that the picture had been retouched, but its owners say it has undergone no other change than by a careful cleansing in 1719, and again, in 1878, by Mr. George Redford who, *teste* Mr. Shoppee, discovered it was painted upon a gilt ground.

THE *Antiquary* commences a "new series" with the present year. Among the articles is one on a supposed Saxon altar-slab at St. Benet's, Cambridge, by the Rev. G. F. Browne, who has made ancient altar-slabs and tomb-slabs a special study. Among other points the author makes the suggestion whether the ancient practice of cutting five crosses on altar-slabs was done as symbolical of the five wounds of Christ. We should think this extremely probable. "The Church Plate of the County of Dorset," by Mr. F. E. Nightingale, is the subject of an article signed C. R. Manning, including some well-executed illustrations, one of which shows a curious and very unusual cup from Wraxall.

PROFESSOR MIDDLETON proposes during next Easter vacation, from about March 22nd to April 22nd, to give a course of lectures in Athens and the neighbourhood with a joint class of students from Oxford and Cambridge, on the buildings and topography. He will be glad to admit also to these lectures any architectural students from the Royal Academy, the Institute of Architects, or the Architectural Association. Professor Middleton's hook on Rome has proved that he has a quite exceptional faculty of reading and expounding the data of ancient buildings, and those students who are able to avail themselves of this opportunity will find it well worth their while to do so.

Lectures on Architecture and Sculpture at the Royal Academy.—Professor Aitchison, A.R.A., is announced to give the following lectures to the Academy students:—Monday, Jan. 27: "Roman Architecture,"—Preliminary." Thursday, Jan. 30: "The Laurentine Villa of Pliny the Younger. Monday, Feb. 3, Thursday, Feb. 6, Monday, Feb. 10, and Thursday, Feb. 13: four lectures on "The Private Houses and Palaces of the Romans." The lectures on Sculpture will be as follows:—By Mr. A. S. Murray, Keeper of the Greek and Roman Antiquities in the British Museum: three lectures (Monday, Feb. 17, Thursday, Feb. 20, Monday, Feb. 24) on "Sculpture in Greek Temples." By Professor J. H. Middleton: three lectures (Friday, Feb. 28, Monday, Mar. 3, Friday, Mar. 7) on "Florentine Sculpture in the Fourteenth and Fifteenth Centuries."

The North-Sea-Baltic Canal.—It has now been decided that there are to be two gates only on the North Sea-Baltic Canal, viz., at each end. This will enable vessels to pass through the canal at any tide in eight hours.

SPIRES, TOWERS, AND DOMES.*

The title of this paper, "Spires, Towers, and Domes," is a comprehensive one, conjuring up to the imaginative mind a boundless vista of graceful towering monuments of architectural art. Who has not felt the powerful appeal made to the senses as the view of a great city unfolds itself for the first time to the gaze of the traveller, with its well-proportioned monuments reaching into the heavens, viewed on a brilliant morning, or, may be, standing out against the rich red hues of an evening sky, domes, towers, and spires one and all testifying to the artistic feelings and restless industry of mankind in all ages?

It is, and responsible part than the one architects of past ages have taken in the building up of the magnificence of many European cities. On their thought, on their work, without doubt the picturesque, the popularity, the importance, and even the prosperity of many a European capital has rested, and in no more prominent direction has architectural skill contributed to such success than in the design and disposition of the graceful Gothic spire, of the stately campanile, and of the voluptuous symmetry of the classic dome.

Every one here has surely felt the awe-inspiring effects of a grand interior, and yet a flow of sentiment is easily checked, the fire of enthusiasm easily quenched, by a commonplace thought, by a mundane fact. Nothing destroys the poetry of an impression so completely as the consciousness of a material defect associated with the object of our admiration. It is in this regard that we can realise the difficulties that had to be overcome by, and the onerous responsibilities that rested on, the designers of past ages. Their works not only have had to meet the requirements of the ages in which they were built, but they are now subjected to the artistic criticism and the scientific investigation of nineteenth-century enlightenment.

It, then, must ever be the greatest care of designers that there shall be in the creations of their craft nothing that shall suggest instability, nothing to indicate decrepitude, nothing that shall point to a finite existence. If this has been achieved then there will be no danger of the first heat of enthusiastic admiration being chilled by a closer knowledge of the constructive anatomy of our architectural idol, whether it be spire, tower, or dome.

Spires, towers, and domes comprise an important section of an architect's work, and form a subject not limited by the dogmas of a style nor bound by the chronological limits of a period. Its vastness presents a difficulty as to its most profitable treatment in a short paper. The historical, the æsthetic, the constructional and scientific divisions of the subject could each in themselves furnish ample material for separate discourses. This paper, however, will be found to embody a large proportion of the constructional and scientific, clothed with a slight historical and æsthetic mantle.

From the earliest recorded times the greatness of man's mind in the material world has sought expression in lofty erections. In the futile endeavours of the descendants of Noah, 2247 B.C., to ontwit the anticipated wrath of an awful Deity by the erection of Babel's tower, and in the more successful efforts of mankind in other lands and in later centuries, we are conscious of the existence of a sentiment that finds expression in the erection of buildings that point upwards and away from this worldly world. China, India, Asia Minor, Northern Egypt, the Moorish lands, Italy, France, Spain, Germany, our own country, have reared many and glorious examples of spire and tower design, but, strange as it may seem, we turn in vain to Greece, the fountain-head of architectural refinement, for an example, and we find it not. The Grecians, a race gifted beyond measure, intellectual to a degree, ultra-refined, almost divine in their artistic feelings, failed to rise above the worldly horizontality of architrave and cornice.

We have seen the campanile development of Italy, with all its wealth of detail. We are familiar with the solid, sturdy growth of Gothic tower architecture in Northern Europe. We are conscious of the beauties and delicacy of the French treatment. But, with all this knowledge, where can we find towers and spires to

* A paper by Mr. S. B. Beale, read at the meeting of the Architectural Association on the 3rd inst., as elsewhere mentioned.

equal in boldness of conception, grace of outline, and beauty of detail, the Gothic,—aye, and even many of the Classic towers and spires of this or our own country? The sequential development of English architecture as exemplified in the ancient ecclesiastical buildings of the Gothic style is exceptionally marked by the development of spire and tower design.

In reviewing the history of spires, our attention, for strong reasons, must be confined to English forms and English construction.

The simplest form of spire conceivable is the four-sided pyramid rising from the square tower, with its sides parallel to those of the tower, and overhanging, thus forming slightly projecting eaves upon a corbel table. Southwell Tower is an example. In the Romanesque period the spire has its first true conception. Thon Church, Normandy, with a masonry pyramidal termination in height about 1½ diameters, and a steeper one at Valladolid, with a height of 2½ diameters, undoubtedly embody the spire principle.

In the Early Gothic of this country spires obtained a firm hold on English church builders, beginning with the octagonal pyramid and its attendant broaches of masonry springing from the angles of the usually square tower, and butting against the splayed sides of the octagon.

From the simple broached spire we turn to an important change. Instead of the spire projecting slightly beyond the faces of its tower base, it sprang from a base area entirely within the edges of the tower. This modification opened up a wide field for elaboration, which was taken full advantage of during the Decorated period. Beginning with the parapet simply, followed by a combination of parapet and broaches; parapet and pinnacles; parapet, broach, and pinnacles; parapets and angle turrets; elaborated again by double pinnacles, and, finally, by the introduction of miniature flying buttresses springing from the pinnacles or turrets, and abutting against the splayed sides of the spire. The Medieval builders in this period produced spires of complicated design and elaborate detail, contrasting with the effective simplicity of the early broached spire in a very marked manner.

In the early part of the Perpendicular period, the spire had reached its highest state of development and elaboration. Spires were constructed from a vertical polygonal drum standing upon a rectangular tower; the surface of the spire was in some instances enriched with cusped panelling. Crockets had free play on the minor turrets and pinnacles at the spire base, and up the ribs of the spires themselves. Ornaments and features were crowded on until the zenith of spire design was reached. Then the reaction came, and square towers were once again generally erected without the superincumbent spire. The decline did not occur, however, until some very beautiful examples of each of the different kinds here scheduled were left to tell their tale.

There are some unique combinations of spire and tower in the minor English Medieval parish churches, among which may be mentioned an octagonal spire springing from a tower of octagonal plan from base to summit; the same, accompanied with angle turrets springing directly from the ground, of which there are examples at Stanwick, Northamptonshire, and at Wickham Market, Suffolk.

It would be difficult indeed to specify the date of the erection of the earliest tower in Great Britain, and what were the exact reasons that prompted its erection. Reasoning upon probabilities, we may arrive at a tolerably reliable conclusion in the latter case.

The tower, rising as it does above the general height of the buildings reserved for the common use of mankind, possesses physical pre-eminence which naturally suggests its erection in those positions and amongst those buildings which require accentuation either to indicate their positions from afar, or to testify to their public or private importance.

The tower of Medieval times in secular buildings served for a look-out, as a refuge, and as a place of vantage in troublous times. There are a few ecclesiastical towers having some quaint legends and curious histories associated with them. Of these the tower of Boston Church, Lincolnshire (in itself a magnificent example) has been immortalised by the writings of Jean Ingelow. In romantic verse the poetess has told of the pealing forth of the bells in the church tower at a time of particular danger from floods. Many human beings were drowned who were not able to take advantage of the

periodical warning rung out from the bells of Boston tower.

There are numberless reasons given for the erection of towers in connexion with ecclesiastical edifices. Archaeologists assure us that the chief ground for erecting the tower was to procure a position for the hanging and ringing of bells. Now, it is asserted that bells of large size were not cast until a date long after large, massive, and high towers had been in existence. This fact rather destroys the idea of bell-raising being the prime cause for ecclesiastical tower building. Certain it is there were many causes working together to justify the erection of towers for one or other of the purposes enumerated. Towers may form a valuable artistic addition to a fabric, and some may serve a purely utilitarian function. There is a further class, the claim of which to existence it is difficult to define.

As a nation's architecture is mostly measured by the standard of its ecclesiastical work, so must we turn for the best examples of tower design to English and foreign ministers, priories, and cathedrals. At the outset it will be well to notice the positions of the tower in regard to the body of a cathedral or minor edifice consecrated to Divine worship.

In the southern countries of Europe the tower was frequently detached entirely from the main building,—a notable instance being Pisa. It has been suggested that the fear of the vibration set up by bell-ringing in the tower prompted the arrangement. It is to a more powerful reason, however, that we must look as the cause of so marked a feature in church planning. The builders of Italy, for instance, in erecting a tower, never appear to have been satisfied unless they produced walls 10 ft. thick and upwards. The excessive weight of such construction brought abnormal loads upon the foundations, producing subsidence, and it is to this fact (not fully appreciated then, nor has it been properly understood since) that we must look as the reason for the isolation of the tower. A settlement (no uncommon thing) due to the great weight of the tower would have entailed disaster and ruin on the cathedral if the tower had conjoined with the general structure. A diagram on the walls, with a little subsequent explanation, will bear out this view.

The position over the crossing of a church as the site of the tower can scarcely be improved upon, combining, as it does, the essential advantages of a centralised position, all the component portions of the church leading the eye of the observer up to it when seen externally. In view of the modern tendency in church-planning to reserve a large congregational area about the preacher, this central tower affords every facility for the effective lighting of a portion of the church usually in the dark. Of the important English examples of this kind that occur to the mind are the cathedrals of Salisbury, Winchester, Norwich, Worcester, Gloucester, and the Abbey of St. Albans.

Although the central position for the tower possesses many advantages over any other, to the unstable manner in which central towers have been constructed has been ascribed their location at the west end of the nave in more modern instances.

We are reassured by the architectural historians that the great inconvenience to worshippers entailed by the frequent works of reparation to the central tower brought about its removal to a position less contiguous to the area reserved for service. This fact may or may not explain the adoption of the western site as a very suitable one for a single tower; the principal point in which this paper is concerned is, that the ancient builders to whom, in other directions, we owe so much, did not erect their central towers with a sufficient regard to economy of material.

The western site, on the extremity of the longitudinal central line of the nave, is a very general position for the towers of the parish churches of England. The extremities of the aisles sometimes came right up to the front or west wall of the tower, thus flanking it on both sides one story high, and in other cases the tower stands clear of the main edifice, only joined thereto on the east side. It has been advanced that this latter is the proper arrangement for a single west tower, if it is to receive its full significance and importance.

There are other less-favoured positions for the tower of an ecclesiastical building that may be noted. Of these, the least objectionable one is the transept site, north or south. Of the others,

the position for a single tower to be most avoided is that to the north or south of the west front.

The otherwise fine tower of St. Mary Redcliff, Bristol, is to one side of the west front.

In England's cathedral towers are exhibited the respective values of each position. Chichester, with its central and detached tower; Ely, with its central and west tower; the two transept towers of Exeter; the three or more towers of Lincoln, Durham, Wells, York, Canterbury, Peterborough, and Lichfield refer to the mind as showing combinations of towers that are peculiarly successful in their architectural grandeur.

The detailed consideration of tower design in plan, in arrangement, in roofing, and in its strict architectural treatment, cannot be done justice to on this occasion, and is, therefore, not attempted.

Each country has some peculiarity of arrangement. Italy has its circular and polygonal plans. Germany has the characteristic ohlong plan; the towers, usually extending over the whole west-end of the church, have been very aptly termed narthex towers. While of English towers the great majority are square, or very nearly so, in plan.

It is not perhaps just to bring the towers of various countries into review order for critical comparison, when it is remembered upon what widely-differing agents their designers have relied to produce the architectural effect of the whole.

A tower that relies for effect upon the beauty and variety of the coloured marbles used in its erection and embellishment cannot be criticised from exactly the same standpoint as the tower that relies upon its fenestration for its effect, or with the tower that appeals to the eye by reason of its exceeding beauty of outline. The one, when viewed as a distant object in the landscape, may well suggest the pumping-tower of a waterworks, and its beauty will not be appreciated without the aid of a telescope. This tower must be viewed from the area immediately around its base, while the beauty of the other towers may be seen miles away.

We may each have our own sympathies directed towards the tower design of a particular age, style, or country. But there are good grounds, patriotism aside, for maintaining that of the towers and spires remaining from the Medieval ages, in which may be seen grand conception with artistic detail, the erections of North-west Europe, and particularly of our own country, must stand in the first rank.

Unfortunately, many a beautiful spire has been lost to us for ever, its ruin and fall arising out of ignorant construction and misuse of material,—an evil extending into later and even current times.

The Norman period of English architecture is in this country looked upon with peculiar reverence; due, perhaps, more to its romantic associations than to its incipient beauty. Now, whatever æsthetic value there may be wrapped up in the massive grouping and rude ornamentation of Norman work, certain it is that there was in this period, and later, an extraordinary prevalence of bad construction, to which is traceable the ruin of many a fine abbey. The evil effect of it is even felt in this century, and arises in some such manner as the following:—

Contemporary church architecture is not much valued in these days unless a precedent can be stated for each arrangement and each detail of it. It is rank heresy to some minds if the forma and modes of construction now adopted cannot be traced to bygone times. But the designer who draws upon Medieval ages for the basis of his nineteenth-century churches must be capable of windowing the busks from the golden grain.

Although no constructor would in these days build up the shafted pier of a church or cathedral with a thin casing of stone, of a thickness only sufficient to work its mouldings on, and then shoot in a loose rubble core, resting content with the idea that a pier had been obtained capable of sustaining the heavy superstructure of a central tower, with the thrusts from the contiguous nave arching, still there are many peculiarities of Norman construction and constructive principles of later styles which are even now religiously followed, and which must subsequently be attended with no less disastrous results than those chronicled on the exhibited diagram.*

The evil, prevalent in the building of many of England's fairest abbeys, cathedrals, parish and

* The diagram here referred to was a list of cathedral towers which have fallen since Norman times.

other churches, ministers and priories, has been the dangerous overloading of foundations and subsoil bottoms.

This is true of the general body of the cathedrals the author has investigated, the weight brought by nave walls on to the foundations approaching very nearly the supporting power of the soil as far as such strength can be accurately estimated. The evil of overweighted foundations is particularly marked in the locality of the towers, and most notably when the tower is over the crossing. Such an instance was the tower of St. David's, South Wales. This tower, 40 ft. square, and weighing over 4,000 tons, first failed by the bodily sinkage of its western side, crushing down portions of the nave, and generally upsetting the perpendicularity of its piers. The expenditure of 11,000*l.* remedied the want of constructive knowledge on the part of the original builders of this tower.

Failure not infrequently occurred at the west tower foundations, and it will be useful to inquire what are the agents generally at work endangering the stability of great towers. Such causes as badly-selected materials (as in the case of St. Michael's, Coventry) are not now dealt with. First and foremost, the most destructive agent is the great weight of masonry in the tower itself cumbering the ground unduly; this overweight being sometimes further aggravated by a tall spire of heavy construction.

The presence of timber in the foundations, occurring as piles, serving no useful purpose whatever, but subsequently decaying and endangering the superstructure, is another cause of failure. The tower of Ely Cathedral sank 6 in. from some such cause, occasioning, as can well be imagined, great ruin to the adjoining wings of the western transept, one of which was taken down and the other repaired. Although no actual mishap has occurred at York, a writer in 1846, remarking on the Minster of that city, chronicled the fact that the tower stood upon very rotten foundations; they crumbled away at the touch, and could be easily probed with a crowbar. The consequence was that cracks appeared in the great tower.

To explain the constructive failure of so many of our fine cathedral towers, it has been said that the Normans erected their work upon the had foundations of the pre-existing ecclesiastical buildings. This explanation shifts the blame from the Norman builders to their predecessors in these lands; whereas, investigation of the construction, and detailed calculations, show that enormous weights were piled upon a small area of foundation by the Norman builders, a conclusion which rather puts the boot upon the other leg.

It is, of course, possible to build very massive masonry to a great height on ordinary soil if the weight of such construction is evenly and sufficiently distributed over the soil. But what has been the method by which the great weight of many towers has been brought on to their foundations? It has been the almost universal rule to carry central towers upon isolated piers, these piers transmitting the many thousand tons pressure upon usually four points of small area on the cathedral site, showing, in some places, a weight of five tons on the square foot, and in others twenty tons. The very nature of a central tower makes it necessary to carry the upper portion upon piers; but when this is done, the piers should be joined again into a continuous construction under the ground-level by the building of inverted arches of the same width as the upper tower walls, and further, they should be bedded in a wider base of concrete to sufficiently distribute the enormous pressure from the piers of a lantern tower. Some constructors go so far as to say that wherever an arch occurs in masonry or other work which tends to throw unequal weights upon foundations, an inverted arch should be built under the ground-line for each one in the wall above. In church work this system of inverted arches should be built between all the pier bases of the nave arcading, under the chancel arch, and in any other position in which a concentration of pressure is anticipated.

It has been remarked that failure not infrequently occurred at the west tower foundations. In this position, where one would think there was no reason preventing the carrying down of the walls continuously on to the foundation, the walls, in many cases, are arched over, and carried upon four piers at the angles of the tower, presumably with the idea

of economising the material that has been so lavishly bestowed up above, but with the sure result of precipitating the destruction of the fabric.

Bells have always been active agents in tower destruction, both from their weight and vibration. A rule has been published with reference to the necessary thickness of tower walls intended to support bells, and it runs: The mean internal area of a tower should be one half the external area, and then, if well built and of good materials, the tower will safely bear as many bells as can be hung on one level. A calculation based upon this rule for a tower say of 40 ft. side produces walls 6 ft. thick, assuming its height at three or four diameters high, this, with the weight of as many bells as can be hung on one level, will show a pressure of five tons on the square foot of soil. Add to this the possible weight of a spire, and such a pressure is put upon the foundation that it is little wonder failure ensues.

This particular rule takes no account whatever of the height to which the tower may be built.

Such rules commend themselves to the unwary by their simplicity, and yet the two or three minutes spent in a calculation of such a nature has brought about a world of anxiety, years of regret, and, perhaps, professional ruin.

These errors of misjudged construction are not overrated in this paper. Examples known to the whole world testify to the truth, for instance, the dome of St. Peter's, and the various modifications during erection that had to be made before a lantern was built to that edifice that could be relied upon not to bring the dome down with a run; the unfortunate cases of our own cathedrals; or the many French and German collapses. They all point to the conclusion that the knowledge and capabilities with the peculiarities, strength, and capabilities of different materials in all the varying phases of construction, is not on a par with the undoubted standard that has been attained in artistic architecture. The science of architectural construction is as far behind our excellence in aesthetic design as the medical knowledge is behind the surgical attainments of another profession.

The disparity arises in but one way. The student of architecture, either from want of guidance or from misdirection in his earliest years, attempts to produce drawings more or less artistic; he is tempted early to study the aesthetics of architecture, the study becomes engaging, even fascinating, until the whole soul is imbued with romantic tradition and architectural lore. It is easily understood how unromantic, even nauseous, the study of the science of construction, and the strengths of materials with their attendant calculations, must have become. A book of formulae and figures is put aside with impatience, perhaps with disgust. The nourishment of practical knowledge is dropped for the narcotic of archaeology.

The principles which are shown by modern science to underlie architectural construction, are in themselves few and simple, and at the same time reliable. A firm grasp of them may be obtained in the first year or so of study. The mathematical knowledge wrapped up in them is not extensive, and should flow without effort from the mind fresh from college or school. Such knowledge once allowed to rust never regains its old vigour. The mathematical and scientific attainments obtained in college life must be carefully nurtured and trained, or they will wither and die under the fierce glow of aestheticism, a sentiment early permeating the whole being of the earnest student.

The few principles which govern tower building may be enumerated very shortly. After having settled the general plan, outside dimensions, and approximate height, the thickness of walls should be tentatively settled, being dependent upon subsequent calculations. Such preliminary judgment should be based upon the least thickness of masonry that is requisite for keeping out weather, consistent with forming a secure and complete bond in the material, and other practical considerations, as window treatment, provision of sufficient abutment for vault springings and corbelling. The approximate weight of the structure may then be calculated, and attention is then paid to the influences which are likely to endanger the stability of the tower when properly constructed.

Towers and spires, above all other buildings, are exposed to the full fury of gales. The force of wind obviously varies directly as the rate at which it is going along, and is given by the following simple formula: $P = 100V^2$ where

P is the pressure upon the square foot in lbs., and V the velocity in miles of the wind in one hour. The full wind pressure that has been experienced must be allowed for as tending to produce overturning effect. A careful estimate of what the maximum force of the wind is likely to be in the particular situation must be made. This calculation should never be omitted when designing a spire, for the reason that there is no more powerful agent of tower destruction than that which produces the rocking action of an apernucumbent steeple.

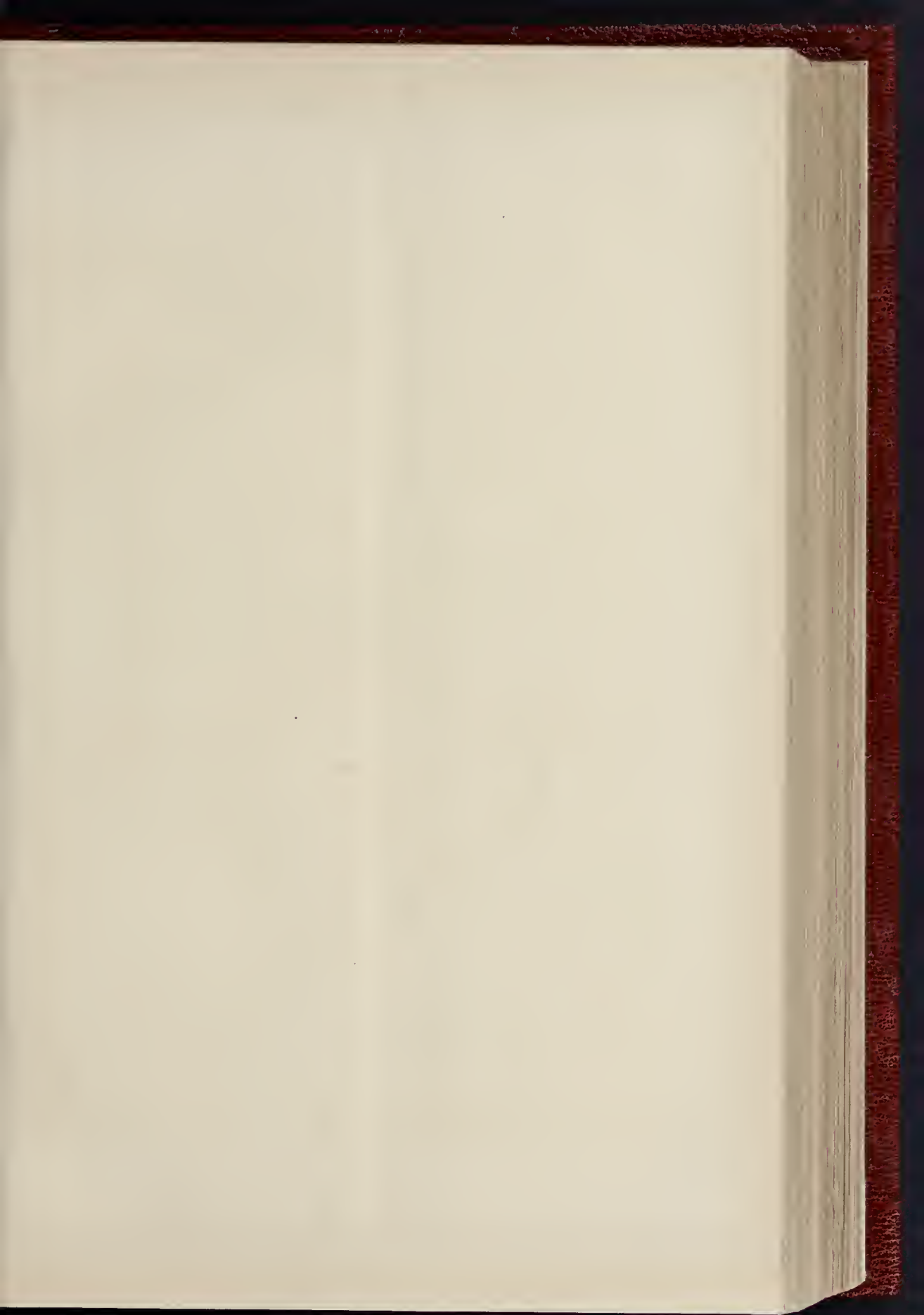
The effect of wind pressure upon a tapering Gothic spire is considerably modified by the plan, elevation, and mode of construction of the spire. The inclination of the sides of Gothic spires, varying as it does from about one in five to one in ten, reduces the estimated horizontal wind pressure by 2 lb. and a 3 lb. respectively on the square foot. This is so small an amount as to be negligible. For an architect's purpose it is unnecessary to find what the reduction is for the vertical slope of a particular spire, as the error is on the side of safety. The plan, if polygonal, necessarily reduces the maximum wind pressure from what it would be if acting upon a rectangular-planned spire—a reduction ranging usually from one-third to one-half for plainly-constructed spires.

Further, if the spire is built with rounded or other rolls projecting up the ribs at the line of intersection of the planes of the spire, not only is there more surface exposed to the wind, but the edges of discharge for the wind are cut off, and its impactive force aggravated. From experiments of wind pressure on cellular surfaces composed of test plates with only one, instead of the usual four edges of discharge, the practice is based of adding one-fourth of the registered pressure on the square foot for each of the lines of discharge cut off. This operation has been regarded in the calculations of the tower Pisa on the large diagram.

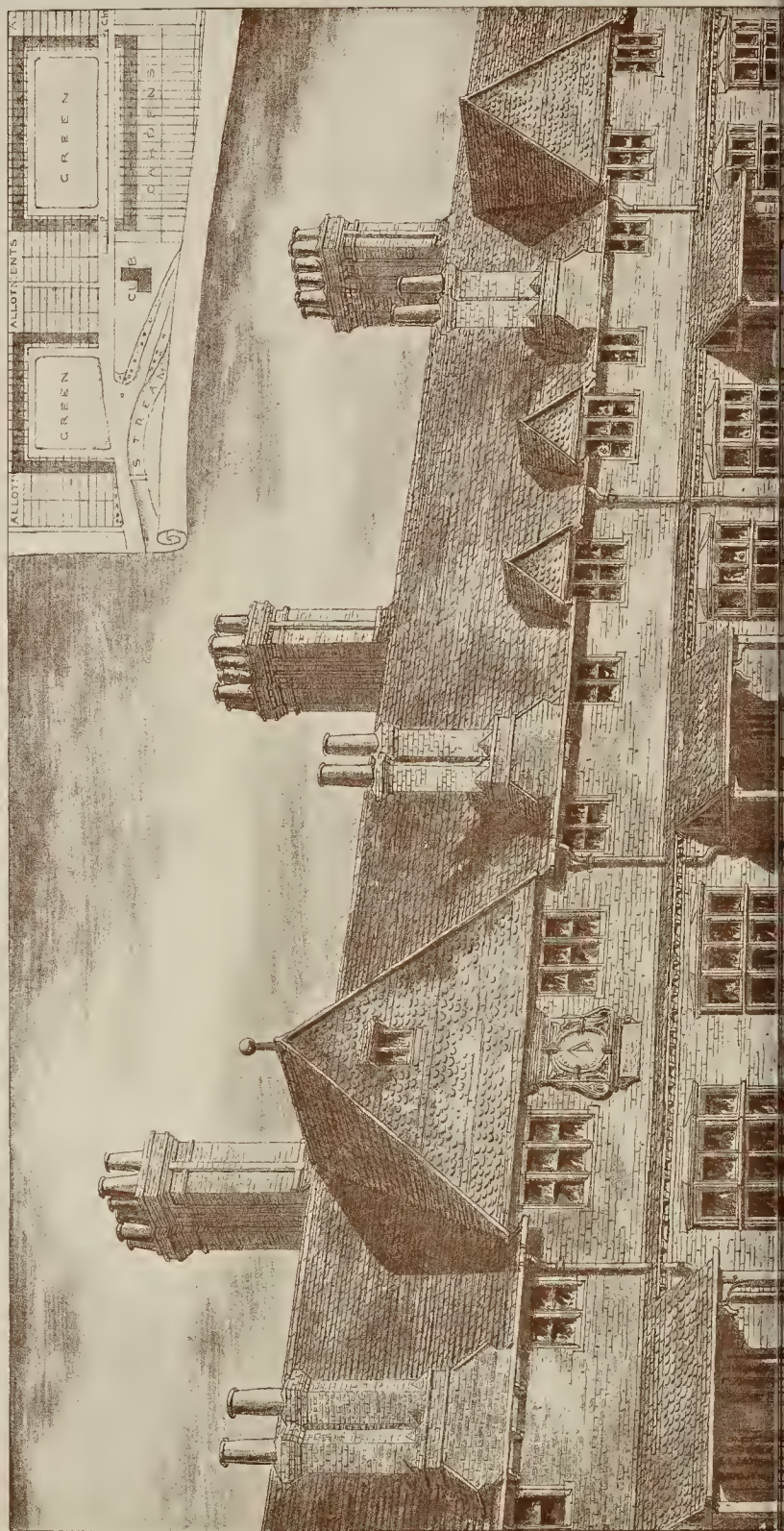
The vertical faces of lucarnes, or other features, would slightly modify the effective wind pressure upon a spire, and they must be regarded or neglected according to the degree of nicety aimed at.

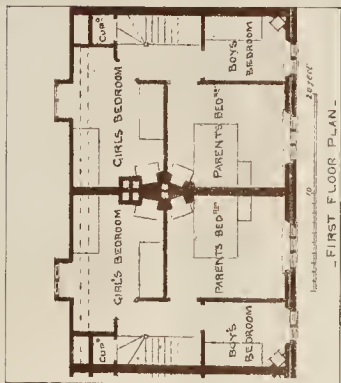
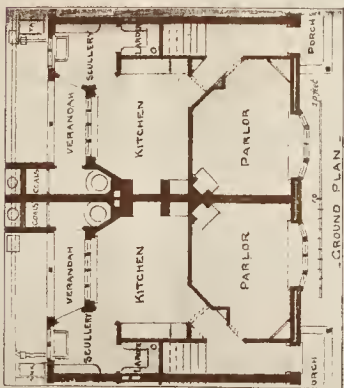
Having at last obtained a careful estimate of wind effect, the approximate weight of the spire with a tentative thickness of material is then estimated, and the subsequent investigation may be either done by calculation of the moments or by graphic resolution. If the investigation be by taking moments, the point about which the forces are estimated as acting should be one-fourth or one-sixth of the least diameter of the spire from the leeward edge, according to its plan. The calculation by moments is advantageous from its allowing any modification of the weight of the spire that may be necessary to balance the respective moments in foot-tons or foot-pounds of the wind pressure and the spire weight. By this means a reliable spire will be produced, possessing the minimum amount of material required for absolute safety and rigidity. Of all the features of spires that do not contribute to their stability the entasised outline is the most prominent. Its introduction to correct a visual delusion surely subverts the important artistic office of the Gothic spire. Who will say that the spire of St. Vincent's, Caythorpe, or St. Helen's, Broughton, Lincolnshire, and many other highly-entasised spires, are not artistic failures? For stability the entasis thickens the spire out at the wrong place; by its adoption the base is cut off at the very point, where, if anything, it should be widened out.

On the other hand, such features as broaches, pinnacles, miniature buttresses, and turrets, add weight and consequent stability to the spire when clustered around its base. To make the investigation complete, a further point that should be inquired into is the tendency of portions of the spire to slide on the bed-joints. This action cannot possibly occur if the total wind force is less than the normal component of the weight of the spire above any bed-joint, multiplied by the co-efficient of friction of the material used in the construction. Failure by crushing should be looked into; the amount of the pressure on the square foot will, in the majority of spires, be greatest at the base, and will vary in disposition and



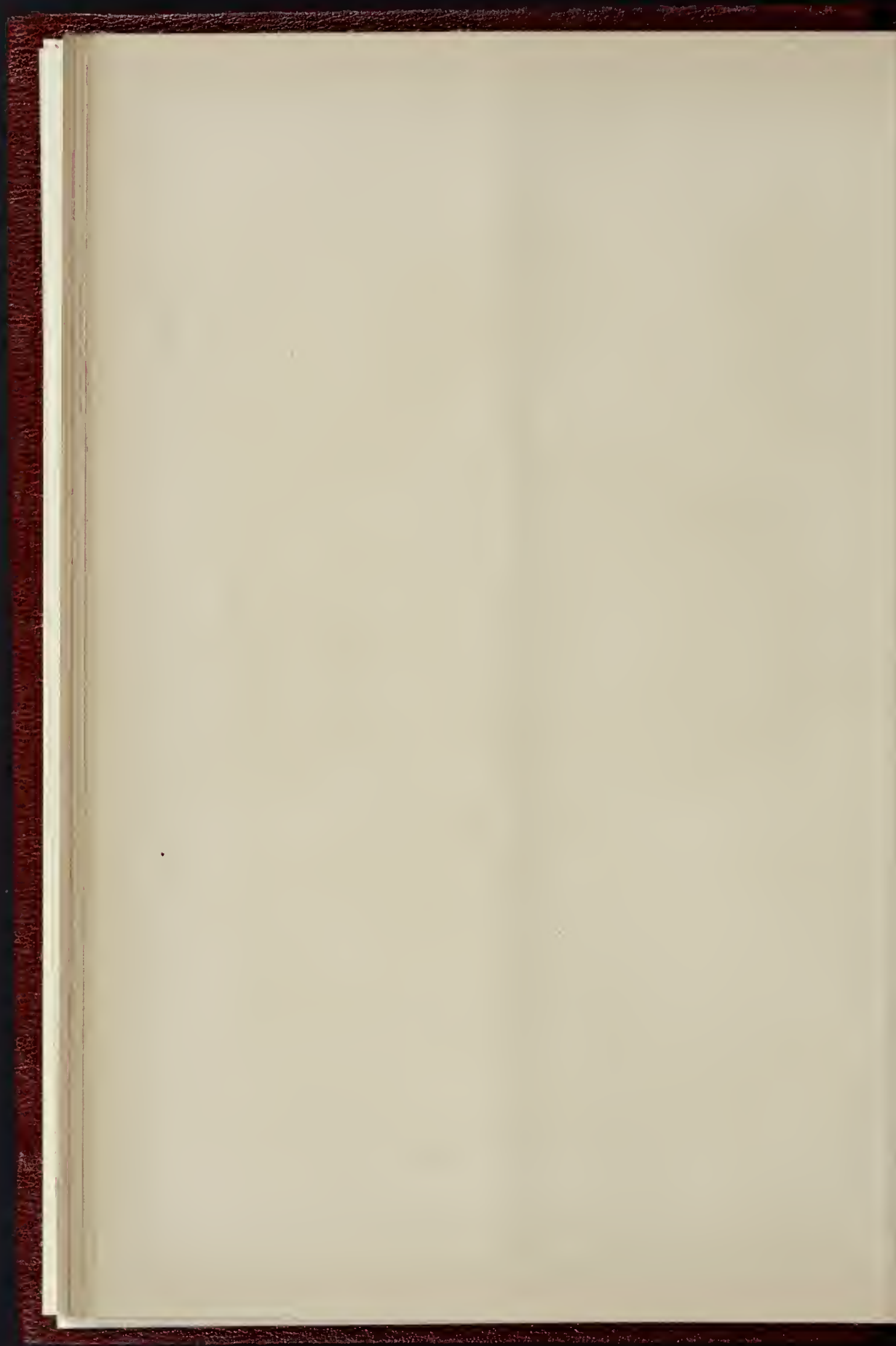
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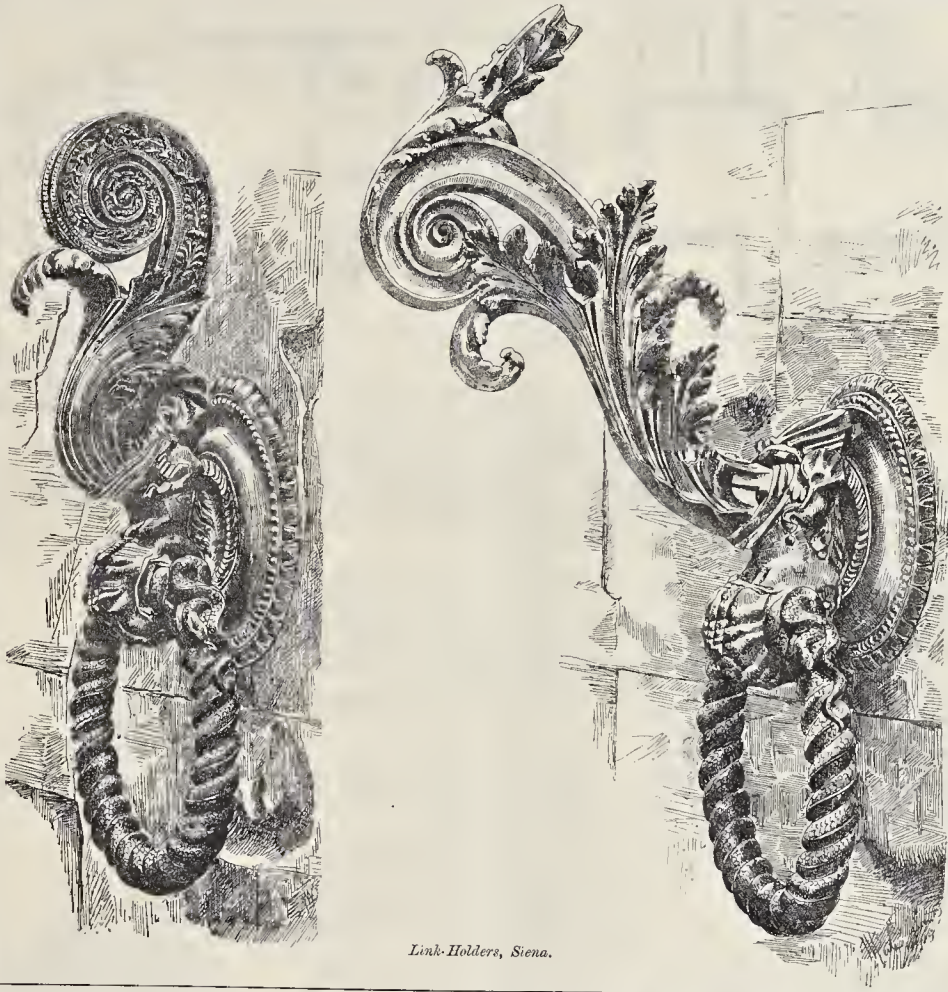




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amount according to the distance of the centre of pressure of all the forces acting in and on the spire from the outside edge of the spire. The amount of this pressure upon a unit of area must, of course, be some fraction of the ultimate crushing strength of the material. If the actual pressure is too near the ultimate strength, the thickness of the material of the spire will be modified.

From constructional failures may generally be learnt useful lessons for future work. The failure of the spire of St. Aldate's, Oxford, is a notable instance. The spire, built of stone, 50 ft. high, stood upon a tower 56 ft. high; the spire had become considerably out of the perpendicular and dangerous; it was taken down to the level of the tower. The cause of failure was attributed to the presence of a 1½ in. iron bar inserted in the first or base-course of the spire. The rusting of the bar had burst the masonry away inside and out, and it is averred that the pinnacles at the angles only saved this spire from actually falling. This is but another instance of misapplied material; the spire was 7 in. thick at the base, while to a depth of 10 ft. down from the top it was of solid stone. If these conditions had been reversed the original spire might now be standing.

This habit of self-extinction has been very eccentric in its operations. It has deprived the art-loving world of many beautiful examples of English and Continental spires.

The calculation for a tower runs upon the same lines as those for the spire, the modifications being due to the different plan and elevational shape, and the consequent modification of wind effect. The tower must answer the

same demands for stability against overturn, safety against sliding on any bed-joint, and possess a factor of safety against crushing; lastly, the total weight brought by the structure upon a unit area of the subsoil should be estimated, and be within the limit of safety. An interesting inquiry into the w-towers construction of Contances appeared in one of the professional journals some while ago. The result arrived at showed an excess of material in those towers to the extent of 1,000 tons beyond the needs of the case.

Upon the screen is exhibited a chronicle of some of the constructional failures in tower and spire designs in the limited area of England alone. France, Germany, Spain, Italy must have an extraordinary record in this same respect. By far the larger section of those towers owe their failure to the causes previously enumerated. Too much importance cannot be attached to the failure of the towers of the ecclesiastical buildings scheduled here. For the reason that the architecture of a country, if it is considered at all, is measured by the standard of its ecclesiastical buildings.

If a factory collapses under the effect of wind pressure, and the lives of an appreciable number of persons come to a painful end, the sad occurrence soon passes out of the minds of all but those most nearly related to the sufferers; but when a cathedral spire or tower passes out of existence the world chronicles the fact for all time.

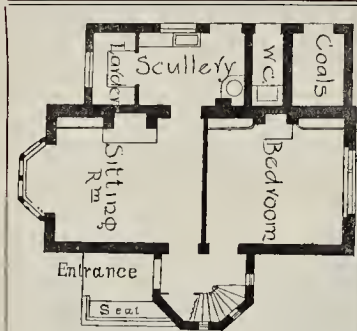
Who will deny that each and every one of those towers would be now existing as they originally existed if they had been proportioned according to the laws of stability as we know

them? Ely Cathedral, and Winchester, Peterborough, and St. David's, with their massive construction, paid the penalty. It is difficult to understand the reason for such massive design as is found in them. The size of a structure can be emphasised without unduly thickening of walls. If for richness of effect, it is a mistake. The luxury of material in the case of a tower can neither be seen advantageously from within nor beheld from without. A window opening may attempt to show the wealth of masonry, while vainly endeavouring to let the light through it, but that is poor satisfaction. The insertion of masonry in spires or towers of a thickness beyond what is absolutely necessary to meet the conditions previously laid down can only be considered as a useless and dangerous practice.*

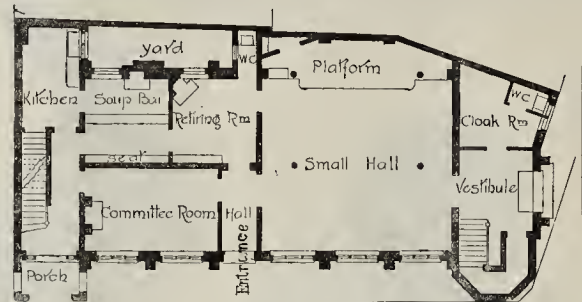
LINK-HOLDERS, SIENA.

THESE metal rings are currently said to have been intended for temporarily placing torches or what in England were called "links" in when not in use; the supposition being that the stem of the torch was run through the ring. Loose rings do not seem the best adapted for that purpose, nor does the decorative scroll above seem very convenient or suitable in such a situation. Their real interest, however, is mainly as bold and fine bits of Renaissance ironwork of a class of which there are examples in Siena that are well known to the curious sketcher.

* The remainder of the paper, with a report of the discussion which followed, in our next.



Gate Lodge, Tunbridge Wells.—Ground Plan (Two Bedrooms over).



St. Matthew's Parochial Hall, Brixton.—Ground Plan (Large Hall over).

Illustrations.

SCULPTURE OVER PORTAL, ST. PIERRE, MOISSAC.

THE doorway over which is found this remarkable piece of Early Medieval sculpture is a portion of the remnant left of the eleventh-century church at Moissac, the remainder of the church having been rebuilt in the late Gothic period. The portion itself was originally in all probability an addition to a still earlier church, of the eighth or latter end of the seventh century.

This sculpture, with the portal under it, is the subject of one of the fine series of architectural reproductions in the Trocadero Gallery at Paris, and we referred to it especially in the course of some remarks on the contents of that Gallery in an article published a few months since. Whoever was the unknown sculptor, he was an artist of real genius, in spite of the grotesque of his unlearned modelling. The manner in which the emblems of the four Evangelists are gronped so as to encircle the principal figure is a finestroke of composition, as well as the ardour with which they and the seated figure beneath all turn their faces towards the divine figure. The row of circular carved paterae beneath has a fine decorative effect. The centre pier under the lintel (not seen in the illustration) is formed in the most extraordinary manner, of figures of lions spirally intertwined.

The illustration is reproduced from a photograph.

PRIORY MANSIONS, KILBURN.

THESE mansions have lately been erected in Priory-park-road, Kilburn. Each block contains eight suites, with their front doors opening from general landings and with spacious private halls. Each suite is quite complete in itself, having all accommodation and offices usually provided in well-appointed private residences, including tradesmen's entrances at the back, approached by stone steps on landings on wrought-iron supports. All the floors are so pugged that no noise can pass from one suite to another; even the noise of nailing down a carpet would not be distinguishable in the suite below. The building has been carried out by Mr. George Neal, of Paddington, from the designs of Mr. Richard D. Hansom, architect. A plan of one floor is appended. Bath rooms and w.c.'s are arranged on an entresol floor.

COTTAGE BLOCK AT BISHOPSTOKE, FOR THE SOUTH WESTERN RAILWAY COMPANY.

THESE cottages have been designed for the South-Western Railway Company to accommodate the workmen engaged in the carriage factory, which the company are about to move from Nine Elms.

There are 100 cottages in all, which are arranged in one irregular and one complete quadrangle enclosing village-greens.

Each cottage has a garden of $\frac{1}{4}$ rood, and arrangements are made to supplement this by as much allotment as the men like to take up.

The material is to be red brick in Selenitic mortar, with tiles for the roofs, and the windows are to be of Imperial stone, all wood and paint being thus avoided.

The ground floors are to be bedded on 6 in. of Selenitic concrete laid to leave a clear 1 ft. air space underneath above the ground level. The cost is calculated, on estimates of work already executed, not to exceed an average of 200l. per cottage, exclusive of the value of gravel for concrete, which will be dug on the spot.

The architect is Mr. Ralph Nevill, F.S.A., and the original drawing was exhibited in the Royal Academy last year.

GATE LODGE, TUNBRIDGE WELLS.

THIS building contains four rooms, besides scullery and offices. Externally the ground floor, staircase, tower, and chimneys are of red bricks, the upper portion being, in front, half timbered with shingle-faced panels, and at the rear hung with red tiles. The roof is covered with brown tiles, the tower with lead.

The contractor was Mr. A. A. Gale, of Woking, and the architect Mr. Edwin T. Hall, of London.

ST. MATTHEW'S HALL, BRIXTON.

THIS building is a Mission Hall attached to St. Matthew's Parish Church. It is at the corner of Talma and Probert roads, between Brixton and Herne Hill stations.

It contains on the ground floor a small hall for lectures, work parties, night schools, &c., a retiring room attached; a committee room, a soap bar and kitchen, and a cloak room. The first floor consists of a large hall capable of holding about 300 people, with a retiring-room attached, and a cloak room. There are accesses to this hall from both roads.

The large hall has an open timber roof, the boarding left white, the rafters, &c., stained walnut and varnished; it also has a dado of brown glazed tiles; the walls will be of brown buff, and the other woodwork is sage green. The glazing above the transoms is in lead lights of pale cathedral glass with ruby horders.

The public rooms and vestibules are heated by hot-water pipes.

Externally the building is of stock bricks, relieved in parts with red brick; the strings, cornices and other drawings are of hox ground stone. The roofs are of green slates.

The cost of the building has been about 2,200l. The contractors were Messrs. Foster & Dicksee, of Rugby and London. The architect was Mr. Edwin T. Hall.

Kitwell's Park, Herts.—Extensive alterations have just been completed at Kitwells Park, Shenley, Herts. The hall has been altered and rearranged in Jacobean style, with new staircase, columns, dado, chimney-piece, and ceiling beams, all in oak, from designs by Mr. Reginald Pinder, F.R.I.B.A. New parquet floors have been laid down by Arrowsmith in the reception-rooms and hall, and the old fire-pieces fitted with Pidgeon Teale, and Nautilus grates, and oak Jacobean mantels. All sanitary fittings and baths of the most modern kinds have been put in, and the drains re-arranged on the disconnected and separately-ventilated system. Doulton's patent jointed pipes being used. The stables and model farm (including cow-houses, pig-styes, and poultry-pens) have also been fitted with the best modern appliances. Messrs. Boff Brothers, of St. Albans, has the contract for the work at the house, and Mr. Carter, of Shenley, that for the farm and stables.

CAMPANILE AT VARESE.

THIS is a sketch of the campanile which

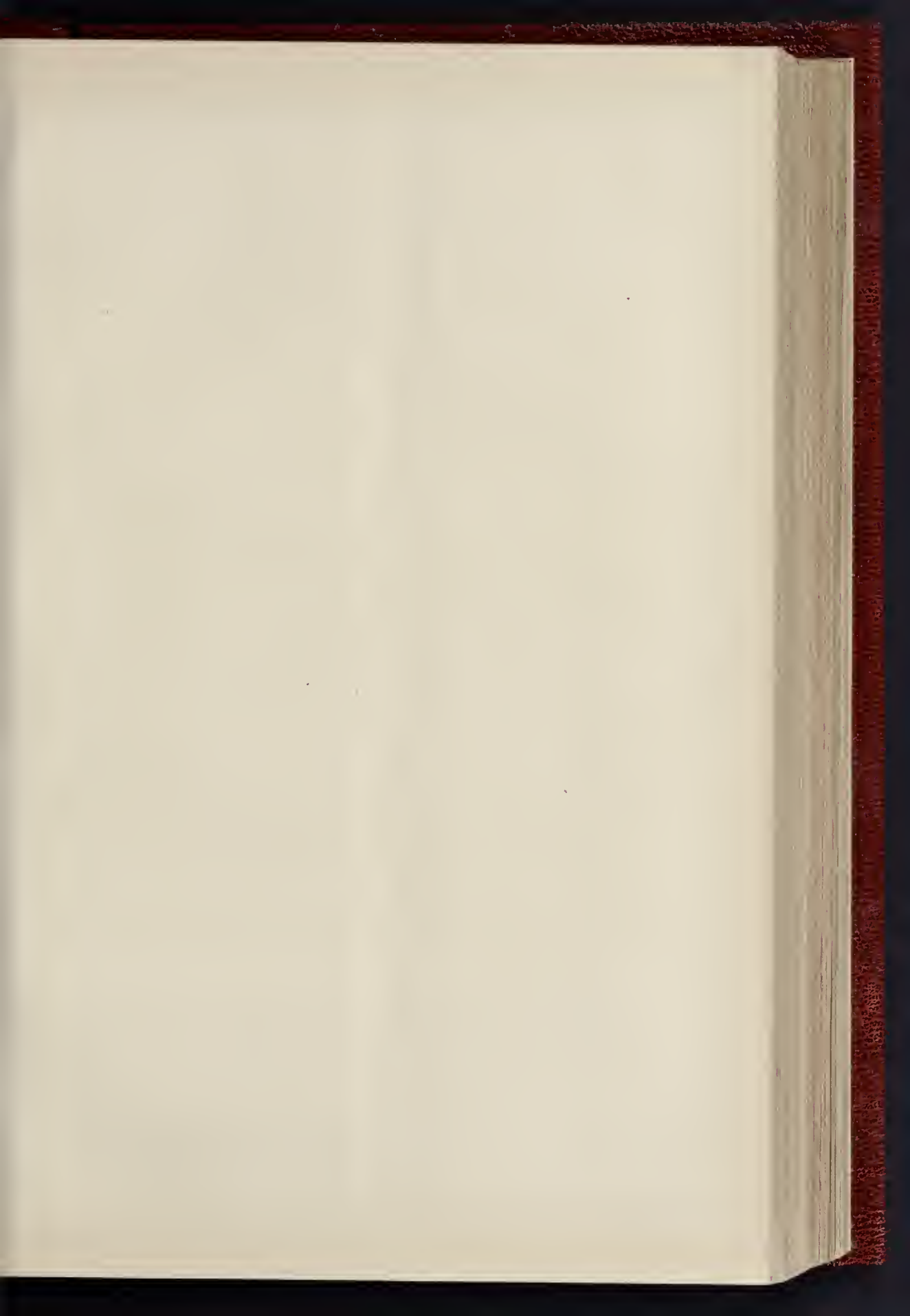


Campanile, Varese.

dominates all other buildings in the old silk manufacturing town of Varese, a few miles from Lake Como. T. E. KNIGHTLEY.

THE BRITISH SCHOOL AT ATHENS.

THE first open meeting of the session was held in the library of the School on the afternoon of Jan. 1. The Director, Mr. Ernest Gardner, made a few preliminary remarks on the prospects of the School for the ensuing season. He said that the Committee had offered an exhibition of 50l. at each of the two Universities for the purpose of sending out students to work in Athens for a period of not less than three months; that a scholarship had been established in connexion with the School by

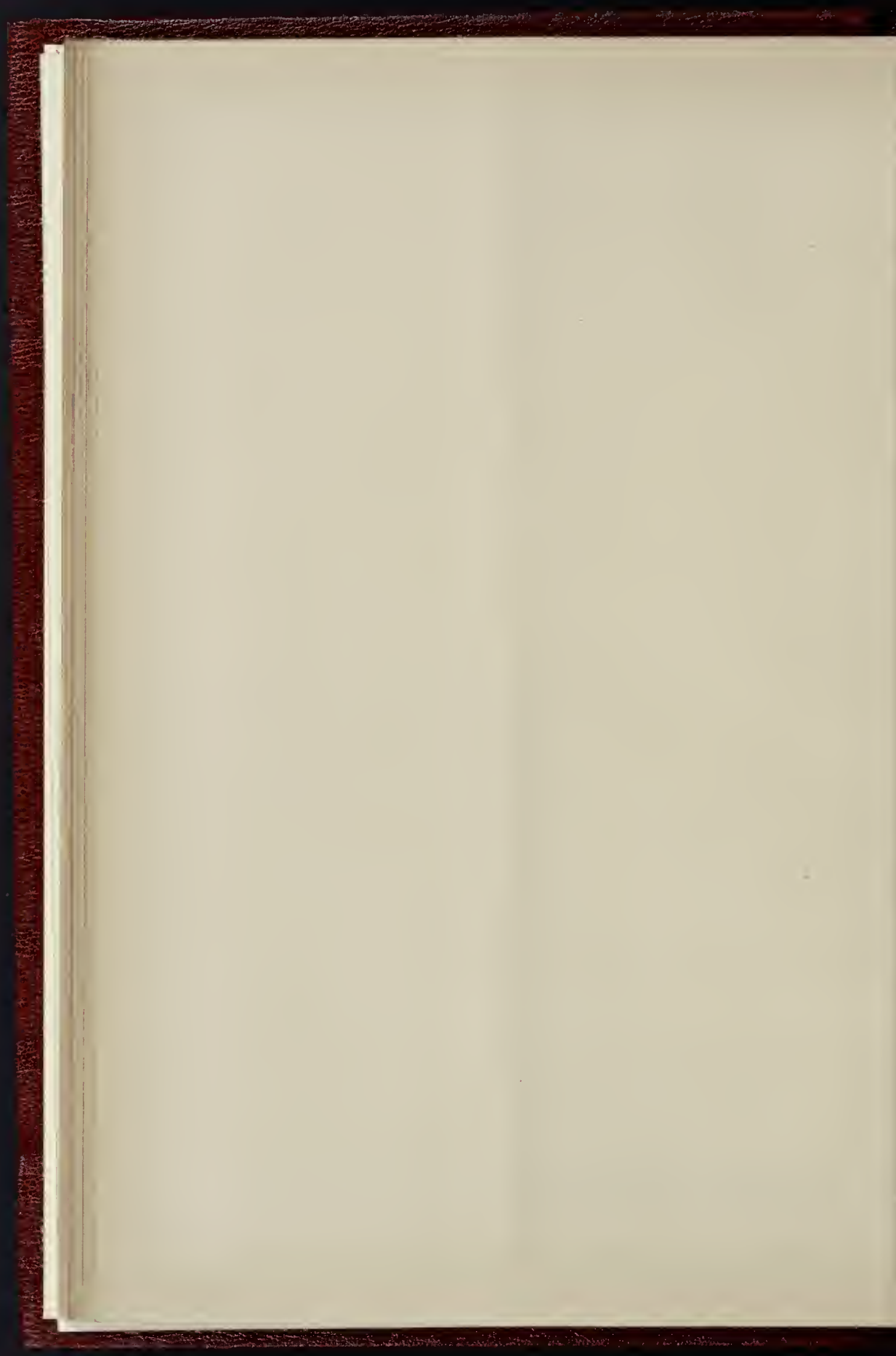


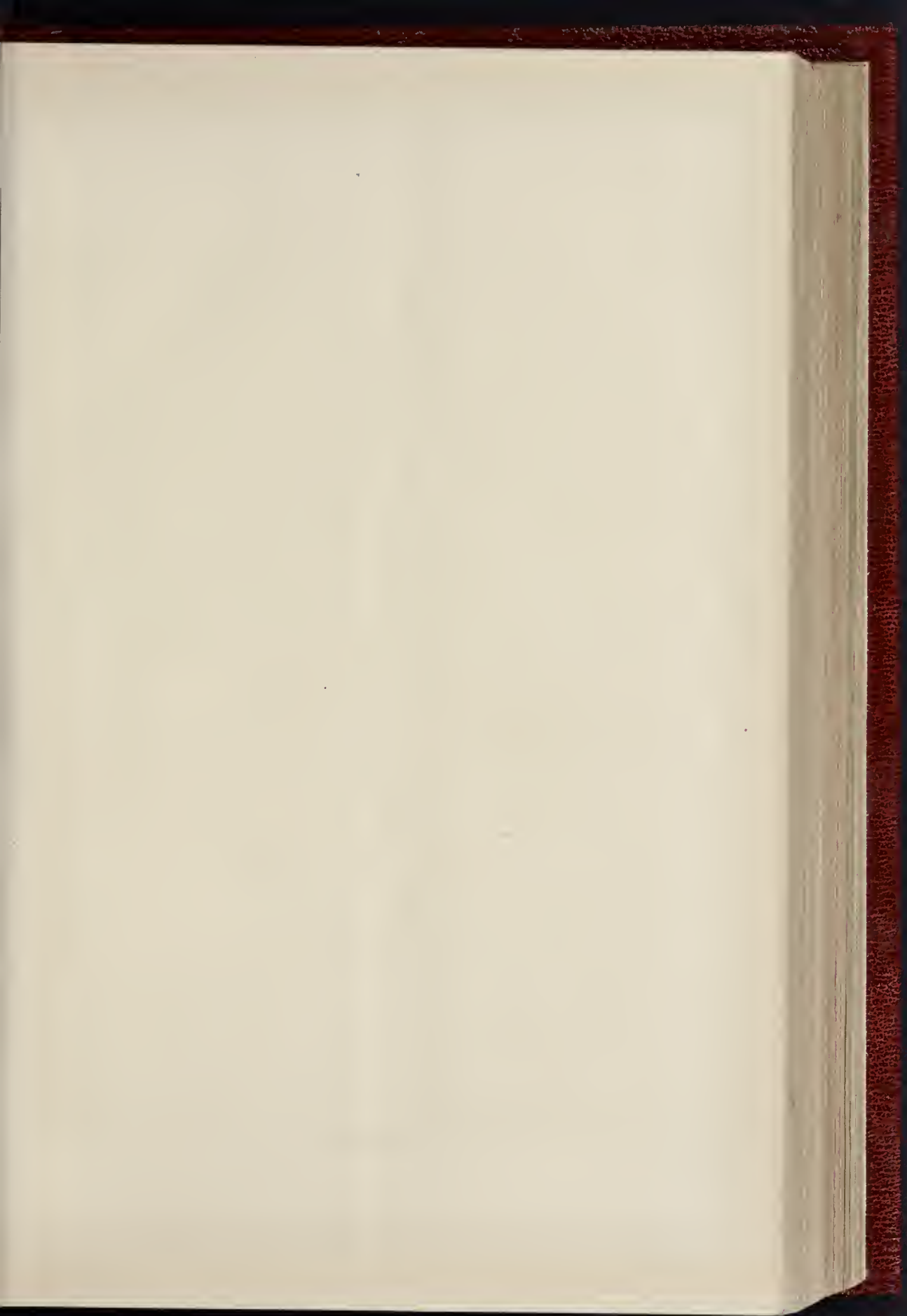




"INK PHOTO, SPRAGUE & CO., 22, MARTIN LANE, CANNON ST., LONDON, E.C.

OF ST. PIERRE, MOISSAC.





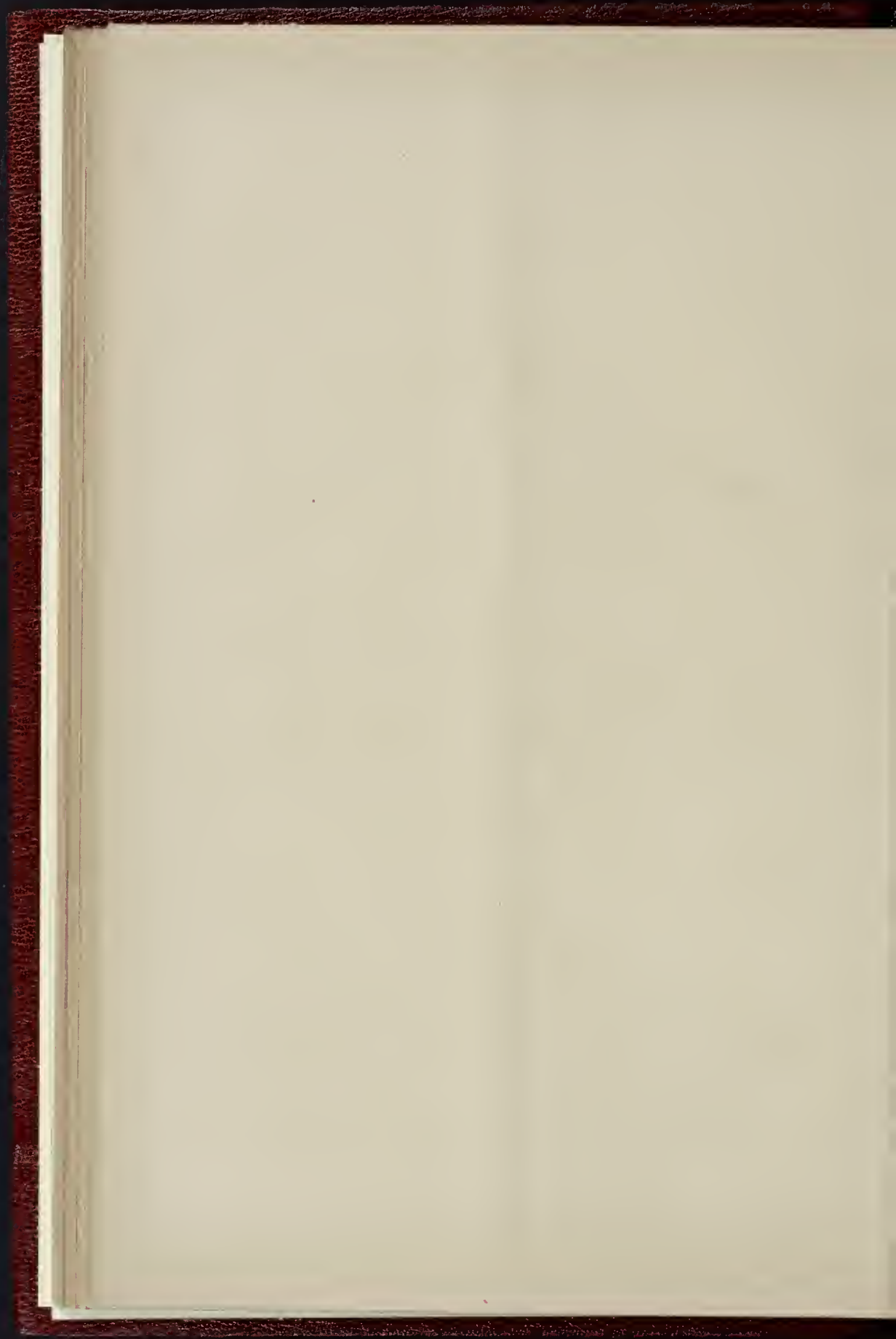
THE BUILDER, JANUARY 11, 1890.





PHOTO BY MR. SPENCER & CO. 22, NORTON, ADE. ST. MATHW'S PAROCHIAL HALL, BRIXTON, S.W.

ST. MATTHEW'S PAROCHIAL HALL, BRIXTON, S.W.—MR. EDWIN T. HALL, F.R.I.B.A., ARCHITECT.



Magdalen College, Oxford; and that a special fund was being got together for the purpose of making a complete collection of drawings and studies of the remains of Byzantine architecture in Greece proper. He also mentioned that the surplus of the Newton Testimonial had been handed over to the School as a reserve fund, and that out of this considerable additions were being made to the collection of books in the library. Three students were already in residence, and four others were expected very shortly. In addition to these, two more were on their way to Cyprus to commence excavations on the important site of Salamis, on that island. Excavations would also be conducted this session by the School on Greek soil for the first time. The exact site had not been definitely fixed on, but negotiations were in progress.

Mr. Gardner then read a short paper on a fragment of a sepulchral stele in the museum at Argos, representing the head of a boy smiling, the date of which is fixed by the character of the inscription as fourth century B.C. He compared this head with that of a somewhat older boy found at Papho, in Cyprus, during the excavations carried on there the season before last under his superintendence, and he argued from the striking resemblance between the two heads, that the Papho one belonged also to the fourth century B.C., and not, as some archaeologists asserted, to the Hellenistic age.

Mr. H. A. Tubbs afterwards gave an interesting account of the excavations undertaken last spring at Poli, in Cyprus, by members of the School, under the auspices of the Cyprus Exploration Fund. These excavations were principally confined to tombs, and Mr. Tubbs described in detail the different varieties of the tombs opened, and their various characteristics. He mentioned that this site had previously been worked on to some extent by a private syndicate, and that Dr. Herrmann, of Berlin, had written a brochure on the subject. He criticised Dr. Herrmann's classification of these tombs according to the various forms of the *τρομος*, or approach, regarding these as no certain indication of date. He also pointed out the difficulty of classifying according to the articles found, and showed that the same tombs had been used and re-used at different periods.

Mr. Tubbs then proceeded to describe the pottery found in the excavations, the most distinctive form of which was the black ware, with raised ornamentation. As to the pottery generally, he showed the persistency of types, and the consequent difficulty of dating particular specimens. A detailed report of these excavations will shortly appear in the *Journal of Hellenic Studies*.

These meetings of the School will be held at intervals during the session, and, in addition, the Director proposes lecturing to the students in the museums and elsewhere.

THE ROYAL ACADEMY:

ADMISSIONS TO THE ARCHITECTURAL SCHOOL.
MR. R. PHÉNÉ SPIERS, F.R.I.B.A., the Master of the Architectural School of the Royal Academy, sends us the following list of students admitted this month, viz.:-

Upper School.

- A. E. Bartlett.
- C. H. Norton.
- B. F. Fletcher.

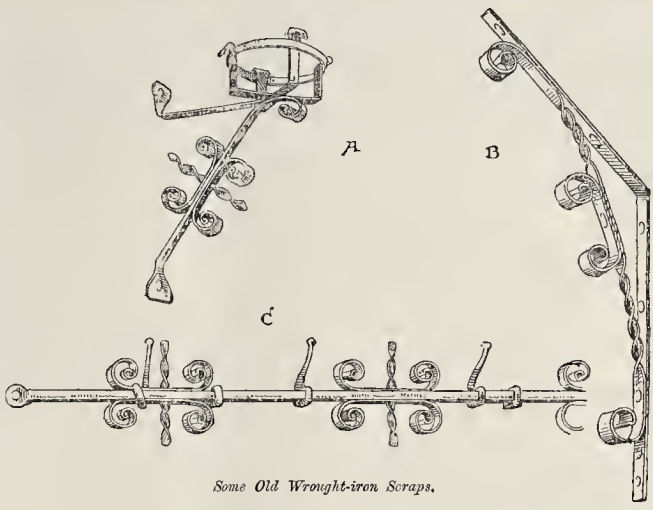
Lower School.

- C. W. Baker.
- R. A. Reid.
- C. Bywater.
- P. D. Smith.
- A. J. Edwards.
- J. S. Stewart.
- E. Gibson.
- G. Streetfield.
- S. M. Herbert.
- H. Tooley.
- H. L. Paterson.
- A. B. Yeates.

Probationers.

- H. P. Adams.
- C. Evans.
- W. E. Barry.
- F. Fellows.
- John Cogg.
- D. B. Niven.
- D. Blow.
- F. Rhoades.
- J. Borrowman.
- A. Dunhar Smith.
- A. W. Cleaver.
- D. C. Veasey.
- J. B. Ellison.
- H. H. Wigglesworth.

The Institution of Civil Engineers-- A new edition of the list of members of the Institution of Civil Engineers, corrected to the 2nd inst., being the seventy-second anniversary of its establishment, has just been prepared, from which it appears that the aggregate number of members of all classes is 5,804.



Some Old Wrought-iron Scraps.

SOME OLD WROUGHT-IRON SCRAPS.

OF the accompanying blocks, A is one of the very few remaining hour-glass holders. It is preserved in Wisley Church, Surrey. Its form should make it applicable to many purposes.

B is a bracket, of the same period, from Effingham Church, Surrey, and C is a hat-rail from the old church at Esher.

ELECTRIC WELDING.

THE electric welding of metals is a very perfect and reliable process. It can be now seen in operation at the small show works of the Electric Welding Syndicate at Hoxton. A display of the process as an experimental illustration was made at Professor Ayrton's lecture at Bath, on the occasion of the British Association meeting about eighteen months ago in that ancient city. The process was also investigated at the Paris Exhibition, and has been a subject of discussion at the Iron and Steel Institute. Prominence was first given to it by Professor Elihu Thomson, at New York, in 1887. The correlation of the physical forces--so concisely and ably elucidated many years ago by Sir William Grove, and which remains one of the brightest accomplishments of that eminent scientist's numerous labours--receives in electric welding one of its most recent and practical illustrations. In the factory at Hoxton, the visitor will see before him the furnace, the boiler, the steam-engine, the dynamo, the copper conductor, the "converter" and the massive copper clamps for holding the bars, pipes, or wires to be welded. Combustion or chemical change in the fuel produces heat; the heat is converted by the steam-engine into motion, the belt conveys this motion to the dynamo, and the revolution of the armature within its magnets converts that motion into electricity, and the current flows along the conductor until it meets with resistance at the intervals where the pieces of metal are placed for welding, and there the electricity is changed into heat. Thus, before our eyes we have the fifty horse-power of the engine converted into most intense local heat and fusing the contiguous surfaces of the two pieces of metal to be welded, so that by mechanically pressing them together they firmly adhere, and a weld surpassing anything the best smith could accomplish is performed in the interval of a few seconds of time.

How this wonderful transformation? To employ a vast current at a very low tension direct would be unprofitable, because the current could not easily be carried to any sufficient distance for handy application with large and costly conductors. To generate at the dynamo machine a current of high tension easily transmissible by a small conductor to long distances, and to convert that tension into quantity when it has arrived at its destination by a "converter," is the plan of the method. Everybody knows the Ruhmkoff coil

by the little toy instruments so very common. The "induction coil," as it is more generally known, has an iron core with a coil of covered copper wire round it. A small primary current of electricity at low tension magnetises the iron core, causing the emission in long sparks of a secondary current induced through the copper coil. If the construction of this induction coil were inverted, the high tension current received by such an instrument would be transformed into a quantity current at very low tension.

In the Hoxton works the electrical current leaves the dynamo at a maximum potential of 300 volts. But when the current reaches the "converter" it is transformed into a quantity current of perhaps some 4,000 amperes, at a potential of only 3 or 4 volts. The interruption of such a current produces enormous heat over a small locality where it is wanted for the work to be done, leaving the current in its changed condition harmless to life, although the electrical energy will probably be at the place of welding nothing under a total of 40,000 watts. By unseen correlations of physical forces, the whole work of that steam-engine is brought to bear upon the weld required to be made in a bar of steel 1 in. in diameter, an iron pipe 3 in. across, or a bar of platinum $\frac{1}{2}$ square inch in section.

By the introduction of a resistance grating the induced current can be modified in power to any extent, so that a metal which melts at 160 deg. of temperature can be as properly brought to its fusion-point, or welding-heat, as another metal requiring 3,000 or more degrees of heat for effecting the like purposes.

In this way the welding of many metals hitherto deemed intractable has been effected, or has become possible. Not only can wrought iron, hard steel, brass, lead, tin, platinum, gold, and cast-iron be welded, but different metals may be actually joined together.

Taking a practical view of electric welding, we have these important advantages:--The welding operation can be seen, and the weld is perfectly clean. The metal is not, as in ordinary smith's work, covered up by coal, with all the attendant risks of cinders getting into the weld; there is an absolute control over the heat as well as over the operation; the homogeneity of the metal, alike in the weld and in the mass of the article, is the same; and, finally, the rapidity and accuracy of execution.

Out of the numerous experiments we have witnessed, two were singularly noticeable,--the welding of a colliery steel-wire rope, and an excellent example of plate rivetting. In the former case, each of the two ends of the wire-rope were hound on an iron ferrule, and then the ends of the rope were filed quite smooth. They were then secured in position by the copper clamps and the current turned on. A perfect weld was speedily effected and the iron ferrules were knocked away.

In the rivetting quarter two inch-plates were placed properly together, and a cold rivet-blank put through the two contiguous holes. The

current was turned on, and in a few seconds the rivet-blank was glowing with white heat. The head-moulds were then pushed forward and the rivet-heads pressed up on both ends with the most perfect results. Afterwards, when it was attempted to cut the rivet-head away, it was found that the chisel could not be got underneath the head, the under-surface of the head being welded down upon the fiat of the plate, and consequently only a clean cut of the head right through could get it away.

At the present time we cannot speak with any accuracy as to the commercial cost of the process, but, without doubt, its value will be such for a great number of purposes that the advantages of its use will outweigh any questions of additional cost,—and those will probably not be such as really would stand in the way of its adoption.

THE HOUSING OF THE WORKING

CLASSES:

ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

THE housing of the working classes was the subject of a paper entitled "Human Homes for the Poor," read at the monthly meeting of this Association, held on Saturday, the 4th inst. at Carpenters' Hall, London-wall, by the Rev. A. Robins, rector of Holy Trinity, Windsor, who has suffered a little martyrdom in consequence of his denunciation of certain Windsor tenements which are unfit for human habitation. The Chairman of the Council, Mr. Hugh Alexander, presided, and there was a large attendance, and in reply to invitations sent to the President of the Local Government Board, Lord Cross, the Earl of Aberdeen, and other prominent sanitarians, letters of regret were received. Mr. Ritchie wrote expressing pleasure that the question of better provision for the housing of the working classes was to be considered, because it was desirable that strong and sound public opinion should be formed in order that full effect might be given to the representations made in his recent circular to local authorities.

In spite of Royal Commissions, as the paper pointed out, and the appeals of philanthropists, the teachings of sanitary reformers, and the public indignation roused from time to time by such revelations as those of "The Bitter Cry,"* the horrible moral cesspools in which scores of thousands of human beings lived in London and various great towns, no corresponding action had been taken by the governing authorities to remedy the evil. The time had come when the nation must be told,—the State and the Church, too, must be told,—that to continue to neglect the question was to be guilty of "criminal indifference." If it was right to confiscate meat offered in the market when it was found unfit for human food, it ought to be considered justifiable to confiscate houses when they were found unfit for human habitation, and as the word "confiscation" might be Statesmen of all shades of politics had followed the sanitary reformers and the philanthropists in their denunciations. It was evident that horses, dogs, and cattle were better housed than their human attendants, that moral advancement was impossible, and that even the physical and mental stamina of the nation were endangered by the existing condition of things, and yet even the boldest seemed to touch the question with timidity. Why? A parson who ventured to cry out louder than his fellows got burned in effigy, and most men who came face to face with the evil became demoralised, paralysed, and dazed, on beholding its magnitude, and on becoming conscious of the fact that so many men, already rich and powerful, made profit and here out of the very horrors of the situation.

In dealing with the gigantic evils of the slums, powers not merely permissive but compulsory must be put into the hands of the proper officials, and the hands of these authorities must be fortified and strengthened. Too many vestrymen and municipal councillors were interested in the continuance of the evil for this power of initiating reforms to be longer left in the hands of such bodies. Before all else, the State must review, revise, and consolidate all Acts dealing with the Public Health, creating the sanitary inspectors officers of the State, and delegating to such officers,

not discretionary powers, subject to the pleasure and approval of local Sanitary Authorities, or Vestries, but compulsory, peremptory authority to deal with insanitary areas. A consolidated and amended Act must declare and define what constituted a house, and what a "human home" must be, what it should comprise, and what it should not comprehend. They would then have Imperial instructions, and such compulsory powers conferred as would enable them to carry them out with effect and authority. Facts with regard to the condition of insanitary houses at Windsor, vouched for by the reports of Dr. Airy and Dr. Taylor, and at Durham by Drs. Vance and Jephson, were adduced to show that while Mr. Ritchie said all the mischief resulted from the halting, hesitating, and unsatisfactory administration of local authorities, the latter retorted that they had no power to do what had been recommended by the Imperial authorities. Such a conflict of authorities must be rendered impossible. They must insist upon the substitution of the compulsory for the permissive principle, and the consolidation of all the Public Health Acts. All Medical Officers of Health must be Her Majesty's Medical Officers of Health, appointed to, and set over a city, or a town, or a district, and that they might be thoroughly disinterested, impartial, and independent, they should be disqualified from taking any private practice.

Such benefactions as that of Sir E. Guinness, noble and munificent as they were, would prove but a drop in the ocean. A question of such infinite magnitude as "the housing of the poor" could only be effectively dealt with by the State. The ways and means, through advances and loans at low interest, could be provided by the State without difficulty, and only the State could solve the difficulty.

In concluding his paper, the Rev. Mr. Robins said:—"A vast proportion of the dwellings of the poor are morally, socially, and physically slaughter-houses. What are they but shambles, for does not depravity destroy our poor within them hourly, and slay them day by day? A distinguished member of Parliament, who has himself a Bill before the House of Commons, wrote to me on Dec. 10 as follows:—"The present state of things is deplorable, and I must say I am not in any way satisfied with Mr. Ritchie's last circular. The real question remains: What is to be done with a Local Authority that will not perform its legitimate duties?" The only possible answer to that question is,—and I desire to set it before you with all the emphasis at my command,—all Medical Officers of Health and Sanitary Inspectors must be responsible only to the Local Government Board, and free of the control of municipalities and vestries, and the powers with which you are invested must be compulsory powers."

As an appendix to the paper, plans were attached of workmen's dwellings designed by Messrs. Knill Freeman & Robins, Newcastle-on-Tyne, with estimates for houses which would be in all respects "human homes," and another appendix contained suggestions by Mr. Stephen Wyborn, architect and surveyor, Windsor, with regard to the necessary improvements in that town. The proposed "homes" are of three types, costing respectively 220*l.*, 200*l.*, 150*l.*, and 135*l.*, according to the estimates of a local builder.

A discussion followed the reading of the paper, in which the Chairman, Mr. Sheffield (Poplar Board of Works), Mr. Mellonds (Windsor), Mr. E. C. Robins, F.R.I.B.A., and other gentlemen, took part. Mr. Mellonds said it was not quite correct to assert that nothing had been done at South-place, Windsor, to remedy the defects complained of. Besides much repairing and cleaning, ventilators had been inserted in the back walls of the rooms, and the tenants had shown their appreciation of this improvement by stopping them up. In summing up the discussion, Mr. Alexander, the Chairman, said a radical cure for the evils pointed out in the paper could only be obtained by an alteration of the Land Laws, by abolishing leaseholds, prohibiting the erection of dwellings with less than 20 ft. frontages, and prescribing that, where there were two rooms in depth, they should measure, from front to back, at least as much as from side to side. Every home, too, should have an open yard with an area at least equal to half that on which the house was built. The proceedings concluded by according to the reverend lecturer a vote of thanks.

THE REGISTRATION OF PLUMBERS.

The Registration Committee of the Worshipful Company of Plumbers, on the invitation of the Court, dined together at Cannon-street Hotel on the 2nd inst. The Master of the Company (Mr. W. H. Bishop), Mr. Philip Wilkins (Renter Warden), Mr. F. Machin, Mr. Alderman and Sheriff Stuart Knill (Past Masters), Mr. John Smeaton (Assistant), represented the Court.

The Master, in the course of his speech welcoming the Committee and reviewing the work of the past year, stated that the work of the examiners was heavier in 1889 than in a previous year by two-thirds. He referred to the necessity for specifying plumbers' work separately in building contracts, and making plumbers responsible for the sanitary efficiency of the whole of their work, from the roof to the main sewer.

Mr. C. Clegg, master plumber, in responding to the toast of "The Registration Committee," referred to the influence of the registration movement on the technical education of plumbers as "the grandest feature of the movement." He suggested that periodical exhibitions of work executed by apprentice plumbers and others should be held under the auspices of the Plumbers' Company.

Mr. L. F. Gilbert, operative plumber, expressed the growing confidence of himself as his fellow-workmen in the advantages which must accrue to the trade from the registration movement, and suggested that a special committee should be appointed to extend the working of the system in Western London.

Mr. Machin, Past Master, in proposing a toast of "The Examiners," referred to the responsible character of the work of the provincial as well as the metropolitan Boards of Examiners and its interest for the inhabitants of the whole kingdom.

Mr. John Smeaton, master plumber, in replying, referred to the recent examinations he had attended at Dublin and Liverpool, remarking that he considered the work of the candidates was fully equal to the average in London, and that some of the specimens of modern plumbing work he had seen in Dublin were of a most superior character. He approved the suggestion of holding periodical exhibitions of plumber work as tending to create healthy emulation among the members of the craft, and he referred to the considerable cost which this and the further development of the Company's educational system would necessarily involve.

Mr. W. H. Webb, master plumber, said that older men in the trade were encouraging the younger men to present themselves for the Company's Examinations.

Mr. R. J. Lyne, operative plumber, said that Dublin members of the United Operative Plumbers' Association were heartily in accord with the examination system, and that they considered it was the only means of protecting the public against "botchers."

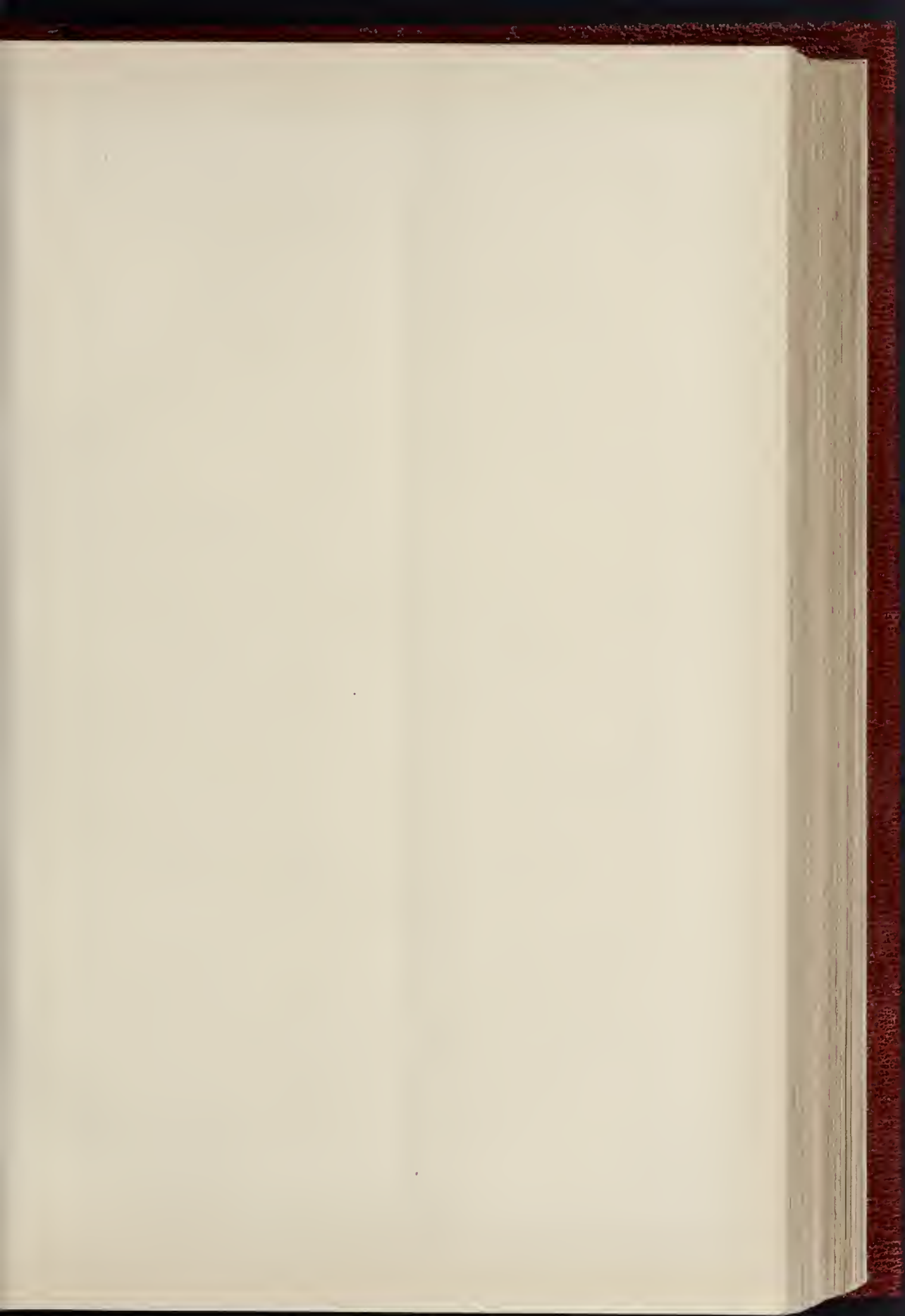
Mr. Wilkins, Renter Warden, in proposing the toast, "The Teachers of Technical and Scientific Plumbing," referred to the report made by Mr. Lyne on the exhibits of plumber work in the Paris Exhibition, and the extension of technical education among French plumbers.

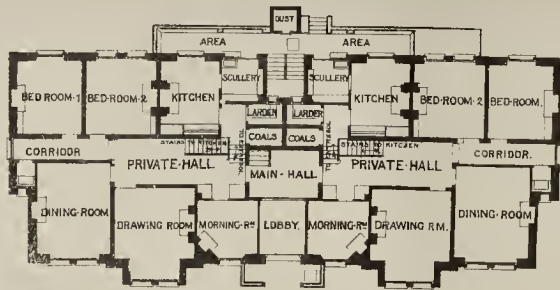
Mr. J. W. Clarke, foreman plumber, said that Plumbing Classes at the Polytechnic were making steady progress, and he found that prizes offered by the Plumbers' Company acted as a considerable incentive to the students. He announced that additional money prizes had been offered by Mr. Titmas, Mr. Clegg, Mr. Hume, Mr. John Smeaton, and Mr. Bostel. He laid much stress on the importance of free-hand and mechanical drawing being taught in Plumbers' Classes.

Mr. Mills, Superintendent of the Trade Classes at the Finsbury and Westminster Institutes, said they found a great impetus had been given to the whole of the trade classes at the Institutions by the action of the Plumbers' Company in promoting classes for plumbers. He pointed out that it was necessary to have separate classes for adult plumbers, mentioning that a class of the kind was held at Westminster. He referred to the course of lectures on Technical Education, specially suited to plumbers, delivered in Dublin, and recommended similar lectures being delivered in other parts of the Kingdom.

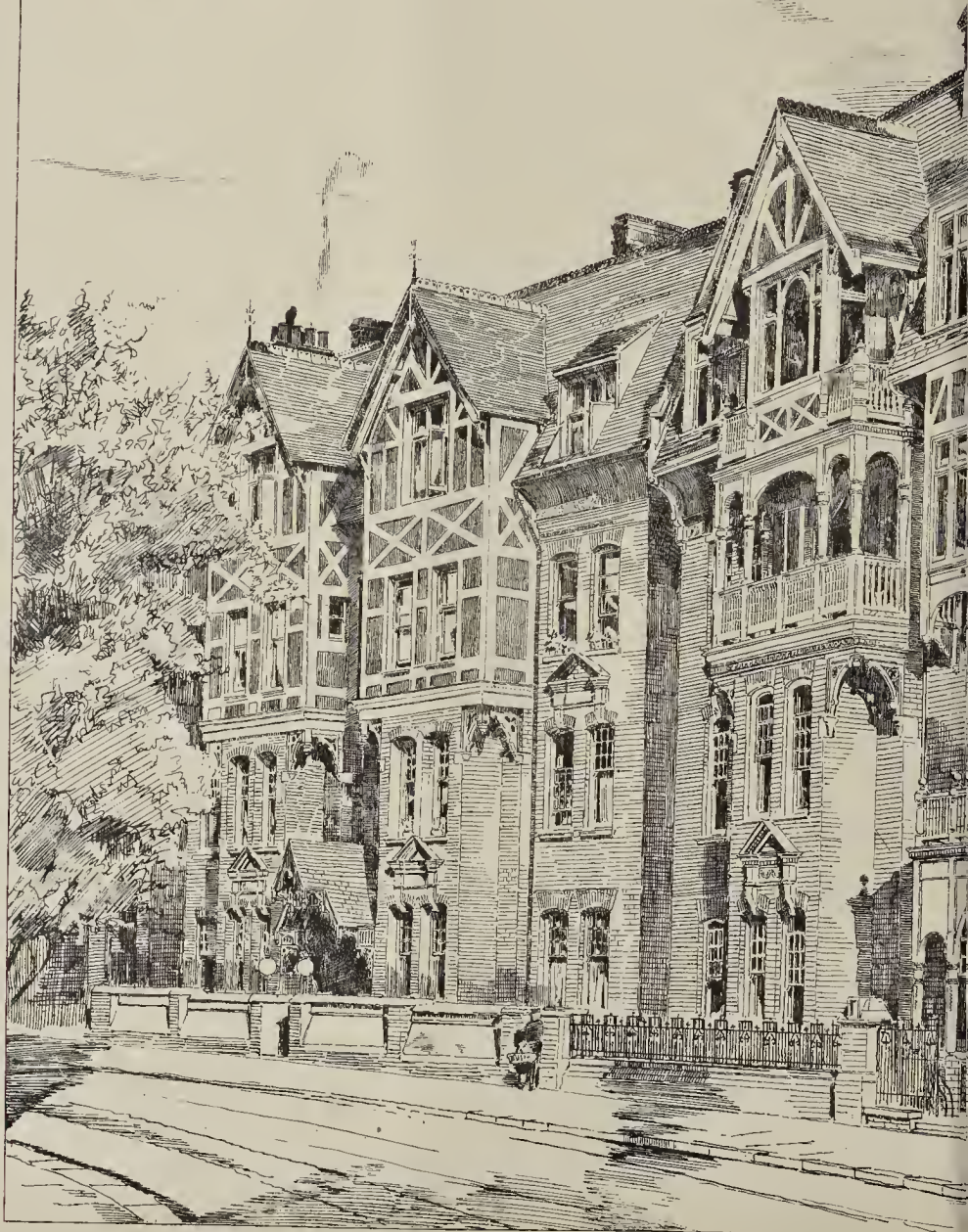
Mr. Browning, Teacher of Plumbing Classes at Chelsea, Lambeth, and Clapham, said that practical work of the students was better in the

* Long antecedent to which, however, were the revelations made in the *Builder*, by the late Mr. George Gowlin.—Ed.





GROUND FLOOR PLAN.



PRIORY MANSIONS, KILBU

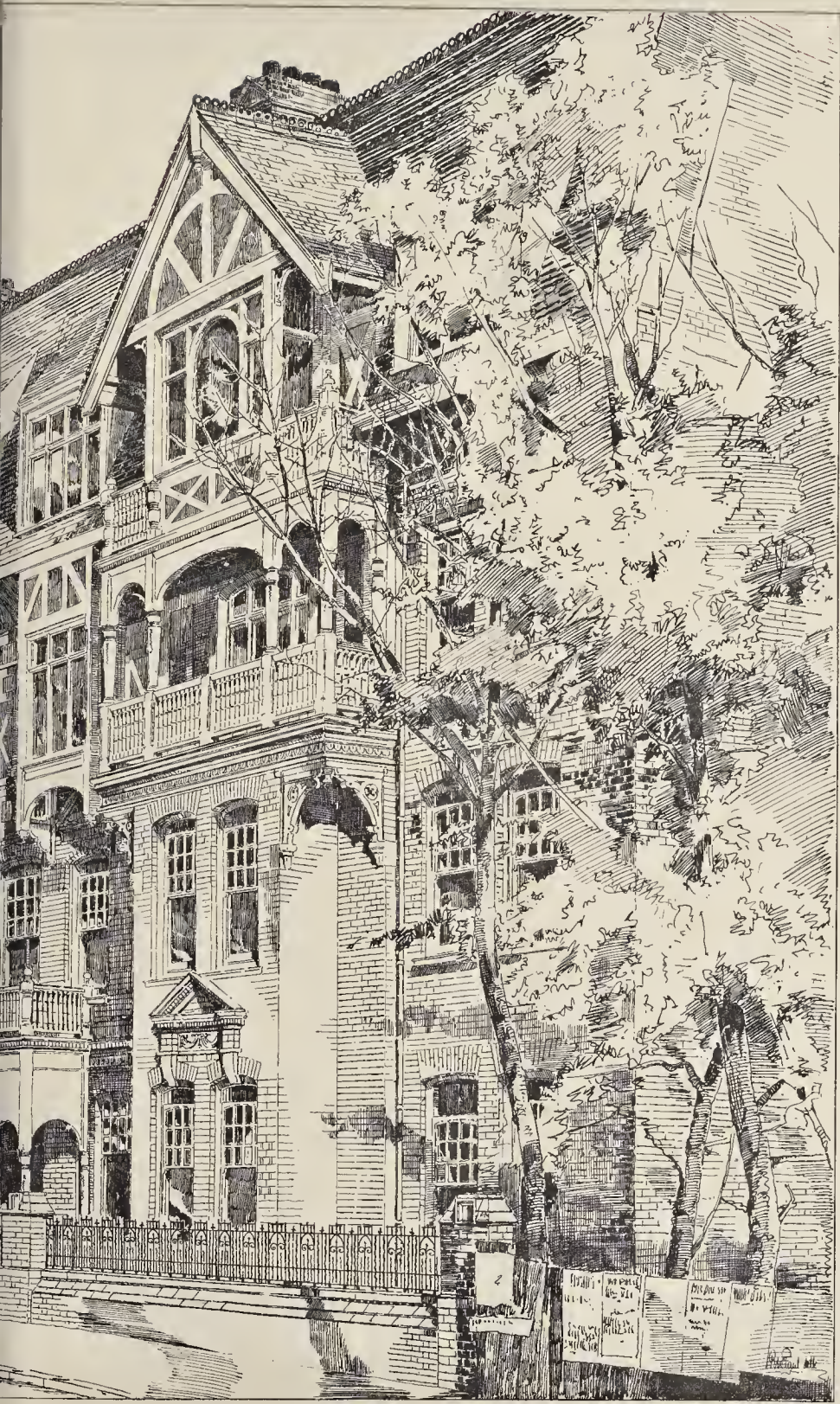
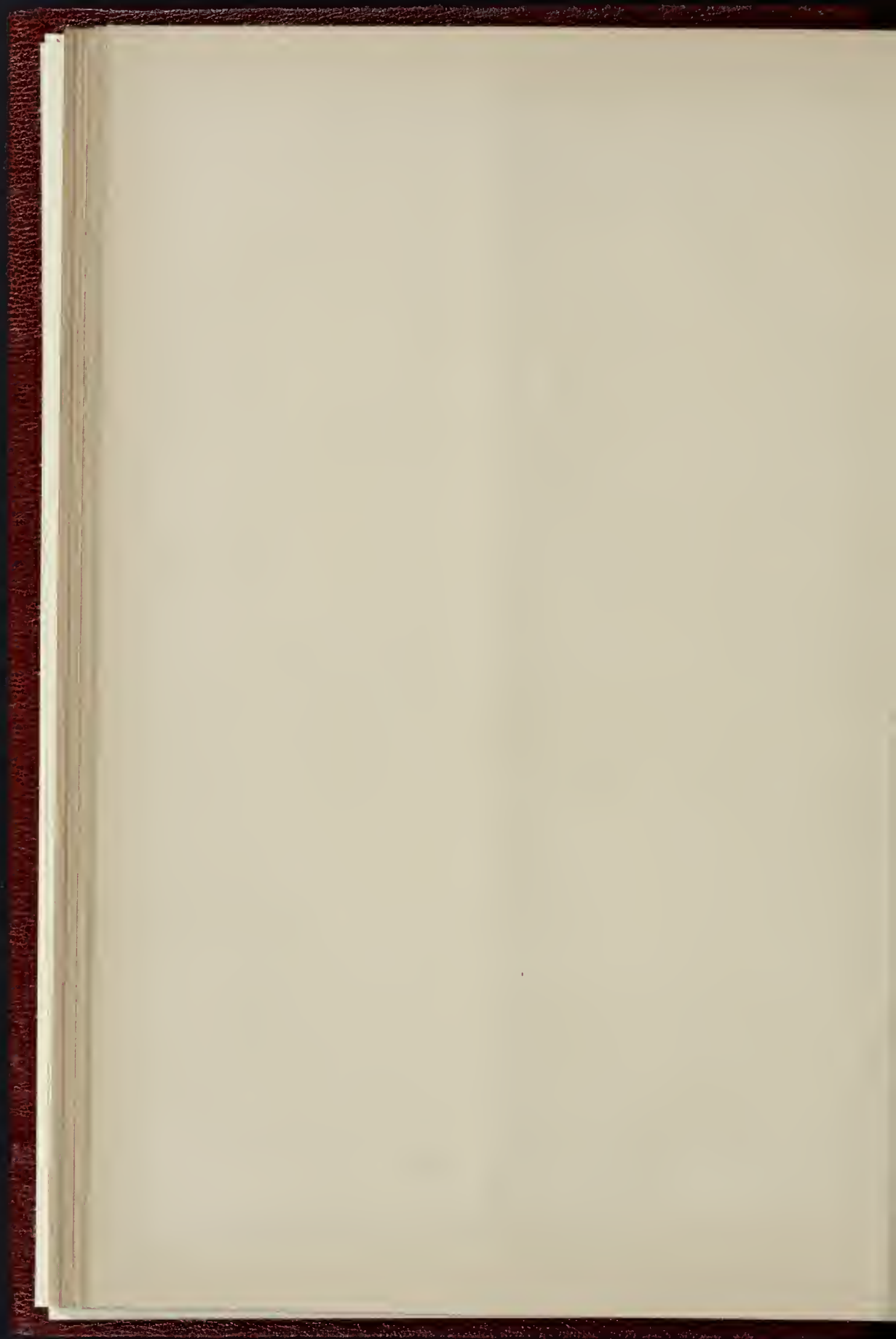


PHOTO LITHO SPRINGS 21 & 22 MARSHES LANE CAMDEN ST LONDON 1



Last session than in any previous one. He recommended mutual improvement classes for adult plumbers, who would be both interested and benefited by practical discussions on the details of their trade.

A letter was read from Mr. Emptage, master plumber, of Margate, regretting that he was prevented by illness from being present, and congratulating the Plumbers' Company and the Registration Committee on the growing interest of the public in sanitary matters, and the hearty support which is being accorded to the registration movement by the trade and the public in all parts of the kingdom.

ARCHITECTURAL SOCIETIES.

The Royal Institute of British Architects.—A special general meeting of this Institute (for members only) will be held on Monday next, Jan. 13, to consider a recommendation of the Council, that the form and alternative form of Articles of Pupilage, submitted to the annual general meeting held on May 6, 1889, be printed and published as an Institute Paper, with this modification—that in place of the word "Architect," as descriptive of the "Principal," a blank be left which may be filled in with the words "Architect" or "Architect and Surveyor," as the party or parties may please; and that a note to this effect be printed in the margin against each of the three places in which the word "Architect" appears in each form. On the same evening, at the close of the meeting above-mentioned, a business general meeting (for members only) will be held for the following purposes:—To read the minutes of the ordinary general meeting held on Dec. 16, 1889; to announce donations of books, &c.; to formally admit members attending for the first time since their election; to ballot for candidates who desire to be admitted as Fellows; to elect, under the terms of by-law 9 (b) candidates who desire to be admitted as Associates; to receive the announcement of the award of the studentships and prizes for 1889-90, made by the Council (in accordance with the terms of By-law 66) in writing under the common seal; and, on the motion of Mr. Wm. Woodward, Associate, to consider the "Sundry Powers and Provisions" portion of the London Council (General Powers) Bill. A public exhibition of all the designs, drawings, sketches, &c., submitted for the studentships, medals, and other prizes, 1889-90, will be held in the larger Conduit-street Gallery daily, until Monday, the 20th inst., at 10 p.m.—the Exhibition meanwhile opening at 10 a.m. and closing at 9 p.m. every day. The drawings and sketches made by the Soane Medallist 1888, the Owen-Jones Travelling Student, 1889, and the Pugin Travelling Student, 1889, will also be on view during the same period.

The Architectural Association.—The sixth meeting of this Association for the present session was held on Friday, the 3rd inst., in the meeting-room of the Royal Institute of British Architects, Conduit-street, Mr. T. E. Pryce (Vice-President) in the chair. The following gentlemen were elected members, viz.:—Messrs. G. Stephenson, J. H. Mann, P. Field, P. F. C. Smith, A. E. Seaman, T. Parker, and W. Stewart. Mr. Sydney B. Beale then read a paper on "Spires, Towers, and Domes," the first part on which we print on another page.

Birmingham Architectural Association.—At a meeting of this Association, held on Tuesday evening last, Jan. 7, Mr. W. H. Lloyd, Vice-President, being in the chair, a paper was read by Mr. F. B. Andrews, A.R.I.B.A., on Pershore Abbey. The paper was based on special interest by the very full manner in which it was illustrated by drawings and photos. Of the history of the Abbey, Mr. Andrews said that much was veiled in obscurity, owing greatly to the fact that fires had been of frequent occurrence in the Abbey, destroying, with much else of value, the record of its early years. Various authorities fixed the date of its foundation in 604, 681, 689 A.D., and other dates in the seventh century, of which 618 seemed that most probably correct. It was at first dedicated to SS. Mary, Peter, and Paul, and given to the secular canons, but finally became the Benedictine Abbey of SS. Mary and Edburga. Records are found of its restorations after fires in the years 1020, 1056, 1102, 1223, 1288, the fire in the last-named year reducing nearly the whole abbey to ashes, together with the town of which it was the central building. The remains at present

existing are the choir, choir aisles, south transept and transept tower, and two small chapels north and south of the choir, and sufficient remains of the foundations have been traced to define the form of the Lady Chapel, nave, north transept, cloisters, Abbot's lodge, fratry, common room, and chapter-house. The south transept, built a few years before the Conquest, is the earliest part of the remains, and the nave and lower part of the tower are of the eleventh century, the Lady Chapel of the thirteenth century, and the lantern and belfry stages of the tower of the fourteenth century. The south transept has a small vault of fourteenth century work, hearing amongst others the arms and rebuts of Abbot Newton, 1413-1456. The choir has a semi-hexagonal plan at the east end, though the surrounding ambulatory and the Lady Chapel appear to have been square on plan. The tower is of special interest, from the very marked resemblance, pointed out by the late Sir Gilbert Scott, which it bears to the tower of Salisbury Cathedral, for though comparatively simple in its detail, the belfry stage is throughout a plainer version of the first stage of the fourteenth-century work in the Salisbury tower, and the lantern is an absolute translation into the later work of the thirteenth-century lantern at Salisbury. "The details," says Sir G. Scott, "bear considerable resemblance, the distribution of windows, blanks, and piers is absolutely identical, and so also are the very remarkable bands, quatrefoils, &c. While speaking, however, of the details as being simplified from those at Salisbury, I must except the internal features of the lantern. . . they are far richer and more beautiful; indeed, I scarcely know of a lantern story so beautiful, and it stands, as far as I know, quite alone in its design." In conclusion, Mr. Andrews mentioned the many interesting buildings which surround Pershore, and which, with the Abbey, make the neighbourhood of singular interest to the architect. A hearty vote of thanks was accorded to Mr. Andrews, on the motion of the Chairman, supported by Messrs. Cotton, Doubleday, Bidlake, and H. R. Lloyd.

Liverpool Architectural Society.—The fourth ordinary meeting of the Liverpool Architectural Society was held on Monday evening last, January 6th, the President (Mr. T. Mellard Reade) in the chair. A paper was read by Mr. James L. Thornely entitled "Monumental brasses" with special reference to those of Lancashire and Cheshire. The lecturer, who exhibited a fine collection of rubbings, began his paper by defining a monumental brass, so far as dealt with on this occasion, as a figure or effigy engraved on a brass plate with or without accompanying canopies, inscriptions, or other ornaments, and proceeded to class the examples roughly under five periods, and dealt briefly with the leading characteristics of each, illustrating his remarks by numerous beehall rubbings, which comprised a fairly representative collection of brasses of ecclesiastics, knights, ladies, and civilians. He also pointed out that the early brasses (many of them of Flemish manufacture) were much larger and more bold and free in design than the later, and mentioned that after the introduction of shading by means of cross lines, the vigour and worth of the brasses gradually declined. He further alluded to the former practice of enamelling the brasses, to represent the colouring of heraldic bearings, &c, thereby greatly enhancing them in richness of effect; also to the handsome canopies to be met with in many examples; he pointed out that the various Norman Gothic styles and their transitions can clearly be traced in these portions of the brasses. Mr. Thornely further referred to the curious but discreditable practice of making palimpsest brasses, i.e., reversing an old brass and utilising it to commemorate a subsequent deceased person. He further referred to the devices or marks to be met with upon some brasses indicating the private or company trade-mark of the engraver, and pointed out that companies or fellowships of brass-workers used to exist. In conclusion, after calling attention to the scarcity of brasses in Lancashire and Cheshire, compared with the southern and eastern parts of England, the lecturer referred to rubbings of the following local brasses:—In Cheshire: Sir Rogers del Bothe and Lady Duke, his wife, at Wilmslow; Roger Legh and children, Macclesfield; and a civilian from St. Peter's Church, Chester. In Lancashire: Piers Gerard, and Sir Peter Leger and his lady, at Winwick, near Warrington; a

knight of the Scarisbrick family, Ormskirk; Ralph Catteral, wife and children, from Whalley; Henry Norris, and Clemence his wife, from Childwall, near Liverpool; and Thomas Beri, from Walton-on-the-Hill.

"A QUESTION OF DISTRICT SURVEYOR'S FEES."

HAYWARD v. SANDON BROTHERS.

It will be remembered that in this case Mr. C. F. Hayward, District Surveyor of St. George's and St. Giles's Bloomsbury, sued Messrs. Sandon Bros. to recover an amount of £56. 5s. as fees due to him as District Surveyor upon the erection of the above premises, which consist of four shops and two sets of chambers on the ground-floor, one set of chambers and box-rooms on the basement-floor, and eight sets of chambers on the upper floors, all the latter approached through an entrance, and having one staircase, and being let as separate tenements.

When the matter was brought before Mr. Bridge at Bow-street, on October 4, 1889, he decided in favour of the District Surveyor, upon which Mr. Edward Morten, counsel for the defendants, gave notice of appeal, as his contention and that of Mr. W. Sockham Witherington, defendant's architect, was that sec. 27, rules 1, 2, and 3, applied only as to the "separation of buildings and the limitation of their areas," and not to fees which are settled under sec. 49, schedule 2, part 1, as not to exceed £10. Leave to appeal was given, and Mr. Bridge suggested that Mr. Morten should draw the case, and that it should be approved by Mr. Hayward it should be submitted to him for signature.

When, however, the parties appeared before Mr. Bridge, Mr. Hayward claimed his fees under sec. 27, rule 2; but his solicitor, in approving the case, inserted also rules 1 and 3. Mr. Bridge objected to rules 1 and 3 being mentioned, unless facts could be shown showing what sum Mr. Hayward would be entitled to if rule 3 applied to the question of fees. These could not be arranged, and Mr. Morten pressed the magistrate to state the case under rule 2.

Eventually the magistrate declined to state any case, and the summons was dismissed, Mr. Hayward's solicitor advising him not to take one under rule 2.

No order as to costs was made.—Communicated.

THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS OF GREAT BRITAIN.

SIR,—At the adjourned meeting held on December 21, 1889, the following resolution was passed, and afterwards referred to the Council for consideration:—"That the Council of the Royal Institute of British Architects be asked to define the present status of the Sanitary Inspector; and, having regard to the obvious intentions of the Sanitary Acts of Parliament, the experience of their working since acquired, and the duties actually devolving upon such officers, to further define what ought to be the qualifications of candidates for the said office." The Council are of opinion that the step proposed to be taken by that resolution is an important one, and that such a course should only be taken if approved of by a majority of the members of the Association and its branches, and, therefore, measures are being taken to obtain that opinion. The Council also will be pleased to receive observations thereon from any Sanitary Inspector, though he may not be in membership, as it is upon a matter which equally concerns all Sanitary Inspectors.

SAMUEL C. LEGG, Hon. Sec.

January 8, 1890.

THE MONTROSE MONUMENT.

SIR,—In the notice of the Montrose Memorial, illustrated in your issue of the 4th inst., after stating that Messrs. J. and W. B. Rhind are the sculptors of the monument, you make what seems to me a most unnecessary remark, viz., "so we are informed, though we do not well understand how two sculptors can be joint artists of one figure." My son, W. Birnie Rhind, I have trained as a sculptor, and for the last ten years he has been associated with me in many of my principal works, in addition to what he has been commissioned to execute in his own name. If it is possible for two architects jointly to design a work of art in the shape of a public building, why may not two sculptors combine their efforts in executing a public monument?

JOHN RHIND.

* Partnership in architectural work is not by any means a parallel case. As far as pure design in architecture is concerned, we should say the same as of sculpture—it must be the work of one mind; but the carrying out of a building includes a great many other things—arrangement of plan, details of construction, warming and ventilation, which one

partner may elaborate separately. A partnership association in such a thing as a work of sculpture would appear to many, as it does to us, to savour more of art-manufacture than of art.—Ed.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—II.

MAGNETS.



MAGNET possesses two characteristic properties: (1) if suspended at the earth's surface, so as to turn freely about a vertical axis, it will in general tend to set itself in a certain azimuth, and if disturbed from this position will oscillate about it; (2) it will attract certain substances: iron, steel, lodestone, and nickel among others.

Any substance capable of being attracted by a magnet is called a magnetic substance. All magnets are made of magnetic substances, but all magnetic substances are not capable of becoming permanent magnets; if they are, some, at least, form exceedingly feeble ones. Although magnets may be made of any shape and of a variety of substances, in practice they are made from rods of hardened steel in the form of a bar or bent into the shape of a horseshoe.

The force of attraction of a magnet varies greatly at different points of its surface. It is greatest near the ends, and sinks to zero at the centre of a uniformly-magnetised rod. The points on a magnet where the attractive power ceases are called its neutral points. Near the ends of a magnet where the attraction is greatest, the force seems to spring from two points, called the poles of the magnet.

When dealing with problems concerned with gravitation,—that is, the attraction of one piece of matter for another,—it is frequently useful to conceive the whole of the matter in a body concentrated at one single point. A sphere, for instance, attracts bodies placed outside it precisely as though the whole of its mass had been concentrated at its centre. This point is simply a centre of forces, and, as such, is of enormous importance mathematically, but physically the centre point of the sphere differs in no way from any other point in it.

The poles of a magnet are nothing more than centres of magnetic force, and differ physically in no way from other points in the steel throughout the mass of the magnet. At the same time it is frequently useful to speak as though all the magnetism of magnets, whatever magnetism may be, were concentrated at these two points, and the steel rod merely served as a metal framework holding these two points of magnetism.

It is of importance to call attention to this at the outset, as the poles are so often referred to that students are apt to get in the habit of thinking that the constitution of a magnet at its poles differs from its constitution at any other point.

It is a line joining the poles of a magnet, called the axis, which points magnetic north and south, a direction which is in London some 15 deg. west of true north, called the declination of the compass-needle. The end of the magnet which points to the earth's north pole will be called the north end, and the end which points to the earth's south pole, the south end, the poles of the magnet being respectively called north and south. The facts that the two poles of a magnet are equal in strength and that like poles repel each other while unlike poles attract, besides many other points of similarity between magnetic and electrical effects, led early investigators to suggest fluid theories of magnetism similar to the old fluid theories of electricity. The probable nature of magnetism will be explained in a future article, for the present it is enough to state that there are no sufficient grounds for believing in the existence of magnetic fluids. On the contrary, there is every reason to believe that such fluids do not exist.

If a magnet is broken into any number of pieces, or even ground to powder, each little fragment is a complete magnet with two equal poles, and possesses all the properties of larger magnets. This has led to the belief that each molecule of the substance of which a magnet is composed is a complete little magnet, and that the various effects produced by a magnet, as a whole, are due to arrangement of these molecular magnets.

The experiments of Professor Hughes, published in 1888, have done much to confirm this belief, and to show the various arrangements the molecules of a magnetic substance can be made to assume under suitable treatment. When a piece of iron or steel is in an unmagnetised state, the molecules are, nevertheless, magnetised, and arrange themselves in closed polygons (fig. 2), the north pole of one molecule

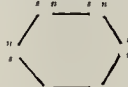


Fig. 2.

sticking to the south pole of the next, and thus neutralising each other's external effects.



Fig. 3.

When the metal is magnetised, a certain number of the closed polygons, fig. 2, split up, and the molecules place themselves end to end, fig. 3, the north poles all facing one way, the south poles in the other direction. Fig. 3 shows also how the unneutralised north poles of the molecular magnets form the N pole of the magnet as a whole, and make it appear that magnetism is concentrated at the pole of the magnet, the same, of course, applying to the S pole. Coercive force, the power which enables a magnetic substance to become a permanent magnet, depends upon the degree of freedom with which its molecules can turn. A magnetic substance under external magnetic influences may have a certain proportion of its molecules arranged as in fig. 3, when the external influence is withdrawn, they will tend to re-arrange themselves as in fig. 2, and whether they will do so or not,—that is to say, whether the substance will cease to be magnetised or not,—depends upon the ease or difficulty with which the molecules can turn. In soft iron the coercive force is excessively small; it can therefore be magnetised very easily, but cannot unaided remain a magnet. In steel, on the other hand, coercive force is great; it is harder to magnetise, but, when once magnetised, the molecules retain their positions, and a permanent magnet is the result.

The quantity of a thing can always be measured by measuring the quantity of some effect it produces, without necessarily knowing the precise nature of the thing measured.

If the poles of two magnets are presented to each other there is attraction or repulsion, and this effect is made use of for defining what is meant by a "pole of unit strength," or "a unit pole." Unit magnetic pole is that pole which, placed at a distance of one centimeter from a similar and equal pole, repels it with a force of one dyne.* Coulomb showed that the force between two magnetic poles varies directly as the product of their strengths and inversely as the square of the distance between them. Hence, by the above definition, if m_1, m_2 are the strengths of two poles, d the distance between them in centimeters, and F the force acting in dynes:—

$$F = \frac{m_1 m_2}{d^2}$$

Although it is impossible to get, say, a north pole without a south pole, the south pole may be moved off to as great a distance as we please by making the magnet long enough. We shall frequently, therefore, speak of a north pole as though it could have a separate existence.

If a movable pole is put anywhere in the region round a magnet, it experiences a force urging it in some direction. Each of the poles of the magnet acts on the movable pole with a certain force, and the direction of the resultant of these two forces is the direction in which the pole is urged.

If the pole is allowed to move, it will trace out a "line of force." A line of force is, therefore, a line such that its direction at any point is the direction of the resultant force at that point. In the present case, magnetic lines of force are meant, dealing with the force produced on a magnetic pole as such; but the definition

* If a force of one dyne acts in the same direction on a mass of one gramme for one second, it produces in it a velocity of one centimeter per second.

will, of course, apply to force, no matter how produced, nor on what it acts. Now since the movable pole, unless screened in some way from the action of the magnet, experiences force wherever it is put in the region round it, this space must be filled with "lines of force"; such a region is called a "field of force." A field of force consists of an infinite number of lines of force. The positive direction, or simply direction, of a line of force is the direction along it in which a north pole would move.

If the direction of a line of force at any one point is required, it can be found by freely suspending a little magnetic needle at that point, when it will lie along the line of force passing through it.

Lines of force can almost be said to be made visible by means of iron filings. If a card be placed over a magnet, or in any field of force, and filings shaken from a muslin-bag on to it, the filings become magnetised in the directions of lines of force, and stick together end to end so as to trace out the contour of the field. A few of the beautiful figures so easily obtained in this way will give students an idea of the distribution of lines of force around magnets and systems of magnets that no mere explanations can ever convey.

Books.

A History of Warwickshire. By SAM. TIMMINS, F.S.A. Elliot Stock.



MR WILLIAM DUGDALE'S history of

"That shire, which we the heart of England well may call," is not to be found on many bookshelves, and even when found will not supply all that the modern reader requires. To begin with, it is nearly two-and-a-half centuries old; and, though the edition published by Dr. Thomas in 1730 contains some additions and corrections, we shall look in vain therein for anything but ancient history. The development of Birmingham belongs chiefly to the latter half of the last century, and to the period following the incorporation Charter of 1836; while Leamington, now an important town, owes much of its prosperity to Dr. Jephson, albeit Mr Timmins passes him over unnoticed. Strangely enough, the town of Rugby meets with the same neglect at his hands. Except as the birthplace of Matthew Hobbes, the historian of English Gothic architecture, and as the scene of Dr. Arnold's labours, the place is scarcely mentioned, though its growth has been remarkable. Perhaps an excuse may be suggested by the fact that Mr. Timmins is an antiquary, and that his interest lies chiefly in the past. To him—as in some degree to others also—Stratford-on-Avon is the principal town in Warwickshire, and all that relates to Shakespeare of paramount importance. But Mr. Timmins' sins of omission are not confined to the above examples. In any list of the "Worthies of Warwickshire" we should expect to find the names of the late Mr. Evelyn Shirley and Mr. Chandos Wren Hoskyns. The former,—a genealogist of the first rank (the original of Mr. Ardenne in "Lothair")—was a Warwickshire man to the backbone, and the latter made the county his home after his marriage with the ultimate heiress of Sir Christopher Wren, and wrote at Wroxall Abbey his fascinating "Chronicles of a Clay Farm." We have looked in vain for some other well-known names, but are bound to add that, nevertheless, small as the county is, its list of eminent natives or residents is unusually long. Drayton certainly, and perhaps Will Somerville, may claim a place in the class which Shakespeare heads, and among authors whose fame is neither local nor fugitive we may surely place Addison, Landor, Arnold, and "George Elliot," besides the never-to-be-forgotten Durdale.

If we turn from persons to places, Warwickshire can boast of a goodly number of historic sites and spots of interest. First there is Stratford (whose memories attract more pilgrims than Becket's shrine ever drew). Then Warwick Castle, mainly rebuilt in the 14th century, is full of interesting relics. "The entrance gate," says Mr. Timmins, "only a few years ago, had some of the hooks from which wool-sacks were said to have been suspended to protect the wall from attacks during the great Civil War. The great inner gateway, with its double portcullis and machicolated tower, is an excellent object-lesson of the art of war four centuries ago." But even Warwick, in spite of the grandeur

which has survived the vicissitudes of fortunes, must yield in interest to the ruins of Kenilworth, and to those especially whose knowledge of English history is derived from the Waverley Novels, its picturesque remains will recall many a romantic scene. It does not come within our province to discuss the story of Amy Robsart, if Kenilworth was not her prison, it was certainly that of Edward II. centuries before, and within its walls Leicester's grand tournament in 1268, and Queen Elizabeth's magnificent reception in 1562, were held. Martock Castle lies outside the tourists' beat. It is an excellent specimen of an Edwardian fortress, and has undergone comparatively trifling changes in its external appearance. It lies low, and is surrounded by a moat, across which access to the great court is gained through a gateway, between two lofty hexagonal towers. Tamworth is less pleasing, and, in fact, is little more than a solid square block of masonry, but its very simplicity proclaims its high antiquity. Astley Castle, built of red and grey sandstone, belongs to a much later period, and, though castellated in appearance, is in other respects an Elizabethan dwelling-house. Of far higher interest is Compton Wynayates, built in the early part of the sixteenth century, and in its main features, still unaltered. Mr. Timmins does it only justice in describing it as "a marvellous and artistic combination of stone, wood, and brick." The chimneys alone are a study, and the carved oak work in the rooms and galleries is wonderfully well preserved. No doubt Compton Wynayates owes its preservation to its secluded position, and we can see in its immunity from destruction the reason which impelled builders in olden times, when castles ceased to be erected, to select unobtrusive sites. Equally well preserved, but of smaller size, is Badesley Clinton, a moated manor-house of the latter part of the fifteenth century, which still remains in the same family,—the Ferrers family,—to which it owed its erection. Upon what principle Mr. Timmins has excluded from his book all notice of Aston Hall we are unable to say. It is true that the house and its surrounding park have been purchased by the Corporation of Birmingham, and most of the latter has been built over, but the mansion still stands, and has not wholly ceased to deserve Digdale's encomium: "A noble fabric, which for beauty and state much exceedeth any in these parts." Those who desire to study its features, and compare its plan with that of Compton Wynayates, should consult an excellent work, entitled "Illustrations of old Warwickshire Houses," published some ten years ago by Mr. Niven. We have left ourselves too little space to speak of the churches of the county. Coventry,—that city which is perhaps more full of old buildings than any other in England,—still boasts its "three spires" (though one of them has been perilously near destruction), and we are glad to hear that the "restoration" (we dread the word) of St. Michael's Church has been carried out "with excellent judgment and good taste." We are not great admirers of this great church, with its enormous windows and unsymmetrical form, but the group of buildings of which it is the most prominent member is almost unsurpassed. St. Mary's, Warwick (with the Beauchamp Chapel), the Parish Church of Stratford, Temple Balsall and Colehill churches are well worth notice, but the Midland Counties cannot in this respect vie with the Eastern.

We have not hesitated to point out the defects which we have noticed in Mr. Timmins' volume, but gladly add that both it and the series to which it belongs are of genuine value, and will, we believe, help largely to remove that ignorance of their own land which is a reproach to many of our countrymen.

The Thirlmere Water Scheme.—It is understood that the contract for the work to be done at the foot of Thirlmere Lake in building the dams and diverting roads, &c., in connexion with the Manchester Waterworks has been let to Messrs. Griesenthwaite, Penrith, and Beatty Brothers, Carlisle. The contract is about 120,000*l.*, and in a few weeks it is expected that over 1,000 men will be employed.—*Manchester Courier.*

Results of Auction Sales in 1889.—From extracts from Estate Exchange Registers we learn that the amount of auction sales of property reported to the 31st ult. was 4,218,274*l.*, or, with private contract sales, 4,304,954*l.*, as against 4,417,840*l.* in 1888, 3,989,099*l.* in 1887, and 4,120,044*l.* in 1886.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

12. Instantaneous Grip Vices. J. Singleton.

According to this invention, on the spindle of cabinet-makers' or joiners' vices a collar to join up to the neck of the loose jaw, such collar being for the purpose of drawing out the loose jaw of the vice. A fixed collar is placed upon the spindle to secure one end of the spring placed upon the shafts. The shaft is threaded or screwed so as to fit the hex nut, and by this and other mechanical details the articles are firmly secured in the jaws of the vice. Or instead of the cam being threaded the nut is made in the form of a boss with a solid collar so as to fix on a loose cam, secured by a loose collar, so that the cam can be worked without interfering with the screw part.

15. Lock Knobs. W. H. Bird.

By this invention a metal nut with an internal screw thread moves upon a suitably threaded square lock spindle. This nut has formed upon its circumference a groove into which a dot or a notch attached to the neck of knob closes when in position.

26. Ships' Berths. E. Lawson.

This invention consists in a modification of the ball-bearing used in fitting ships' berths, and is so made turning on bosses or joints, that the rail may be turned up out of the way when not in use, and can be readily removed from the berth when necessary, or can be applied to either end of the berth, if wished.

35. Ornamental Glass Tablets, &c. G. Fyfe.

According to this invention, the surface of the glass is coated with a preparation of isinglass and gold applied. A transfer is then taken from a litho stone, and put on the work before the medium dries. The hack of the transfer is then washed away, leaving the design upon the glass.

107. Wheelbarrow Bodies. J. W. Sankey.

The bodies of the harrows are, according to this invention, stamped in one piece out of a flat plate, the corners being gathered or puckered so as to give the necessary slope or taper to the body, and the surplus metal at the corners is taken up and utilised.

123. Keys or Wedges for Railway Chairs, &c. S. Danrchesky.

This invention relates to wooden keys, which, having some advantages to balance the disadvantages they possess in shrinking and becoming loose in dry weather, are extensively used in railway work. They are simple and readily procurable, holding the rail both laterally and vertically in the chair; they are also elastic and reserve their original dimensions after having been subjected to a heavy compressed force. The key, which is the subject of this patent, is of wood and metal,—a joint key,—and is provided also with a suitable appliance for preventing it dropping out of the chair owing to vibration or shrinkage.

147. Locks. W. Kneen.

The levers of locks are actuated by weights or gravitation instead of springs. The levers or tumblers are made with a weighted end, and the bolt also slides upon an incline, and by its own weight falls into a position for latching or locking the door.

198. Hydraulic Lifts or Hoists. A. A. Vulgrier.

Lifts are generally arranged to rise in a vertical direction. The common centre of gravity of the platform and the load never coincides exactly with the axis of the hydraulic cylinder or with the resultant of the hydraulic pressure if there are several cylinders. The platform is, therefore, subjected to a strain, the moment of which cannot be balanced except by horizontal reactions which, according to the nature of the construction, are either entirely derived from the guides along which the platform rises and falls, or partly from the guides and partly from the packing of the hydraulic cylinder. These reactions produce friction and jamming in certain cases, sufficient to entirely stop the motion of the lift. Instead, therefore, of the axis of the hydraulic cylinder being arranged vertically, it is inclined at a considerable angle, while the platform remains horizontal, suitable guides and wheels being fitted to assist the easy movement.

213. Portable and Collapsible Reading-desk. E. Pillow.

The board of this reading-desk is hinged and folded, and, when open, is inclined. It is provided with spring-clips for holding the book in position; provision is also made for keeping pens and pencils, and a small lantern may be fixed when the desk is used by a lecturer who desires to signal instructions to an assistant or operator.

282. Conduits for Electric-Mains. F. Coates.

By this invention it is proposed to lay conduits in such a manner as to avoid to a great extent the breaking or opening-up of the pavement or roadway when the mains are once laid, and thereby to avoid interfering with the traffic and to facilitate the repairs to mains by constructing the conduits in such a way that they may be easily opened and closed, at the same time providing the conduits

with suitable locks or fastenings to prevent their being tampered with. They are made in stone, earthenware, or cement, and placed at the side of the kerb or roadway.

* * In consequence of the Patent Office authorities not having issued the "Official Journal of Patents," we are compelled to hold over the "New Applications, &c.," till next week.

MEETINGS.

MONDAY, JANUARY 13.

Royal Institute of British Architects.—Special general meeting of members only, to consider the question of "Articles of Pupillage," followed by a business general meeting (for members only) to ballot for new members, to receive the announcement of the awards of studentships and prizes, and to consider the "Sundry Powers and Provisions" portion of the London County Council (General Powers) Bill. 8 p.m.

Royal Academy of Arts.—Prof. J. E. Hodgson, R.A., on "The Old Masters' Exhibition of 1890." III. 8 p.m.

TUESDAY, JANUARY 14.

Institution of Civil Engineers.—Mr. G. F. Lyster on "Recent Dock Extensions at Liverpool." 8 p.m.

Society of Biblical Archaeology.—Anniversary meeting. 8 p.m.

WEDNESDAY, JANUARY 15.

Society of Arts.—Adjourned discussion on Sir Robert Rawlinson's paper on "London Sewerage and Sewage." 8 p.m.

British Archaeological Association.—Mr. A. S. Canham on "The History of Crowland: its Charters and Ancient Crosses." 8 p.m.

Institution of Civil Engineers.—Students' Visit to the Sewage Works at Crossness. (Train to Abbey Wood leaves Charing-cross at 12.20 p.m.)

Architects' Foremen and Clerks of Works Institution.—Annual Meeting. 8.30 p.m.

Inventors' Institute.—(1) Mr. S. J. Mackie on "Lessons Deducible from Recent Fires." (2) Several short descriptive papers will be read on "Inventions for Minimising the Dangers of Fires, and Saving Human Life." 8 p.m.

THURSDAY, JANUARY 16.

Royal Academy of Arts.—Prof. J. E. Hodgson, R.A., on "The Old Masters' Exhibition of 1890." IV. 8 p.m.

FRIDAY, JANUARY 17.

Architectural Association.—Discussion on the Progressive Examinations of the R.I.B.A., to be opened by Mr. Arthur Cates. 7.30 p.m.

Bradford Historical and Antiquarian Society.—Mr. W. Scruton on "Some Fragments of Bradford History." 8 p.m.

Miscellaneous.

Messrs. C. Leary & Co's Annual Circular on Hard Woods states that the hard wood trade of London has had a full share in the general improvement of business which has characterised the year 1889. Apart from a period of stagnation during the dock strike, the record is distinctly satisfactory, a large volume of trade having been combined with a generally good, though not unduly inflated standard of values. At the same time, it is undoubtedly a fact that the business passing through London would be considerably greater if the facilities for handling goods were equal to those afforded by other ports. As to East India teak, the stock of timber and plank is 60 per cent. larger than at the close of 1888, and there are besides 3,750 loads, recently arrived, yet to be taken into account. The tonnage afloat and under charter to load is 32,678 and 24,119 respectively, against 19,468 tons afloat and 25,360 tons to load at the beginning of 1889, but a large number of cargoes are already sold. The year just closed has been remarkable for the imports into Europe having been the largest on record, and for the great activity in the ship-building and rolling-stock industries, which, moreover, promises to continue for some time to come. The market has been in a good position during the greater part of the year, importers not having been under necessity to force sales, and the business in floating cargoes has been very large, and at good prices. Heavy arrivals during the last three months have somewhat unsettled the market, and the tone is less satisfactory. Cargo quotations are 12*l.* to 13*l.* per load.

Resident Engineer for the Bible Works.—The *Manchester Courier* reports that on Monday a meeting of the Bible Committee was held at the Town Hall, Preston, for the purpose of interviewing the six selected candidates who had applied for the position of Resident Engineer to the Bible works. The applicants were reduced to three—Mr. A. F. Fowler, Navigation Engineer to the York Corporation; Mr. Archibald Hamilton, Resident Engineer to the new works on the Clyde Navigation Trust; and Mr. John Stirral, chief assistant to Messrs. D. & T. Stevenson, engineers, Edinburgh.

Messrs. Foy, Murgan, & Co.'s Annual Wood Report, 1889.—Messrs. Foy, Murgan, & Co., in their annual report, say:—"The past year, while not leaving importers as good a result as the one before it, has still been marked by a certain firmness in prices, and although the highest f.o.b. figures of the opening months were not quite maintained, the abatement was neither general nor serious, although at the same time sufficient to enable shippers to realise their stocks. The margin between spot prices and f.o.b. cost has been exceedingly meagre, and while many cargoes have left nothing beyond bare import cost, some have even been distinctly sold at a loss. These drawbacks have to a great extent been discounted by a wonderful absence of bad debts, and by the sound, though quiet state of the building trade, enabling importers to sell retail to consumers at remunerative figures. The hoped-for improvement in the building trade did not manifest itself during the year, but there are signs that its coming may be expected in the near future, owing to the general revival of trade all over the country, and to the general commercial prosperity that has now set in throughout the Kingdom. Upon this will probably depend the stability of the market for the year. The figures of the dock stocks are very similar to those of 1888, the only distinct decrease being in Baltic deals. The effect of the strike was not only felt in the curtailment of the deliveries, but the loss sustained by depreciation, owing to exposure to the weather, of many fine cargoes of deals and battens, was enormous, and has not even yet been fully brought home to bidders. Auctions have not been heavy, and this shows that demand has been continuous, and has at no time required the drastic remedy of forced sales to stimulate consumption. Deliveries from the docks have been good, and had it not been for the unfortunate strike they would have been considerably larger, thus giving an index to the steady demand which has ruled, and which during the autumn has been far better than for a considerable period."

The English Iron Trade.—The English iron trade opens the year with the market in an active and buoyant condition, improvements in prices being reported from all directions and for every description of the crude and finished article. Notwithstanding advanced and advancing rates, business in pig-iron is comparatively brisk. The Glasgow warrant market has been strong, and a large amount of buying has been going on. In several districts makers have practically withdrawn quotations, and they are generally unwilling to commit themselves forward. Where, however, actual business is done, this is effected at higher rates, Scotch makers quote this week from 61. to 1s. 6d. bigger per ton. Cleveland iron has been put up 2s. 6d. a ton, and Bessemer 3s. 6d. in the North-West, where, also, Spiegleisen has advanced to the phenomenal figure of 130s. a ton, being an increase of 32s. 6d., or over 30 per cent. in a week. Finished iron is also much stronger, and both marked and common bars have been raised 10s. per ton, while black sheets and Welsh bars have improved 15s. A similar tendency is displayed by steel. Rails and blooms are 8s. a ton dearer, and billets and slabs, 12s. 6d. Shipbuilders are beginning to book fresh orders with the New Year, notwithstanding the increasing cost of tonnage. Engineers have their hands very full of orders, and plenty of new business is coming forward.—*Iron.*

Yorkshire College Engineering Society.—At the meeting of this society on Monday evening, the President (Professor Arch. Barr, B.Sc.) delivered his annual address. As Professor Barr is leaving Leeds to fill the Chair of Engineering at the University of Glasgow, the opportunity was taken to present him with a testimonial from the members expressive of their appreciation of his services to the society. In the absence through illness of Mr. Josb. Buckton, chairman of the Engineering Committee of the College, Mr. Wicksteed occupied the chair. Professor Barr spoke for an hour on the lessons to be derived from the life of James Watt, the founder of the profession of engineering. Mr. Goodman, the new Professor of Engineering at the College, also spoke.

Birkbeck Institution.—The Monday evening lectures in "Quantity Surveying" are from 6.30 to 7.30, and not from 6 to 7, as advertised in our last issue.

Aberdeen Trade in 1889.—During the past year the various industries followed in Aberdeen have, with one or two minor exceptions, been prosperous, and in some cases workers have shared in the improvement. In the granite trade a large amount of business has been done, although the merchants complain that, owing to over-competition, profits have been forced down to a very low point. In the polished monumental and ornamental granite departments there has been a satisfactory activity and a large export of finished articles to the Colonies and abroad, not to speak of the trade in the home country; and the granite merchants have plenty of orders in hand for the current year. There has been no change in wages. It may be mentioned that, besides the "native" or Aberdeenshire granites, granite of various colours from Sweden and other "foreign" granites are now, to some extent, employed in the trade, and that a commencement has been made in a new branch of industry, in the export to America of stones dressed and ready to be used in building. The "boom" in house-building in Aberdeen is now over, as is evidenced by the fact that the valuation roll shows that there are in the town 1,241 vacant houses and 322 vacant shops, of a united valued annual rental of 16,994l., and by the further fact that the number of plans of buildings lodged with the authorities for sanction has now reached what may be called a normal figure. During the year the Town Council have approved, as regards lines, levels, &c., plans which may be classified as follows:—Dwelling-houses, 116; cottages, 17; alterations and additions, 74; balls, 2; church, 1; miscellaneous (including warehouses, workshops, stables, &c.), 42. In many cases the premises described as "dwelling-houses" are within the bounds of the city proper, and there has also been a considerable amount of building in the suburban districts adjoining. A commencement has been made with the new prison on the south side of the Dee, and work is well advanced at the new Infirmary buildings in Spa-street. There are no other buildings of any special magnitude in prospect. The Town Council have taken the preliminary steps for the formation, under the improvements scheme, of a new street in the east-end running from Castle-street in the direction of the Links.—

Engineering Works on the Danube.—The Hungarian Government are inviting tenders for the engineering works which are to be carried out at Orsova, on the Danube, at the so-called Iron Gate. The work is divided into three sections, viz.—1. The blasting of a channel in the river-bed to a depth of 2 metres below mean level of water, and having a width of 60 metres. The quantity of rock to be removed is about 160,000 cubic metres. 2. The construction of two so-called "Stau" dams, requiring 620,000 cubic metres of rock *débris*, and 100,000 cubic metres of facing stone. 3. Blasting of a channel in order to avoid the worst rapid, requiring the removal of 240,000 metres of rock, and 95,000 cubic metres of facing stone. The most difficult part of the work will consist in the submarine blasting, as the current runs at the rate of 4 metres per second. The Government have already attempted this work by Lieut.-Col. Laner's method, consisting in dropping dynamite cartridges, attached to a fuse, to the bottom, but without success. Tenders are, therefore, now invited, which must be sent in to the Hungarian Minister of Communications at Buda-Pesth, before January 31 next, and who will furnish, for a sum of 20 florins, all drawings, plans, specifications, &c., the amount of caution money to be deposited by the successful tender, the deposits of the unsuccessful ones being, of course, returned.

Obituary.—We regret to bear that Mr. Edward Ellis died at his residence, Bruce Grove, Tottenham, on the 8th inst., after a long and painful illness, in his 73rd year. He had practised as an architect in Fenchurch-street, London, for nearly forty-five years,—during the last ten years in partnership with his son, Mr. Edward Brookes Ellis, A.R.I.B.A., and retired about three years ago in consequence of failing health. He had carried out many large buildings in London, chiefly offices and warehouses; churches at Peterborough and Edmonton; the Corn Exchange at Bury St. Edmunds; vicarages at Oakham, Higham, Edmonton, and Peterborough; schools for the Tottenham School Board; and many private houses in the neighbourhood of London.

Proposed Railway Survey of the Khyber. In connexion with the proposed railway survey of the Khyber, it may be noted that there are at least two feasible routes through the hills to the west of Peshawar,—from Jamrud by the Khyber direct, or by incline along the Kabul River to Dakka. The latter is the one which is to be surveyed at once, or so soon as the needful tribal arrangements are satisfactorily made. By the former route, to Jellalabad, and for some distance beyond, the only really difficult lengths would be from Ali Masjid across the Kotal to Landi Khana, and possibly a short length at Chorgali between comes when a railway has to be made to Kabul itself, there will be no difficulty in carrying the line on from Jellalabad. By the Dorunta Gorge, Kats-i-Ashu, up to the Adrak-Badrak Kotal, not very far from Jagdalak, or to within about fifty miles of Kabul, there would be a certain amount of rock-cutting, though nothing insurmountable. But it would be a question if from Jellalabad a better alignment would not be by the Lugman Valley and the Kabul River. There is every reason to believe that a perfectly practicable route could be obtained in this direction, which in former times was used for the movement of formidable armies, and is only now avoided by kafilas on account of the want of proper escort.—*Indian Engineer.*

Sewer Ventilation into House Chimneys!—Mr. W. Santo Crimp, the Engineer to the Wimbledon Local Board, writes to the *Western Morning News* (Plymouth) as follows:—"I have recently had occasion to examine the literature relating to sewer ventilation, and in the first volume of the Proceedings of the Association of Municipal and Sanitary Engineers I found this paragraph:—

"Plymouth.—The sewers are ventilated by chimneys or shafts into house chimneys. Very few persons know where they are, to prevent prejudice, and the imagination that they are injurious to the residential property. This means, in the cases of those houses where chimneys have been utilised as sewer ventilators, that when down draughts occur the sewer gas is carried into the living-rooms. May not this explain the prevalence of scarlet fever in Plymouth?" Upon which the Editor of the journal in question remarks: "Such a statement, in such a form, ought to be at once replied to. But we should be surprised to find it to be a fact that sewer ventilation is attempted in Plymouth by means of any chimneys of dwelling-houses."

Sir A. B. Walker.—At a special meeting of the Liverpool City Council on Wednesday, the honorary freedom of the City was presented to Sir A. B. Walker, Bart., in recognition of his munificent gifts of an art gallery and of the engineering laboratories in connexion with the University College. The document was enclosed in a casket, and was presented by the Mayor, Mr. Thomas Hughes, on behalf of the inhabitants of the city. Sir Andrew, in acknowledging the gift, expressed his great appreciation of the honour, and said that, with regard to the two institutions he had established, the best thanks he could receive was the consciousness that they were doing a great and important work in the community.

New Swedish Society of Builders.—A new society of builders has been formed in Stockholm, which at its first meeting enrolled over fifty master builders and architects as members. One of the main objects of the association is to improve the relations between employer and workman in the building trades, and to resist strikes. On the latter point the society has been so far successful as to put an end to the recent masons' strike in Stockholm.

The Chief Engineer-Elect of the London County Council.—The *Liverpool Post* states that Mr. Clement Dunscombe, the late Engineer to the Liverpool Corporation (recently appointed Engineer to the London County Council), left Liverpool on Saturday, in Messrs. Elder, Dempster & Co.'s steamer *Calabar*. Mr. Dunscombe is going to Grand Canary for the benefit of the sea trip, and the beautiful climate of the Canaries.

The Proposed Underground Railway in Edinburgh continues to excite much interest in the city. The opposition to it is strong, and, if the scheme is persisted in, steps are to be taken to prevent its fulfilment. Various alternative schemes have been proposed, some of which, it is alleged, would, if carried out, be a greater boon to the public than the Princess-street scheme.

The Proposed Strand Improvements.

The report of the Parliamentary Committee of the Strand Board of Works upon the London Street (Strand Improvement) Bill of the London County Council was adopted at the meeting of the Board on Wednesday. The Board's chief objections to the Bill are according to the Standard in reference to the "betterment clauses," which provide for a rent-charge upon property within a given area. The report protests against the arbitrary way in which the area supposed to be specially benefited by the improvement is defined. It seems to the Committee peculiarly unreasonable to exclude Somerset House, Lancaster-place, the west side of Wellington-street, Wellington-street North, Covent-garden Market, the Law Courts, Lincoln's Inn, the Temple, and Incorporated Law Society from the area supposed to be specially benefited. If there is one thing more than another which has rendered the improvement urgently necessary in the public interest, it is the fact that the Law Courts have been erected in the immediate neighbourhood of the proposed improvement." The Daily Telegraph quotes the following paragraph from the report:—"Our committee desire to call special attention to the fact that it is impossible in the case of this scheme that any new and valuable frontage can be obtained to the widened street by adjoining landowners, as in the case of the Shaftesbury-avenue improvement, inasmuch as the London County Council must purchase both sides of Holywell-street to effect the improvement, and in no case will it be possible for any owner to obtain a frontage to the Strand which he does not now possess. In consequence of the improvement, the London County Council become the sole owners of the new frontages on the north side, while the south side of the Strand will, for business purposes, be deteriorated in value. Our committee are of opinion that an improvement in this locality has been long called for in the interests of the metropolis as a public improvement." The Board resolved to oppose the Bill in Parliament, and to ask Mr. W. H. Smith to receive a deputation on the subject.

Humours of an American Sanitary Journal.

The Sanitary News, of Chicago, in its issue for Dec. 21 last, has been pleased to appropriate from our issue of Nov. 30 not only the report of Mr. Henry Law's paper "On a Method of Regulating the Maximum Discharge of Sewers," but the block (which the Editor, or a clever printer, calls a "Diagram") illustrating the same. If our American contemporary had quoted the source whence he derived his matter, the value would certainly not have been less. However, we will spare a more excellent way, and give all the credit that is due to the Editor of the Journal for the following extract, which is not altogether inapplicable to London just yet, we fear, in spite of the movement for the registration of plumbers:—"Plumber (just commencing business for himself, to his bookkeeper): What is the meaning of sanitary? Bookkeeper (always ready for the occasion): Well, sanitary is one of those words that has a Latin root which enters into the composition of many English words, such as sanguine, sanguinary, sang froid, &c., and means no cure, no pay. Plumber: Say, painter, leave off the sanitary, and make it just plain plumber. Next morning low over the door hung the following sign:—

HENRY H. SMITH
JUST
PLAIN PLUMBER.

PRICES CURRENT OF MATERIALS.

Table listing prices for timber and other materials. Columns include item name, quantity, and price per unit.

Table with columns for 'TIMBER (continued)', 'METALS', and 'OILS'. Lists various materials and their prices.

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Table for competitions with columns: Nature of Work, By whom Required, Premium, Designs to be delivered, Page.

CONTRACTS.

Table for contracts with columns: Nature of Work or Materials, By whom Required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page.

PUBLIC APPOINTMENTS.

Table for public appointments with columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page.

TENDERS.

Multiple sections of tenders for construction projects in various locations including Ashburton, Derby, Gosport, London, and Westminister. Each section lists project details and contractor information.

LONDON.—For erecting factory, Paradise-street, Fishary, for Mr. H. Lebus. Mr. H. Woodzell, architect:—
 J. Anley £4,800 0 0
 Holloway 4,779 0 0
 Lascelles 4,632 0 0
 Grover 4,589 0 0
 Laurence 4,555 0 0
 W. Shurmer 4,572 0 0
 W. Scrivener 4,421 0 0

LONDON.—For alterations, &c. to premises in Commercial-road, E. Mr. H. H. Collins, architect:—
 Kilby & Gayford £1,800 0 0
 Ashby & Horner 1,855 0 0
 W. Shurmer 1,845 0 0
 Hearle & Son 1,753 0 0
 Sabej 1,668 0 0
 Thompson 1,629 0 0
 Culnan 1,545 0 0

LONDON.—For alterations and additions to 25, Sussex-square, for Mr. S. J. Parker, under the superintendence of Messrs. Godwin, Basley, & Co., 23, Cadogan-place, S.W.:—
 Wilkinson & Son £1,416 8 3 1/2
 Bush & Co. 1,415 0 0
 Greatorex & Co. 709 0 1/2

LONDON.—For putweller's work to the "Audley Hotel," Audley-street, for Mr. R. H. Barnes. Mr. H. I. Newton, architect, 49, Victoria-street, Westminster, S.W.:—
 Saunders & Sons, High Holborn* £145 10 0

LOWESTOFT.—For new road, sewer, &c., for the British Land Company, limited, on their Crown Meadows Estate. Mr. Henry B. Michell, surveyor:—
 Bennett, Ipswich £635 0 0
 Gibson, Ipswich 624 0 0
 Pizzey, Hornsey 624 0 0
 Wilson, Walthamstow (accepted) 615 0 0

NOTTINGHAM.—For the restoration of old buildings at the Castle, and conversion of same into an Industrial Art Gallery, for the Corporation of Nottingham. Mr. Herbert Walker, F.R.I.B.A., architect:—
 J. F. Price £3,850 0 0
 E. Hind 3,707 0 0
 Fish & Son 3,700 0 0
 Woodland 3,650 0 0
 H. Vickers 3,637 0 0
 Bell & Son 3,600 0 0
 Wheatley & Maule 3,600 0 0
 Hudson & Son 3,500 0 0
 J. Thomas (accepted) 3,453 0 0

PORTSMOUTH.—For the rebuilding of the "Ship Antelope" beerhouse, for Messrs. Simonds & Co., Winchester. Mr. W. Yeardy, architect, 30, High-street, Gosport:—
 J. Croad, Portsea £724 0 0
 C. H. Roberts, Southsea 670 0 0
 H. Clark & Sons, Landport 633 0 0
 J. Crockerell, Landport 629 0 0
 T. P. Hall, Southsea (accepted) 584 0 0

READING.—For new granary, for Messrs. H. & G. Simonds, the Brewery, Reading:—
 Strong Bros. £1,173 0 0
 Higga & Sons 997 0 0
 Ruffel Bros. 945 0 0
 Bottrell & Son, Reading (accepted) 945 0 0

SWANWICK.—For the erection of "Railway Hotel," stables, coach-house, &c., for Messrs. S. & T. N. Blake & Co., Mr. W. Yeardy, architect, 30, High-street, Gosport. Quantities supplied:—
 C. Roberts, Portsmouth £1,511 0 0
 J. Croad, jun., Gosport 1,505 4 0
 W. Rapley, Gosport 1,382 0 0
 W. Franklin, Southampton 1,364 0 0
 J. Luke & Son, Gosport 1,250 0 0
 Morgan, Islel, & Morgan, Southampton 1,244 0 0
 J. Plummer, Fareham 1,230 0 0
 T. P. Hall, Portsmouth 1,220 0 0
 H. Jones, Portsmouth 1,210 0 0
 C. Wareham, Stubbington 1,170 0 0
 J. Crockerell, Portsmouth* 1,150 0 0

UTTOXETER.—For a 100-quarter malthouse, with cellars, bridge, sub-way, &c., for the Uttoxeter Brewery Company. Mr. R. Hardy, architect, 3, Thurland-street, Nottingham:—
 Baines, Newark £5,525 0 0
 Dennett & Ingle, Nottingham 5,349 0 0
 Bisset, Sheffield 5,285 0 0
 Sicker, Derby 5,056 0 0
 Wood, Derby 4,900 0 0
 Lowe & Son, Burton (accepted) 4,800 0 0

WEST WICKHAM (Kent).—For the erection of a residence, for Mrs. Thomasset. Mr. Alex. R. Fleming, architect, 121, Cannon-street, E.C. Quantities by Messrs. Mew & Overden, 121, Cannon-street, E.C.:—
 T. Crossley, Bromley £4,000 0 0
 Ashby & Horner, Alabate 3,990 0 0
 Mid-Kent Building Works, Beckenham 3,909 0 0
 F. Cooper, Beckenham 3,780 0 0
 S. Sabej & Son, Islington 3,707 0 0
 Syme & Duncan, Beckenham 3,640 0 0
 E. R. Palmer, Beckenham (accepted) 3,585 0 0

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TO CORRESPONDENTS.
 B. D.—One who objected to compete [we have entire confidence in the bona fides of the promoters in this case]—H. R. C. W.—It is hardly a matter for public discussion to what point one of the County Council are in no way bound to follow the precedent of the Board of Works. E. E.—"A Constant Reader" [we presume you are one of the "practical men" referred to. We presume entirely to the opinion already expressed.—J. Y. should read carefully.—E. B. E. do not insert such announcements unless directly requested by the principal.—H. W. J. H. (no space)—J. C. Bolton (we do not receive reports of such kind).
 All statements of facts, lists of tenders, &c. must be accompanied by the names and addresses of the sender, not necessarily for publication. We are compelled to decline posting 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 library 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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SATURDAY JANUARY 18, 1890

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Scottish Art and Architecture.



THE interesting volume which has been brought out by Mr. Brydall* is in some of its chapters rather a history of Scottish artists than of art in Scotland; at all events such names

as those of Robert Adam and Wilkie certainly belong more to the history of English than of Scottish art. A history of artists who are Scottish in nationality would, when brought down to the present day, include some of the best known names among the members of the Royal Academy of England at this moment, the extent of the Scottish element in which is almost proverbial, inasmuch that it has been insinuated that one of the best qualifications for an artist seeking election as an Associate is to be a Scotchman. But the volume contains a great deal of information in regard to the meagre remains of early Scottish art, the formation and history of the Scottish Academy, and the works and career of many artists of talent whose names are nevertheless little known south of the Tweed.

In the opening chapter on the sculptured stones belonging to the ancient period, the author refers to Mr. Billings's remark that among the Iona stones, along with sculptured forms believed to be very ancient when found on stones in other parts of the country, are found undoubted marks of much later origin, and that some which show characteristics of great age are inscribed with a date in the seventeenth century. This is accounted for by an ambition among some of the Highland chiefs "to appear in the character of Norman knights" (rather a curious way of putting it), and it is added that a document written between 1577 and 1595 mentions, in regard to the hurrying-place at Iona, "in this are all the gentlemen of the Isles buryit as yet." This accounts for these dates in a probable manner; but it would not explain the curious incident which we mentioned in connexion with the historic exhibition in the model of the Bishop's castle at the late Glasgow Exhibition, of the hag-pipe with a Celtic style of ornament and a

date 1500 inscribed upon it: an incident which perhaps suggests that there was even at that time such a thing as a taste for the archaeological reproduction of the decoration of an older period.

We have no doubt Mr. Brydall is right in his estimation of the important amount of artistic work once existing in the architecture and furniture and decoration of Scottish Abbeys and other ecclesiastical buildings; nothing probably like what once existed in England, but still far more than might be hastily estimated from the extent of the remains and records of such work now to be found. It may be assumed that there was a greater extent of destruction of such work in Scotland than even in England, owing to the peculiarly strong anti-papistical feeling of the Scottish reformers; that this feeling was pre-eminently strong and stubborn in Scotland history leaves little doubt; yet it is curious, in respect to this, to read of the caution appended to a letter of instructions given in 1560 for the removal of all altars and "monuments of idolatry" from the churches. This document, signed by "Mr. Argyle, James Stewart, and Ruthven," is a circular of directions of this iconoclastic kind, of general application and with a blank left for the name of the particular church to be operated upon—"Traist friends, after maist hearty commendacioun, we pray you fall not to pass incontinent to the kirk of —, and take down the hail images thereof, and bring down to the kirk-zayrd, and burn thymoppinly." Yet to this heartily-expressed commission is added the postscript "tak guid heid that neither the dasks, windocks, nor darris be ony ways hurt or broken, either glass wark or iron wark." When we compare this with the well known and dramatic account of the Cromwellite emissary in England breaking the stained windows of Canterbury Cathedral with a pole—"rattling down proud Beckett's bones," one cannot but wonder at the apparently greater tenderness towards the windows in Scotland. It is probable however that this is in reality a piece of the "canny" instinct of the north country, which would not readily destroy anything that was necessary to keep the church habitable for service, and which it would be an expense to replace. Perhaps we may also read it as an indication that there was not much stained glass work in the Scottish churches. The author indeed mentions that almost the only fragments of ancient stained glass left in Scotland are those pertaining to the old Maison Dieu

in Edinburgh, "containing the Scottish arms and those of the Queen Regent, Mary of Guise, encircled respectively by a crown of thistles and laurel, with other armorial bearings, and the figure of St. Bartholomew, who has strangely escaped from the destruction of his brother Apostles there in 1559. In these fragments, while the figure is inferior to the other parts, the deep ruby and bright yellow on the Royal Arms exhibit traces of a bold broad manipulation and richness of colour, shewing a good appreciation of the glass-stainer's work." Possibly the importance and prominence of the armorial bearings acted as a protection to the figure of the saint. But if there had been anything like the amount of medieval stained glass in Scotland that there was in England, it seems likely that by similar chances some other relics of it would have escaped to tell the tale; and we imagine that the direction to spare the church glass points in the same direction, and that it was mostly plain glazing not obnoxious to the Reformers.

The author indicates the early seventeenth century as the period when the modern form of architecture began to be developed in Scotland; later than in England, as England was later than the Continent, the spirit of the Renaissance travelling slowly northward towards the outer zone of civilisation. Among the first names of the period when architects began to be known by name is mentioned that of William Schaw, "Master of the King's Works" to James VI., who died early in the seventeenth century, and restored in 1594 the Abbey of Dunfermline. A part of the translation of the Latin inscription on his tomb shows that he was held in high honour, and spent no little pains in the studies whereby he rose to eminence: "he had travelled in France and many other kingdoms for the improvement of his mind; he wanted no liberal training; was most skilful in architecture; was early recommended to great persons for the singular gifts of his mind; and was not only unwearied and indefatigable in labours and business, but constantly active and most vigorous, and was most dear to every good man who knew him: an architect's epitaph that should not be forgotten. The family of the Mylnes succeeded to eminence in architecture; beginning with John Mylne, several of whose predecessors had however also held the office of Master-mason to the King; there is also mention of Alexander Mylne a sculpt-

* Art in Scotland; its Origin and Progress. By Robert Brydall, Master of the St. George's Art School at Glasgow. Edinburgh and London: Blackwood & Sons, 1889.

tor (probably, the author says, the brother of John) who died in 1643, and on whose tomb in the cemetery by Holyrood it is recorded that

"What Myron or Apelles could have done
In brass or patriy, he could that in stone."

Another Mylne was concerned in the building of Holyrood Palace; and a later member of the same family was the Robert Mylne born at Edinburgh in 1734, whose name is well known as the architect of old Blackfriars bridge, and who was afterwards surveyor to the fabric of St. Paul's.

It is only after the lapse of a good many chapters in the book that we return to the subject of Scottish architects in the eighteenth century, about the middle of which century died William Adam, the father of his son, and James Gibbs of Aberdeen. William Adam made an essentially Scottish reputation, but Gibbs was certainly to all intents and purposes an English architect; the only building in Scotland with which his name is said to be probably associated is the church of St. Nicholas in his native city, which the author describes as "professing to be Classic, but of no particular style." He was one of the first noteworthy examples, perhaps, of the many eminent artists who, born in Scotland, have made all their reputation in England, and to whose names a history of Scottish art can hardly make any claim. To the ability of the still more eminent, or at all events more successful English architect of the period who was born in Scotland, Robert Adam (the son, as above indicated, of a true Scottish architect), the author hardly does full justice; perhaps in part owing to Adam's questionable taste in deserting his own country. Now, Robert Adam (for it seems to have been he who was the prevailing genius of the family) accomplished what few single architects in the world's history have accomplished; he made a recognisable style; not a very powerful one certainly, and not perhaps original in any separate detail; but with that harmony and completeness in itself which more than any other quality constitutes style. To say that its characteristics were "the introduction of large windows, often rather half-looking for want of dressing, grouped three or more together, by a great glazed arch" can hardly be called a fair description; it is the selection of a detail which, after all, we have not noticed as especially prominent in his works; but the essence of his style does not consist in this or that separate detail, but in the harmony and completeness of the whole. The author gives a sketch of the curious history of the Adelphi scheme, and its financial failure. In speaking of Adam's early studies, we observe that he retains the spelling "Spalatro," which may be considered as abandoned now for the more correct "Spalato," doubtless an Italian corruption of *palatium*.

Among the artists to whom considerable space is given are William Dyce and Sir Francis Grant, concerning both of whom we confess it was news to us that they were both Scotchmen; their career and fame was entirely English; so was that of David Roberts. Indeed it seems to us, looking over the list of artists' names, that Raeburn was the only one of the highest rank who remained *de facto* a Scotch artist, and made his fame in his own country. Thomson of Duddingston had a reputation beyond the border, but his landscapes, though evincing genius, can hardly be said to keep their place. David Scott, a man of undoubted genius, remained a Scotch artist; the author observes that he has been called "the Scottish Michael-angelo," a comparison rather beyond the mark; his genius had some affinity with that of Blake, though he no doubt drew better than Blake and was (if one may be permitted to say so) more sane in his temperament. Several works of his are mentioned which are unknown, we imagine, to most English readers; among others a reference is made to his remarkable illustrations to the "Pilgrim's Progress." A copy of this work we came upon not long since in a seaside lodging in a little fishing village; a goodly thick quarto ensconced among the family Bibles. Many of

the designs are very powerful, especially that of Christian entering the Valley of the Shadow of Death, where a deep shadow is thrown from a dimly-seen gigantic figure bending forward so that the top of the crowned head is seen; this design is quite in the spirit of Blake. Some very interesting details are given of Raeburn's manner of working, from which we learn that in painting a portrait he never made any preliminary outline of the head or figure, but drew it in at once with the brush. Among the sketches of deceased Scottish artists of recent days we notice that one of the most distinctly Scottish in reputation, Sam Bough, was by birth an Englishman. The short biography of him is very interesting, for the personality of the man was as powerful and original as that of his paintings.

Mr. Brydall has produced a very interesting hook which will fill a gap in libraries of works devoted to art. While on the subject of art in Scotland it will not be out of place to mention another book dedicated to our special branch of art as illustrated in Scotland, namely, the third volume, and a volume of goodly bulk and thickness, of Messrs. MacGibbon and Ross's "Castellated and Domestic Architecture of Scotland."* The authors are now endeavouring to carry out the scheme which they announced, and for which they asked assistance and information at the close of their second volume, of extending the scope of the work so as to include an account and illustrations of every old castle in Scotland; a fourth volume is to follow, and it is intended that there should be a complete record of this class of buildings. This is a very spirited effort, and deserves all recognition. We devoted considerable space to the first two volumes, and it is perhaps only necessary to say here that the third volume is carried out with the same completeness and the same large proportion of plans, sections, and sketches, as the former ones. The plans alone form a most valuable and interesting collection. We have never been able quite to like the style in which the views are drawn; it is rather mechanical and too much overdone with shading lines; but it fulfils all the practical purposes of illustration. Naturally the examples are not of quite the same interest as in the first two volumes, since in those the scheme of complete illustration had not been entered upon, and the most remarkable examples were of course selected; but everyone interested in the subject will be glad to see it thus continued. Among the more picturesque and characteristic examples in the third volume are Meggerie Castle, with its modest dormers ensconced between the square corbelled-out towers at the angles, and Sorn Castle, shown in two small elevations, a solid block of masonry with a great machicolated cornice and angle-turrets, and the windows set out in a very picturesque manner; the well, or rather well-cover, from the Mansion-house at Greenock, with its pyramid of masonry carried on thick cylindrical columns at the angles, is a curious and unusual bit of work, dated 1629. We hope to be able to congratulate the authors soon on the appearance of the fourth and concluding volume of their interesting and valuable book.

Canal Work in Russia.—It seems probable that the Russian Government will shortly begin the construction of the great canal between the Onega Lake and the White Sea, connecting that sea with the Baltic, plans for which have been for some time under consideration. It is estimated that the length will be 235 kilometres, of which 133 kilometres are natural canal, whilst the depth is to be three metres. The cost of the canal alone is estimated at seven and a half million roubles; but with a harbour constructed at Wyg, on the White Sea, and dredging of the river Svir, the cost will be ten million roubles.

* The Castellated and Domestic Architecture of Scotland from the Twelfth to the Eighteenth Century; by David MacGibbon and Thomas Ross, Architects. Volume III. Edinburgh; David Douglas; 1888.

THE LATE SIGNOR BRENTANO.

BY PROFESSOR MELANI, OF MILAN.



HE have referred already to the lamented and untimely death of Giuseppe Brentano, the young Milanese architect, who was victorious in the celebrated competition for the facade of the Duomo at Milan. He closed his career as an artist with an enormous success, which gave him a position such as many would have been well content to earn at the end of a long and laborious life; and has passed away without even seeing the commencement of that work to which he devoted his ceaseless attention, in order that he might make it more worthy of the monument it was to complete.

Giuseppe Brentano was born in 1862. From his early youth he cherished the idea of becoming an engineer, and had attended the technical classes at the Polytechnic, in which he became a pupil, and left these in 1885. When a student at the Polytechnic, Brentano obtained his great triumph, not by the display of his qualities as an engineer, but rather as an architect; a fact which is the more worthy of remark, as the Polytechnic school in question does not offer any special facility or inducement towards the study of architecture. Not that architecture is not studied in the Italian polytechnics, but the study of art does not form any organic element in these institutions, because in them those who belong to the architectural and engineering sections have to frequent for a short time some schools of the Institute of Fine Arts, together with the pupils who have devoted themselves to art, and not to science. The students in these polytechnics benefit very slightly from the artistic instruction in the fine art schools, and are all wrapped up in their studies in the science of construction. In practice they are excellent engineers, whereas as architects they do not go beyond mediocrity, even if they reach that stage, owing to the insufficiency of their artistic training.

However, Brentano was evidently born an architect rather than a scientist, and he left the Polytechnic of Milan with a disposition more susceptible to the attractions of art than to those of science.

In fact, while still at the Polytechnic, a competition was opened at Siena, among the architectural students, for a scholarship, and young Brentano was among the competitors. The subject was a plan for a building for a given purpose, and a study on the history of art. Brentano was successful in this competition, and it was on this occasion that I came to know him personally. Knowing that I had successfully competed in a similar affair in Tuscany, Brentano called on me, and sought from me some information on this matter. I gave it to him very willingly, and encouraged him, after having seen some of his works which he brought for my inspection, and (as he added with extreme courtesy) for my opinion. Brentano wrote me several long letters from Siena, and when he returned to Milan again called on me with his work executed there. I conceived a very favourable opinion of it; but at that time I was much better pleased with a series of water-colour drawings, evincing a bold picturesque spirit,—drawings taken from remains at Florence and at Siena. These were, for the most part, fragments of Mediæval architectural works, to which, Brentano remarked, he felt himself drawn more than to any other style of architecture. The year after this first success, Giuseppe Brentano was made a qualified architectural engineer, and at the annual exhibition of the Institute of Fine Arts he exhibited a design in the Tuscan Mediæval style, which was, if I remember rightly, a very faithful reproduction of the celebrated

* The Italian fine art institutions have an architectural course, in which, together with architectural composition, ancient and modern architectural styles are also taught. The youths who attend these courses are not trained in construction, and hence they cannot exercise the art practically as architects, although even they may come out triumphant in the competitions for large public buildings.

Tabernacle of Orcagna in Or San Michele at Florence: he also exhibited a series of crayon sketches, of extreme delicacy, characterised by exquisite taste. Thenceforth, he was a recognised artist. Then came the International competition for the façade of the Duomo at Milan, and he was immediately urged to compete by his friends. At first the subject of the competition appeared to Brentano beyond his powers and studies (this the writer heard from his own lips), but subsequently he entered on the task, and exhibited two schemes at the preliminary competition; one of these was flanked by two towers, and one was without towers. In these designs there was, to say the truth, a good deal of uncertainty as to the system of treatment to be adopted; but passing over this fault in the two studies by the young Brentano, it was undeniable that in them he proved himself to possess greater strength than he had credit for; in fact, such was the power he evinced, that he was justly selected to be one of the fifteen competitors in the second competition. I can remember the great interest which the two schemes submitted by Brentano awakened in the public mind, because they were submitted in their original form, in the shape of rough sketches and as unelaborated designs, and the interest was so great that very high hopes were at once entertained of him. They showed, in fact, that the author had yet much more to say after these,—his first two efforts,—and the result proved it.

Selected as one of the competitors in the second competition, and before setting to work, Brentano paid a lengthy visit to Germany and Austria, and having secluded himself at Vienna, he devoted several months to work under Hasenauer, the celebrated architect of the Burg Theatre and of the Museum of Fine Arts and Natural Sciences at Vienna; he did this for the purpose of becoming more skilled in that Gothic style which had now become his ruling thought.

Brentano laboured, not only in the studio, but outside it, and wherever he went he carried away with him numerous studies and sketches. After this ample and opportune preparation, he set himself to work, and as soon as his plans were submitted many who saw them foretold the result. When the Exhibition was opened, Brentano at once gained admirers, and as a rule those who had not the courage to support his schemes were, at any rate, of opinion that none of the other competitors (Ciaghin, of St. Petersburg, had died after the preliminary competition) had produced a work which was worthy of being executed. The truth is that Brentano had three other strong competitors, or rather two others, who, supporting his ideas of dispensing with the towers of the façade for the Milan Cathedral, had each of them submitted important designs.

However, Brentano came out of the competition victorious, and his victory was a substantial one, almost without opposition, for he received twelve out of fourteen votes.

Thus it was that the architect Brentano awakened for several years universal interest, and all wondered that such a young artist should have achieved a triumph in such a way, and in an international competition wherein many illustrious men had laboured, and the press published biographies of him, spoke of his works, and praised his talent.

I cannot say how much such a conspicuous success may have affected Brentano, but I can affirm that he made no boast of it whatever; so true is this, that when one of the leading Italian publishers asked him to publish the façade he had designed, he refused the invitation, and preferred postponing it until after the sketch had been executed as a model, for which purpose he required the assistance of several of his colleagues. But, alas! poor Brentano never even had this satisfaction, and when he had barely commenced to execute his model in wood, according to the conditions of the programme, he was attacked by typhoid fever, and died in Milan on the morning of Dec. 31, 1889.

The jury who had declared the scheme of

the young Milanese architect to be not only the best, but also one worthy of being executed, had also evinced the desire to see the crowning of the centre compartment somewhat raised,* in order that the centre feature might be more elaborated than the one shown in the plan. And it appears that Brentano himself was convinced as to this requirement, as also were many at Berlin and elsewhere. Consequently, Brentano had recently devoted himself to working out a different solution of this problem, which, indeed, was far from being a simple one. The fact is, so far as is known, and judging by the recent declarations made by Brentano, that he had not definitely accomplished anything in this direction which would serve as a guide to the modeller Brambilla.

As to the model, it was executed on a scale of 1-20, or, rather, of 1-21; that is, the full size of Brentano's original design. And as it was begun it will now be completed, on the very clear lines traced out by the young architect. Fortunately, the Cathedral authorities agreed on the necessity of having a simple model executed in wood, and this sample, consisting of one portion of a pier, will afford the modeller greater security in the interpretation of Brentano's conception, because it is executed under his own direction and with his approval.† There is only one thing that will leave anything to be desired in the wood model, namely, the proposed variations in the central portion, a matter which it will be exceedingly difficult to proceed with under the present circumstances.

The reader may naturally ask a question on this point, Will Brentano's plan be carried out, or what are the probabilities as to its execution? The reply to this question is by no means easy. I must limit myself to conveying the opinions most in vogue, and the facts which are best known on this subject.

Your readers will remember what gave rise to the present international competition. It was the fact that a bequest was made by a Milanese citizen, Aristide de Togni, in 1884, amounting to 830,000 lire, for the façade in question. This bequest, although very large in itself, was a modest one when compared with the total sum required for a worthy façade to our cathedral; and it was left subject to a condition that, if within twenty years the sum, or a part of it, were not expended on the façade, it would go to the benefit of the city hospitals. Hence the necessity of opening the competition at once, and of stimulating it.

It is certain that there are a great many who even now do not believe that the façade of the Duomo at Milan will be carried out, and there are also many who think that, in spite of De Togni's bequest, the competition which recently took place was merely an academical one,—albeit, one which has left an important page in the annals of the cathedral. The great difficulty which appears at present obvious to every one, arises from the fact that our cathedral is not bereft of a façade; and that, consequently (say some critics), it would be useless piece of extravagance to spend an immense sum in providing it with a new one from the mere desire of improving the style of the monument. The façade of the Milan Duomo, as it stands to-day, is far from being unworthy in the eyes of those who accept with serene impartiality any artistic manifestation which efficiently represents any period in national history, and you will easily understand that if the monuments of Italy were to be improved in style, even limiting ourselves to the most noticeable ones, an end would never come to a work inspired by the very partial judgment of epochs and circumstances. It may be replied that these ideas are not the ideas of our time, and that before opening an international competition with the solemnity which characterised the one for the façade of

* See the official report of the jury, p. 4.

† According to the programme of the competition, Brentano was to superintend the execution of this model in wood, after which he would have received the second half of the prize of 40,000 lire assigned to him (see the Programme of the competition, article 10). The continuation of the model is now being executed under the superintendence of the cathedral authorities.

the Duomo at Milan, consideration ought to have been given to the responsibility assumed; but the fact remains that both in Italy and beyond its shores the idea of improving the style of the façade of our cathedral has opponents; but those who favoured it, having the majority on their side, succeeded, at all events, in bringing about the competition.

Some other difficulties in the way of the execution of Brentano's scheme also arise from the fact that, by its execution, the ensemble of the present façade would not be substantially altered. I should explain that at Milan there existed, and still exists, the false impression that the renovation of the façade should be executed not so much to improve the style of this portion of the monument as to give greater scale to the building. It is a fact that, as compared with the palaces designed by Mengoni and the great arch of the Galleria Vittorio Emanuele, the Duomo of Milan, looked at from the Piazza, presents rather a modest figure. Now, those who think thus, believed (and still believe) and hoped that the new façade would have corrected this obvious disproportion to the prejudice of the Duomo; yet seeing that after all the project to be executed would, from this point of view, leave things pretty much as they are, they do not appear to be over-pleased with it; so that if they do not raise difficulties, they at any rate stand apart with a rather suspicious indifference.

There is also the question of funds, but this, in my opinion, is not so serious as might be believed. In works of this kind Milan would, doubtless, get the support of the Government, and probably the support of Italians generally, although, perhaps, not to a very large extent; yet Milan is the most industrial and the richest city of Italy, and could rely a great deal on her own resources. Her capitalists are not scarce, and their affection to the Cathedral which lends individuality to the city assumes a Chauvinistic character which in England would perhaps hardly be credited. Again, the construction of the façade to the Duomo does not merely mean its commencement and completion in a short space of time. It is probable that the cost would not be far short of ten million lire, according to an approximate estimate; but ten million lire should not be sufficient to alarm us when, as in the present case, the payment is distributed over a number of years. In this amount would not be included the campanile, which would not only be necessary, but indispensable to the Duomo, particularly after the façade was renewed.* But Brentano's scheme is being prepared to stand fire, for further criticism, in the shape of a model. A drawing is one thing and a relief-model is another; and there are people in Milan who are rather doubtful as to the result of this final proof of Brentano's scheme. I, who am a faithful chronicler of what passes before my eyes,—if an opinion were allowed me,—would say that if the relief-model does not succeed in awakening a very lively interest on the part of the public, then adieu to the façade. It would then, I believe, be buried among many other projects of the present and previous, and even earlier centuries.

But even after this proof, admitting that it does awaken the enthusiasm I have referred to, it does not follow that the work will be immediately commenced. The judgment of the international jury requires the sanction, first, of the Preservation of Buildings Committee of the Province of Milan, and secondly, of the Superior Board of Fine Arts, and when so many persons have a right to intervene and express their opinions, especially in questions of works that every one has an ambition to carry out, obstacles easily arise. But there is in favour of Brentano's project and of its execution this

* When Napoleon, King of Italy, in June, 1805 ordered the façade of the Milan Duomo to be completed, the façade at that time had its doors and pilasters decorated up to the first Baldacchini, and as the work was completed with some carelessness, the expense amounted to about four million lire, comparing the money of that time with its present value. (See the Concorso Monumentale per la Nuova facciata del Duomo di Milano." A. Guidini, La facciata del duomo di Milano attraverso i secoli, p. 197.)

fact, that on account of the lamented death of the architect, the scheme may gradually assume, I might also say, an impersonal character, and in this way it would have more than ever an absolute possibility of being carried out (since a committee might be entrusted with it, consisting of this one or that one who on their own merits might aspire to the honours which fell to the lot of poor Brentano).

At the present state of the work, then, there are those who have the fondest faith in seeing Brentano's façade commenced, and there are also those who have no such belief. For my own part, I withhold any decision until I see whether it "stands fire" as a model. And if this test is favourable, as I hope it may be, then no serious difficulties are likely to impede the commencement and the final completion of the work (except, of course, any national calamity); and then, indeed, Giuseppe Brentano will have a lasting and magnificent monument.

To add a few personal details as to the late architect: Brentano was gentle in manner, tall, thin, and pale in appearance, and particularly of late gave rise to many fears among his friends as to his health. He was accustomed to a life almost of luxury, and was in this way quite the opposite to the "Bohemian" artist, a fact worth noting in a city like Milan, where artists are, perhaps, more Bohemian than in any other artistic Italian centre. Brentano used to dress not only with faultless elegance, but even with extravagance. Being a very young man, and new to the life, he had not many acquaintances among artists, but he had many among the upper classes of residents, to which class he himself belonged. Thoroughly devoted to study, Brentano shunned every opportunity of publicity, and when recently at the re-election of the Communal Council he was asked to become a candidate for the Council, he returned thanks and refused; nor, indeed, would he have accepted any office which might have distracted him from his studies or occupied his time. I can also say in his honour that after his triumph he fled from the turmoil of the city as though to fly from the sound of the praises and the gaze of the curious, both of which disturbed him, and he also avoided even that notoriety which was almost inseparable from the nature of his studies, and the responsibility which his triumph had thrown on him. Nor do I exaggerate owing to the affection I bore to my young colleague, nor is it because I think it a duty only to allude to the good works of those who have gone before us, that in writing of Brentano I allude to his blameless life, and I would even have spared myself alluding to it were it not that it contributed to render the young Italian artist more dear to all who knew him.

Before concluding, I should say that the international competition for the façade of the Duomo appears to have been fatal to several of our young colleagues who took part in it. Brentano is the fourth architect among the competitors under thirty years of age who has died. The first was Teodoro Ciaghi, who is one of the fifteen who was to have presented himself in the second competition, and he died before being able to begin the studies requisite. Luigi Tabac, a young artist of Venice, who died at Trieste, was also a very formidable competitor; and Raffaele Cattaneo, an architect and a writer, whose name was connected with the splendid publication issued by the "Organia de la Basilica de S. Marco," at Venice.

ALFREDO MELANI.

Sheffield Municipal Buildings Competition.—In reference to our remark that a well-known Sheffield firm of architects was mentioned in the local papers as among the six selected competitors, the architects in question wish us to state that they did not, as we assumed, make this communication to the local press. The fact that it is known in that case, seems to show how impossible it is to keep these matters secret, in spite of all the efforts made by the authorities.

NOTES.

THE re-opening of the Railway Rates Enquiry last week found the opposing parties no nearer agreement, though Sir Henry James was prepared with a proposal which may simplify matters somewhat. It is suggested that the objections not yet disposed of should be tabulated, and the reasons for making them shortly and concisely stated. The railway companies will then state the grounds on which they decline to comply with the demands made, and the Court would thus be in possession of a revised statement of the points still in dispute. Mr. Balfour Browne took an opportunity of stating that the attitude of the traders represented by him towards terminals was still one of refusal to recognise the right of the companies to make any charge for them at all. Certainly, as matters now stand, in the event of the terminals claimed being disallowed, the railway companies would claim a right to re-cast the whole of the schedules, so as to provide for them in some other way. The form in which they were directed to bring in their proposals gave them a fair ground for assuming that such charges would be dealt with on their merits; and they have adduced a considerable amount of evidence in support of the reasonableness of the sums claimed. The traders will doubtless have to address themselves to the task of rebutting this evidence, as far as they may find themselves able to controvert it, the Board of Trade being hardly the tribunal to decide upon the legal arguments connected with this matter. Much less time was occupied in the examination of witnesses last week than in the case of the representatives of the London and North-Western and Great Western companies, owing to the latter having exhausted so much of the general case for the railways, that there are only certain matters relating to their own particular systems for the other managers to deal with. In defending the proposed classification, Mr. Scotter, of the London and South-Western Railway, maintained that no classification which brought the whole trade of the country into eight classes could hope to be either theoretically or logically perfect. We might add that the modifications already effected as the result of this inquiry afford proof that a full discussion of it by all parties interested will go a good way towards rendering it practically perfect. Mr. Oakley, of the Great Northern Railway, has given his evidence, but the Midland Manager (Mr. Noble) is ill, and unable to attend. The solicitor to the latter Company, Mr. Beale, who attended several of the conferences which preceded this inquiry, appeared on their behalf. Unfortunately, Mr. Courtenay Boyle has since fallen ill, too, and this will necessitate the postponement of the inquiry for a time.

THE discussion on the County Council's proposed amendments of the Metropolitan Building Acts, at the members' meeting of the Institute of Architects on Monday, did not end in anything, the meeting wisely adopting the suggestion of one member that it would be very premature to commit themselves to any decisive expression of opinion, on short notice, on such a matter. On the proposals of the County Council we have already commented at considerable length. Some of the criticisms made on them by Mr. Woodward in a short paper were to the point and of value; some were superfluous or frivolous, and one can hardly say that a critic who finds such difficulty in understanding the wording of an enactment is in the best position to clear the minds of others about it. Mr. Woodward seemed to find the wording of the clause which the Institute print as No. 70, but which we received and printed, more fully, as No. 68 (see *Builder*, December 14, 1889, p. 22), quite unintelligible. The meaning of the words is about as plain as any legal phraseology could be; whether the powers to be taken under the clause are such as it is desirable that the County Council should exercise is a query we have already suggested.

AS in the case of the Royal Academy Gold Medal competition for Architecture, so in that of the Soane Medallion competition at the Institute (the subject being a school), no award has been made this year, except medals of merit to three competitors, Mr. E. W. Gimson, Mr. C. S. Spooner, and Mr. F. W. Bedford. This reservation of the Gold Medal and studentship is probably due principally to the unsatisfactory nature of the plans, though not much can be said for the designs in comparison with some that have been submitted in previous years. Among those selected for mention, the plans of "Nineteenth Century" and "Cedric" are totally devoid of system or of any perception of the actual working of the plan; that of "Georgian" (Mr. F. W. Bedford) is a better plan, but the eccentric colouring and drawing of the perspective view have probably contributed to put the author out of court. The detail elevation, however, shows talent and some originality. Of the Title Prize designs, that to which the prize has been awarded (a stone screen to the entrance of a mansion) "Privacy," by Mr. J. C. Watt, is one of the best designs that has been made for this prize of late years, and is the only one that is in the running at all; the other three are very poor. The perspective is a delicately-executed pencil drawing showing a rusticated and panelled stone screen, with a high block containing a circular archway and gates, rising above the screen-line near each end; these gate-blocks rise somewhat high in proportion to the screen, and rather require connecting with the line of the screen so as to break the abrupt right-angle formed at the junction. This is however a refined piece of work and highly creditable to its author. The prize design for the Grissell Gold Medal (subject, a timber spire) by Mr. Walter Percival, is also an admirable set of drawings made out with great care, and showing no little originality of design; it is a kind of translation of a pinnacle and flying buttress spire into an essentially wooden form of design, which is very cleverly carried out. As a matter of construction, however, we should prefer to see a central vertical tie from the upper portion of the spire rather than depending only on bracing. The collection of drawings for this medal (eight in number) is generally good, which is gratifying, as this exceedingly useful and valuable prize has on some previous occasions not attracted anything like an adequate competition. Mr. Begg's drawings which have gained the Pugin travelling studentship fully justify the award; they are mostly pencil drawings, not highly finished, but drawn in exceedingly good style; a view of Lincoln Cathedral and another of Lincoln Chapter House are especially good. Mr. Macintosh's set of measured drawings of Pluscardyn Abbey, Elginshire, which have gained the Institute Silver Medal for this class of work, are evidently carefully done; they are not so attractive in appearance as the successful drawings for this prize have sometimes been, partly perhaps that the subject does not admit of it. Mr. T. E. Mowlem gains a medal of merit for measured drawings of Cranbourne Manor House for the same prize. The drawings done on tour by the Pugin Student of 1889 (Mr. C. E. Mallows), the Soane Medallist of 1888 (Mr. A. N. Prentice), and the Owen Jones Student of 1889 (Mr. H. V. Lancaster), are exhibited, and form three most interesting and excellent collections of sketches, especially the last-named set; they all thoroughly justify the awards made to their respective authors.

THE new headquarters of the Berlin police are now completed, and the various departments (both civil, political, and criminal) are now moving into their new home. The site on which the building has been erected has a superficial area of nearly 170,000 square feet, 114,000 of which have been actually built upon; so that this new Prussian "Scotland-yard" is the third largest building in Berlin (coming in size directly after the old palace and the new House of Parliament, which latter will not, however, be finished before 1894). The building con-

tains not only the head offices and the whole of the administrative department of the police, the official residences of its chiefs, and quarters for the "A" division of constables and detectives, but also detention cells (and all pertaining thereto—i.e., baths, washhouses, kitchens, &c.) for 328 male and ninety-four female prisoners, stabling (with smithy, &c.) for sixty horses of the mounted police, and thirty horses for the transport vans, and a riding-school (110 ft. by 55 ft.). The planning is considered to be exceedingly practical; an interesting feature is the placing of the horses on two floors connected by a ramp with an incline up and down which the constables can with ease ride their horses. The elevations of the building are in red brick with facings of stone, and, although kept as plain as possible, certainly make a very favourable impression. The courtyards, the central one of which is covered, have their elevations in yellow brick with terra-cotta facings, and show some interesting detail. The building, which has been erected in less than four years, at a cost of 255,000*l.*, has been designed by and carried out under the superintendence of the city architect, "Stadtbaurath" H. Blankenstein.

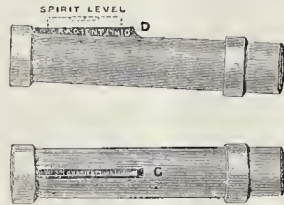
WE understand that the Glasgow Harbour Tunnel is to be commenced at once in the hands of Messrs. Hugh Kennedy & Sons, Glasgow, whose offer has been accepted by the promoters. The tunnelling works, which will consist of three separate bores of 16 ft. diameter each, one for pedestrians and two for cattle and wheeled traffic, are to be reached on either bank by a perpendicular shaft 80 ft. in diameter, set well back, so as not to interfere with the quays of the harbour, and worked on the hydraulic lift principle. Finnieston Quay, rather over half a mile below Glasgow Bridge, is the chosen place of crossing,—a point about in the centre of the busiest part of the harbour. The new ferry-boat of the Clyde Trust, designed to meet the same want, will ply not many yards away, and the two systems will be in rivalry, at least for a time.

FROM a report, in the *Australian Builders' and Contractors' News* of November 30, of a meeting of the Royal Victorian Institute of Architects, it seems that there is at Victoria a kind of taking-up of Ruskin afresh by architects, just at the time that in England people are beginning to discover the essential futility and weakness of much of his eloquently worded criticism. Mr. H. D. Annear on the occasion referred to read a paper on "John Ruskin and Architecture," and a discussion followed in the course of which one of the speakers said that "though some of them might think Ruskin was too much up in the clouds yet instead of finding fault with him they should toil, patiently and painfully if necessary, after him." If the Victorian architects expect to get any real information on architecture from the study of Ruskin, we fear they will have to toil very painfully and patiently indeed, to accept fancies for facts, and to swallow a great many statements which are pure romance, and romance of a somewhat childish order. It seems rather a pity that this kind of thing should be beginning over again, somewhat after date, at the other side of the globe.

THE first experiences in navigation of the new Loch Lomond tourist steamer have been very trying, and are quite unique in character so far as British waters are concerned. She was lately launched from a Clyde yard, and a few days ago began the ascent of the River Leven, connecting the loch with the Clyde, over a short course of four miles. The Leven falls 20 ft. between its source in the loch and its mouth in tidal waters, but the fall is distributed pretty evenly over the whole distance, there being no lock or any other artificial work, and the result is a winding "rapid" of very considerable force, especially after rains, when the loch is parting with its surplus freely. The

Leven is not navigable in any practicable sense, but it can be traversed by craft of very light draught when in flood, pretty much after the manner of the Canadian *voyageurs*. The old Loch Lomond steamers have not only been all of them built on the Clyde, and in this way tracked up the rushing Leven to the station assigned to them, but they have been brought down periodically for repairs, and in the same way returned. These movements were possible only after the craft had been stripped of all the weight-making portions of their fittings, short of engines and boilers, and including funnels and paddle-box rails, to admit of passage underneath the three or four rigid bridges which span the stream. The new saloon steamer built for the purpose is the largest that has ever attempted this short strip of peculiar navigation, and her experience has shown that the limit of burden is very narrow, and has now been all but overstepped. Abundant haulage power was available, consisting of several hundreds of men on either bank, and some scores of horses, but the stoppages were frequent, owing to grounding, and some of them lasted many hours, so that this short but trying passage of barely four miles ran into days. The current of the Leven is very capricious, swelling rapidly after rains within the great area of the loch watershed, and subsiding as rapidly in obedience to change in the opposite direction. In the case of sustained rainfall the passage is, of course, performed with more certainty, but there is always the risk of delay, even extending to weeks.

WE have received a circular describing what appears a useful and convenient appliance, patented by Mr. Irwin C. Wallas, sanitary engineer, of Kilburn, for testing the gradients of drains as each pipe is laid. This consists of a set of small hard wood blocks, accurately cut to various gradients, so that



on the application of the under-side of the block to a pipe to be laid at the specified gradient, the pipe can be adjusted, as shown by the cut, to the precise gradient required by the application of the spirit-level on the upper surface of the block: when that is proved level the pipe is at the gradient intended.

WE have received some examples of "S. Barter's Manual Training Diagrams" which consist of large coloured diagrams on glazed paper, or details of carpenters and joiners' work, various forms of joints, tenons, &c. They will prove useful in technical schools and Polytechnic institutions.

AT the Burlington Fine Arts Club are collected a number of drawings by the late Mr. Spencer Vincent, who enjoyed the distinction of being eminent both as an amateur athlete and an amateur artist. The drawings exhibited are few of them much finished, but there is plenty of good work in them, and many of them exhibit real genius in regard to the perception and rendering of colour-effect in nature. An interesting portion of the exhibition is a collection of sepia sketches made at the meetings of a sketching-club called "The Os Society," on subjects given for the evening, and we presume treated by each member according to his own fancy. Among these "A well-known spot" (150), "Danger" (152), "A Storm" (154), and "Cloudland" (163) are especially good.

THE Victoria Gallery in Regent-street, where the "Humorous and Grotesque Exhibition" has been for two or three weeks open, is a prettily-arranged gallery for exhibitions, but unfortunately rather deficient in light on the ground-floor: the upper galleries are well lighted. The exhibition contains much that is of interest, though (in spite of its name) it strikes one as a rather melancholy display, in regard to the older works, of spite and ill-nature combined with vulgar and repulsive exaggeration. Rowlandson and Gillray were no doubt terrible caricaturists in regard to their power of giving pain, but they achieved this end by means which would happily be impossible to any caricaturist in the present day, both on the score of decorum and of artistic feeling; they were rather brutal than satirical in the true sense of the word. To art they made no pretence; and as to genuine humour and satire, Mr. Tenniel, Mr. Keene, and Mr. Sambourne are intellectually far beyond any satirical artists of the last century. Cruikshank too appears here as what he was, an artist immensely overrated even as a caricaturist. Hogarth, from whose works a fine set of engravings are here collected, is not to be ranked as a caricaturist, though he chose to be so occasionally; and it is absurd to exhibit his "Marriage à la Mode" and "Rake's Progress" in a "grotesque and humorous" exhibition; pictures more thoroughly serious and tragical were never painted. In general, in the contrast between old and modern humorous drawings, the exhibition may be said to recall the old Latin grammar quotation that Colonel Newcome was so fond of: "Ingenus didicisse fideliter artes emollit mores"; and it is gratifying to think that modern culture and modern manners would no longer tolerate either such drawing or such brutality as was indulged in by Rowlandson, Gillray, and their weaker follower Cruikshank.

AMONG the correspondence on various subjects that usually assists to "pad" the *Times* when Parliament is not sitting have been two or three letters, as often occurs, on the subject of "street music," as it is facetiously called, meaning the instruments of torture called street organs and pianos. As usual, these inflictions and the vagabonds who turn the handle find their defender, this time in a wisecracker who signs himself "Blondel." We owe "Blondel" however one hint which may be turned to good account. He is obliging enough to suggest satirically that the words "nervous invalid" should be written on the houses of those who dislike street organs, and that the operator should be compelled by law to keep at a distance of fifty yards from such houses. It would no doubt be news to scribblers of the stamp of "Blondel" that there are thousands of persons neither nervous nor invalids, but possessed of sane minds in sane bodies, who regard the prevalence of the swarms of barrel organs that are allowed to infest the streets as one of the greatest curses of life in London, and a disgrace to its municipal government. But "Blondel's" suggestion may be turned to a better account than he thinks of. Let a bye-law be passed that all persons who object to these street pests may put up a small notice-board on their houses,—"No organs allowed," and that on the affixing of such notice the organ-grinder should be bound to remain at fifty yards distance from the house without the tenant thereof having to invoke the intervention of the police; on the contrary, let the organ-grinder be liable to be taken in charge by the police on the mere fact of his being found transgressing within fifty yards of a placarded house. This simple arrangement would probably eliminate the organ-grinder. It would go hard if we could not find, in every respectable street, a series of persons separated by a distance of less than 100 yards from each other, who would be only too thankful to adopt this simple means of exterminating a nuisance which is yearly becoming more intolerable.

SPIRES, TOWERS, AND DOMES.*

A VERY forcible example of an ill-conceived tower is the leaning one of Pisa. The diagram on the opposite page is reduced from a measured drawing which was to a scale of 4 25 ft. to the inch.

The tower, circular upon plan, is nearly 178 ft. high, with an out-to-out base diameter of 50 ft., the height bearing a ratio to diameter of 3 1/2 to 1. The wall of the lower story is 13 1/2 ft. thick, and of the upper stories 9 ft. The tower is entirely of marble. The calculations explain themselves. The first item is the superficial area of the foundations. Then comes the cubic contents of the portion of the tower resisting overturn of the wind,—that is, of the exposed part from top to ground line. The weight of the marble is assumed at 170 lb. the cubic foot, and is expressed in decimals of a ton. The total weight of the portion resisting the overturn moment of wind is 15,325 tons (see diagram), and its moment about point A is 91,950 foot-tons.

Point A is $\frac{D}{4}$ from the leeward edge of the tower.

The peculiar case of this tower exhibits graphically the application of the previous remarks of the effect of wind upon cellular surfaces.

The reduction of the wind effect registered upon a flat surface, due to the circular plan of this tower, is annihilated by the galleries, in consequence of their forming cells for the reception of the full force of the wind; in consideration of which a 60 lb. pressure has been calculated. The moment of this force about the point A is ridiculously below the strength of the tower, the ratio being as 1 is to 5 1/2.

The graphic resolution coincides—the distance of the centre line of the three lines marked on the diagram "lines of resolution,"—resultant from the centre of gravity,—only deviates two-elevenths of the distance between the centre of gravity and the point it would be absolutely safe at, showing that notwithstanding the severe inclination there is still a very large margin of safety against the overturning effect of wind.

Next as to the total weight of the tower upon the earth foundation. The soils in the neighbourhood of this tower are not noted for their weight-carrying powers.

The tower brings a pressure of 7 1/2 tons on the square foot, and at a fair computation, the soil, sandy one, is only capable of sustaining 4 1/2 tons. This fact obviates the need of any further inquiry into the causes of the subsidence. The tower is thrown from 12 1/2 ft. to 15 ft. out of the perpendicular, has sunk bodily down some feet into the earth, which has since been excavated away from its plinth.

This tower is a unique example of useless masonry overloading its foundations, still standing, as it does, to tell the tale.

It would be safe to say, from the figures that are before us, that many thousand tons of masonry are in the structure which have no business to be there. It can easily be imagined what the fate of the cathedral would have been with the tower of Pisa joined to it.

The investigations of Canon Moseley, Rankine, and other noted American, French, and German scientists, have now taken a firm hold upon the constructive professions, and these researches are destined to have a far more weighty influence upon architectural construction than has hitherto been the case, tending to produce in our buildings the fullest economy of material consistent with practical needs and lasting stability.

Domes.

Of the numerous domes that have found existence in the last few centuries, how many can be said to be monuments of architectural and constructive skill? The last century has seen great strides made in many branches of science, and yet in the erection of domes, a field in which scientific knowledge could have such full scope, construction is drifting in a backward, rather than in a forward direction. The most recent dome (that for the tomb of the late Emperor of Germany) decides that the *dual* construction still holds the field, so that since the days of Wren there has been seen no legitimate advance in the matter of dome-raising, and it is the opinion of some

that his step was to one side of the obstacle rather than over it.

The cathedral cupola of London was the first of a new race, and in its essential principles one which has been followed by each successive dome constructed of similar materials.

There is no need to recapitulate here the time-honoured theory of the construction upon which have been based the erections of recent centuries. High architectural authorities have satisfied themselves upon the point, and the casual student rests content. It must, however, be felt that the lighting difficulty has not received the attention it deserves as being really the pith of the whole problem. Suppose that the convex surface of the spherical dome, as seen from the exterior, is endowed with the importance and dignity that is consistent with the magnitude of the structure of which it forms part. Then, by nineteenth-century reasoning, the inside surface of this identical shell is unsatisfactory by reason of the unpleasant visual exertion required to grasp its contour,—a disadvantage due to the great distance from the dome to the level of the inside pavement. How can it be otherwise, when the dome shell, even on the St. Paul's plan, is in semi, if not complete, darkness?—a defect undoubtedly due to the system of admitting the light at the wrong place. There is a great deal to support this view.

In the opinion of many, there is no dome interior that satisfies the canons of artistic taste so completely as that of the Pantheon at Rome, an interior lighted directly from the sky.

Again, by universal consent, there is not a more inartistic and depressing dome exterior than that of the same Pantheon at Rome. The evil effect of the flattened appearance of the exterior and its piled-up abutments has been a more powerful factor in modern dome construction than has the principle, almost divine in its simplicity, of admitting the light direct from the heavens. The former has generated the dual and triple constructions of St. Peter's and St. Paul's, and most subsequent domes, while the principle of lighting from the eye of the dome has not been perpetuated with success.

It is not suggested that the great value of top-lighting for the dome has not been fully realised, but rather that its non-adoption has been due to the concomitant difficulties having proved too much of an obstacle to its realisation. What are these difficulties?

In the first place, artistic and even religious sentiment demands that the apex at the crown of the dome shall be surmounted by a lantern erection so as to annihilate the Mahomedan associations attaching to a bald domical sphere. But this very lantern as now built obstructs, rather than lets in the light.

With the example of St. Peter's before him, no dome constructor has again ventured to support a lantern erection upon a single spherical masonry or brickwork-offered dome.

And however we may marvel at the unique construction of the great Sir Christopher, no architect of the present or coming centuries will venture to make such a large draft upon labour and material as was made in the construction of the three roofs to cover the one floor area of St. Paul's.

Granted that for architectural reasons the lantern is essential, then such lantern must be of such a design and of such a size that it conveys a bright strong light from the heavens to the dome interior. If this can be done the need for the dual system ceases to exist. Now the difficulty of carrying a heavy load in the shape of a large lantern at the apex of a spherical dome has hitherto proved insuperable. It will remain so while stone or brick is relied upon as the sole medium of construction.

The materials hitherto composing domical construction, though possessing a full complement of compressive strength, have not possessed that cohesive strength and tensile resistance in sufficient abundance to resist the aggravating bending moments set up by a load at the apex of the dome.

It will here be a fitting opportunity to review the mathematical theories involved in dome construction. So few investigators have brought their work to a practical conclusion, and fewer still have arrived at conclusions that are of the slightest value to the practising architect, that a *review* is not a formidable task. Upon the writings of Bomelet and Venturoli are based the calculations to be found in Gwilt. Mr. Merrifield read a paper many years ago before the Royal Institute of British Architects upon

the dome of *uniform* stress, which showed the shape to be a parabolic cone—a conclusion already arrived at by Wren in designing St. Paul's. Lastly, Mr. Wyndham Tarn has put on record his views. His results, if anything, are more useful than those of the former writers, although he goes about his calculations in a similar manner to the method of Venturoli. His opening steps are common knowledge, and may be followed by any student. By the simple laws of mechanics it is shown that there are two forces generating moments about every point in the arch ring of the dome resting upon an abutment. These forces are the thrust at the crown acting with a leverage about each point in the arch ring, the amount of the leverage varying as the point under consideration alters its position, and the weight of the half-arch acting also with varying leverages about different points.

It must be patent to an observer that there is some point in the dome where the effect of the thrust is greatest,—in other words, where the dome is weakest.

The question arises, where is this point? Mr. Tarn, in a purely mathematical enunciation and proof, in which trigonometry, the calculus, and the higher algebra, involving cubical equations are introduced, demonstrates unquestionably from pure mathematics that the thrust is a maximum at a point 20 deg. from the springing and 70 deg. from the crown. This may be accepted as reliable, inasmuch that on reference to some experiments made by a Mr. Hland on arches composed of wood voussoirs, after careful observation, it was seen that the result first to give way under the thrust was at a point corresponding with Mr. Tarn's mathematic conclusion. At this point, of course, in a masonry dome, the chain would be placed, as has been pointed out.

Given the respective radii of the interior and exterior of a dome-shell, together with the weight of the masonry per cubic foot, the height of the pier, and, lastly, the amount of the thrust at the crown, then, from Mr. Tarn's data it is easy to calculate the amount of thrust passing from the dome to abutment, and the thickness necessary at the abutment to obtain equilibrium and also stability.

A remarkable case is that over Sultan Mohammed's tomb at Gol Gumbaz, at Bejapore. As far as our knowledge of it is correct, its construction is opposed to all modern ideas of good design, the thickness of the shell at the crown being no less than 18 ft., diminishing at various stages to 9 ft. 6 in. at the abutment. Whether it is solid at the thickest part is not known to the author; anyhow, it is the soundest dome existing without extraneous aids at the present time.

The days of masonry and brick domes existing solely as such are numbered, if not even now at an end. And if a dome, such as has been indicated here, can be constructed (and there is no reason why it should not be) satisfactorily from an architectural point of view, when viewed both internally and externally supporting a suitable and effective lantern erection, then the dual construction which has been the great bar to domical roofing development will be superseded, and an architectural sham be abolished for ever.

The question naturally arises, how can this be effected? The following suggestions have been roughly sketched out:—

The introduction of metal into masonry dome construction has had a precedent for a century past in the presence of the iron chain. But suppose the chains are entirely done away with, and a series of iron ribs are fixed radiating from the eye of the dome, formed by a circular metal curb, and abutting upon a similar curb at the base, the whole cross-braced and tied, and fixed upon expansion rollers. By such an erection a framework would be obtained, which could be calculated to resist any bending moment that might be brought upon it by a superimposed lantern, and no thrusts would be transmitted to the drum or abutments. The scheme for covering the metal framework is not a new one, inasmuch that it was suggested some years back to construct a dome entirely of terra-cotta. The idea of the author is that terra-cotta would form a very suitable material for casing the whole of the metal framework, internally and externally alike, by blocks interlocking, and treated architecturally inside, with over-lapping joints externally.

Such a construction would produce a dome which, if suitably treated internally, would be satisfactory artistically, and constructively ex-

* Continuation of the paper by Mr. S. P. Beale, read before the Architectural Association on the 3rd inst. See p. 24, ante.



No 598.

Three Quarter
Black & Bright
Suit - German.



Back-plate.



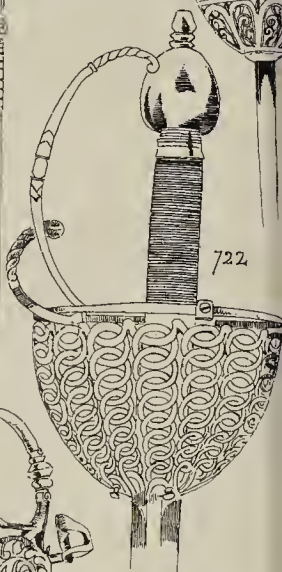
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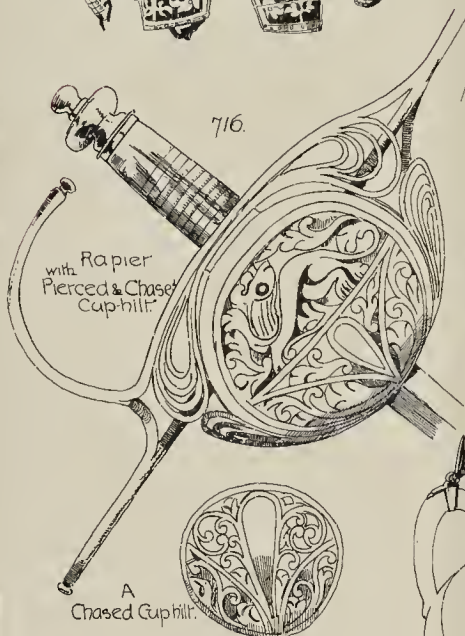


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716.

Rapier
with
Pierced & Chased
Cup-hilt.



A
Chased Cup-hilt.

678.



7047.

Silver Mug with double
said to have belonged to D

1005



Fluted Tudor
Wine Jug of
white ware.

Sketches from The Tudor Exhibition

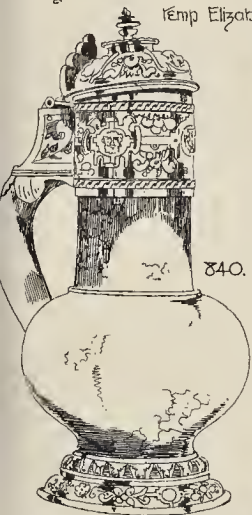


4. Silver-Gilt Standing Cup and Cover 1523-4.

Lent by The Barber-Surgeons Co.

Silver-Gilt Standing Cup and Cover, given by Queen Elizabeth to Sir Francis Drake circa 1580.

Jug of German Stoneware in English Silver-Gilt mounts Temp Elizabeth



840.



1174.

Portions of two Palls or Herse Cloths lent by The Merchant Taylors Co.



1173.



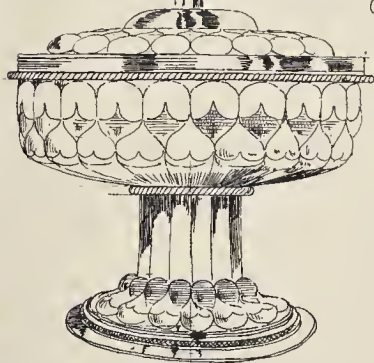
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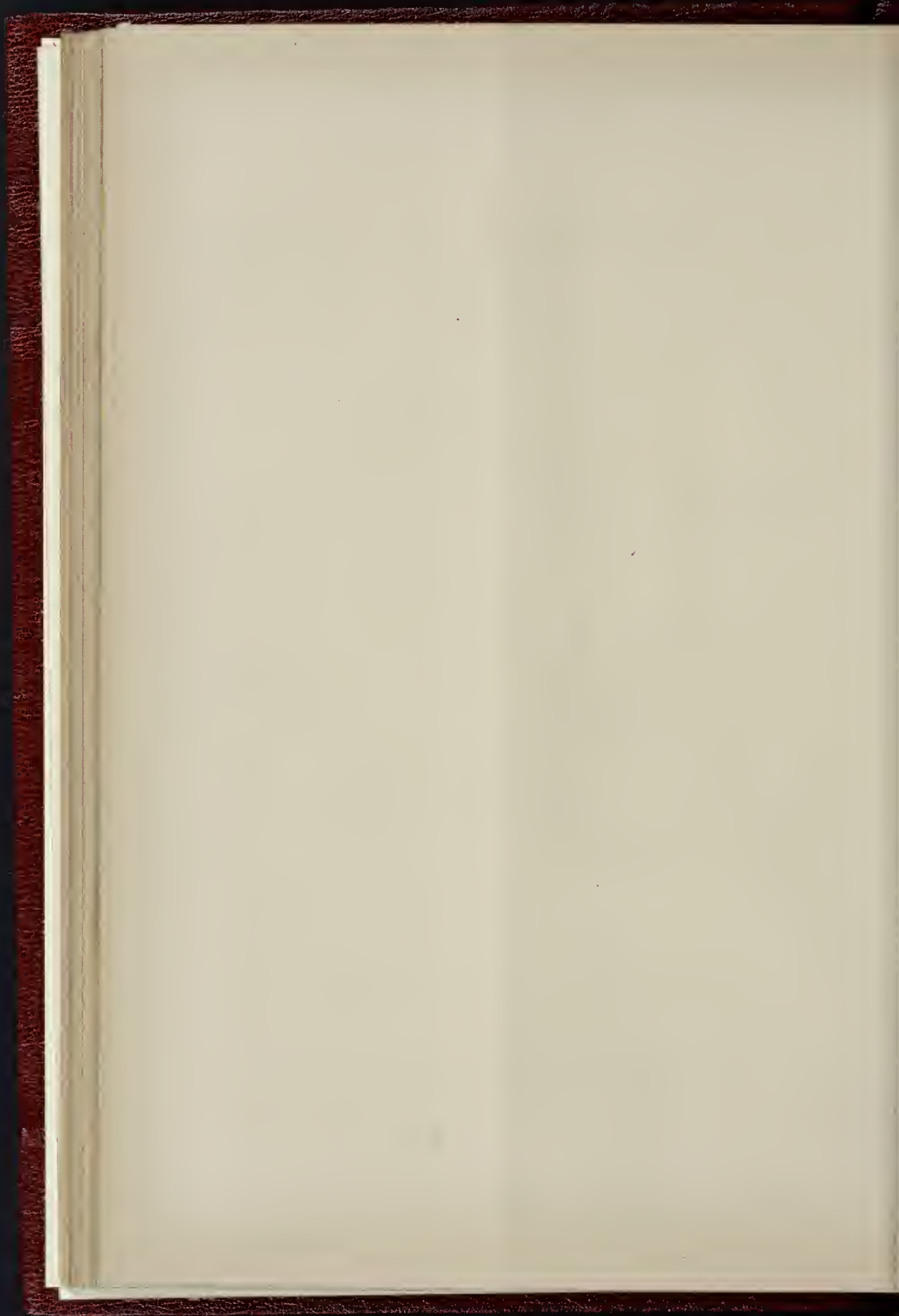
Top of Knob

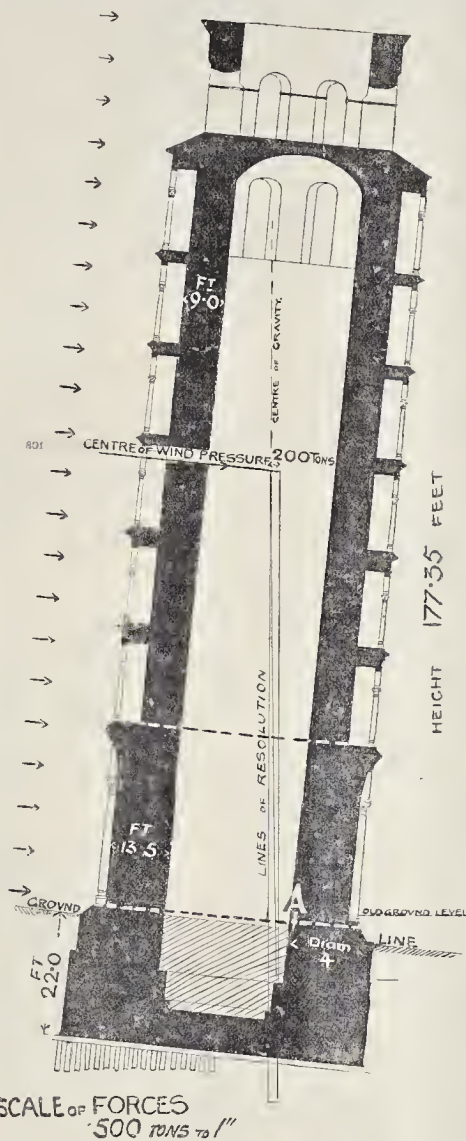


812

Silver-Gilt Covered Cup 1515-16 lent by Corpus Christi Coll: Oxford.







The Leaning Tower of Pisa.

Base area	61.75 ² × 7854	=	2985	super. feet
Contents				
Foundation	61 ² × 7854 × 27.6	=	80630	cubic feet
Base	39 × 2.14 × 36.75 × 13.5	=	60755	"
Trunk	36.75 × 3.14 × 9 × 117	=	121505	"
Head	31.68 × 3.14 × 6 × 22.6	=	12533	"
Archading	48.75 × 3.14 × 6 × 19.5	=	14923	"
Columns, &c.			3279	"
			215716	"
Deduct for window and door openings, stairways, &c., calculated at			14080	"
			201636	"
Weight of a cubic foot of marble in tons . . . . .			.076	"
Weight of portion of tower resisting overturn			15325	tons
Moment of weight about point A in Diagram	15325 × 6	=	91,950	foot tons
Moment of wind pressure about point A	42.25 × 177 × .0267 × 85.5	=	17,700	"
Pressure of tower on the square foot of foundation	{ (201636 + 80660) × .076 }	÷	2985	= 7½ tons
Safe pressure on the sq. ft. of damp sandy soil, at a depth of 22 ft. from surface - θ = 30° = Ang. of Rep.	$\frac{1 + \sin \theta}{1 - \sin \theta} \times 22 \times .0424$	=	4½	tons

splendid collection of photographs which was exhibited on the screens. He had to confess that he was a little staggered at the vastness of Mr. Beale's subject,—"Domes, Towers, and Spires,"—when he saw it in the syllabus. Obviously, a great deal might be said and written under such a title, but Mr. Beale had wisely confined himself to one side of his subject, and his paper might be described as a plea for the scientific construction of towers, spires, and domes, and not only of towers, spires, and domes, but of all buildings. He did not think that any one would attempt to argue against that for a moment, for it would be absurd, with all the scientific knowledge of the present day, to blindly follow old methods of construction, where they were known to be faulty. They might all learn valuable lessons from the failure of Medieval towers, but he thought they must not go too far in the direction of the advocacy of scientific construction at the expense of the æsthetic side of their studies. Mr. Beale had rather spoken as though the two sides of an architect's education were in antagonism, for he had much glorified the scientific side and thrown cold water on the æsthetic side (Mr. Beale: "No, no!"). He, Mr. Cresswell might have misunderstood him, but he thought it was necessary that they should learn to design before they attempted to construct. Of course, it was impossible to design a building without a knowledge of construction, but he thought that to teach a student how to calculate stresses and strains, before he had learnt anything of the artistic side of his profession, was putting the cart before the horse. He had been very much interested in Mr. Beale's application of scientific principles to the case of the leaning tower of Pisa, to show that it was unstable. His calculation as to the cause of the subsidence of the tower seemed to depend upon a factor which he understood was Rankine's factor of earth-pressures. But he wished to know whether that factor took into account the variety of strata of the earth, and whether it would assist a man who had to deal with earth beneath which there was a running sand or spring the existence of which was unknown to him? For it seemed to him that, under such circumstances, the tower of Pisa might have been constructed with a perfect knowledge of all Mr. Beale's calculations and yet might have failed. Mr. Beale, in speaking of the origin of towers and spires, and more particularly of spires, described the English examples as being very beautiful. Of course, they all admired them very much, but he thought that they must acknowledge that it was to Normandy that they owed the origin of the spire. Mr. Beale had mentioned one example in Normandy, which was the tower of the church of Thaon, a very early church, with a low pyramidal roof of stone to the tower, which was no doubt the first sprout, as it were, from which the later spires were developed. On the subject of detached towers, Mr. Beale had attributed the placing of bell towers in a detached position to the fact that they

ceeding economical, compared in the light of the present accepted modes of dome construction—proof alike against fire, frost, and the dreaded hand of time.*

A few domes are illustrated upon the screens. That of Sta. Maria della Salute, Venice, of which there is a near view and a general one, exhibits an arrangement and general design that is peculiarly graceful externally.

The remarkable central protuberance on the dome over the Pisa Baptistery is a feature more unique than elegant. To it may be traced, perhaps, the bulbous roof terminations on some Belgian and North German Cathedrals.

In drawing attention to the collection of photographs in this hall to-night, comprising as they do examples of many of the principal phases of tower, spire, and dome design, I would venture to say that they are a unique set. They form part of a fine collection gathered together in the course of some forty or more

years. This portion numbers some 240 views. I feel the whole meeting is indebted to the gentleman who has placed these views at our disposal, Mr. James Onbitt, in whose service it has been my privilege to spend some little time; he published seven years ago some notes upon tower design, in which were classified towers of the Romanesque and Gothic styles under two great heads—towers with super-towers and towers without super-towers. Under these two divisions come some hundreds of types classed according to their plan, their roofing, their buttressing, etc. On the tabulated diagrams are scheduled the places where examples of the several types are to be found. The arrangement will repay careful study, and in thus directing attention to these views my paper concludes.

Mr. H. O. Cresswell, in proposing a vote of thanks to Mr. Beale, said he did not think there could be a doubt, as Mr. Beale had said, that they were very much indebted to the gentleman who had so kindly lent them the

* This appears more than doubtful. Had the Pantheon been so constructed, it would not now be standing.—Ed.

would be likely to cause subsidences if they were joined on to the main building. He (Mr. Cresswell) did not think that was entirely the reason. He might be wrong; but in this country, he believed, one reason why towers were detached from the main building was that in early times they were used to a great extent as the strong places in the villages or towns in which they were erected. Many towers, particularly in the West of England, he had always understood, were detached, so that when the people suffered from raids across the marches by the wild men of Wales, they fled to their towers as the strong places of defence. Mr. Cresswell next referred to a list of fallen towers, which were nearly all central towers, and said that Mr. Beale had undoubtedly hit upon the weak point of such towers,—their being carried on four comparatively frail piers, resting on isolated points without any connexion with each other. But for the abutment afforded by contiguous walls, none of the old towers would have stood to the present day. Salisbury Cathedral was one of the most deeply interesting examples, for there they could see the various additions which had been made from time to time to prevent the failure of that spire; if those works had not been done the spire would have collapsed. That spire was said to be in a dangerous state within a short time of its erection, and was several times strengthened to preserve it, and the last restoration on a large scale was carried out by Sir Christopher Wren late in the seventeenth century. With reference to the aesthetic position of towers, he apprehended that with cathedrals in England, it was generally intended that they should have both a central tower and two western towers, and, if they would observe, they would see that that arrangement was suited more particularly to English cathedrals. In England their cathedrals were very long and low, and, consequently, a central tower became an essential and beautiful feature. In France, on the other hand, he thought that the reason of placing the towers and spires at the west end only was that their naves were so very lofty that if a tower had been put upon the crossing it would have had to have been a gigantic affair to tell above the roof. He thought that the French were thus compelled to build their towers at the west end on account of the height of their naves, and to be content with a small niche over the crossing.

Mr. Arnold Mitchell, in seconding the vote of thanks to Mr. Beale, said that differences of taste and education lead them to form varied estimates of the different styles of art, but the most devoted follower of Classical antiquity could scarcely fail to appreciate the intrinsic beauty of the Gothic style. He was very pleased to have heard Mr. Beale emphasize that point in the opening remarks of his paper, although he might have emphasised somewhat more strongly the two distinct varieties of English towers and spires,—viz., the central and the western. Mr. Beale had not, to his mind, laid enough stress upon the fact that the central lantern tower was the legitimate descendant of the Byzantine dome, and that the western tower was the legitimate descendant of the Italian campanile. The little tower of the Church of St. Surplice, on the Lake of Geneva, showed in the most striking way the development which had taken place from the dome to the lantern-tower. At the crossing of the transepts, viewed from the interior, there was a perfect dome. Externally, however, it was a lantern tower. He thought that if they bore this fact in mind when viewing some of our English churches, they would find that some such development had taken place here. The Italian campanile was expressly intended for the hanging of bells, and, although Mr. Beale dissented from that view, it seemed to him (Mr. Mitchell) that he had not made out his case. Mr. Beale had stated that the thickness of the walls of the bell-towers constructed in accordance with the rule quoted by him was out of all proportion to the necessities of the case. Perhaps that was so, but Mr. Beale had gone a step further, and seemed to find fault with the Norman builders for making the walls so much thicker than they need have been. But it should be remembered that the Norman builders were feeling their way; they were building experimentally, so to speak, and did not at first fully understand what they could do with their material. How different was a Norman work, such as the tower of St. Alban's, as compared with an erection of the fifteenth century,—say such an example as that at King's College

Chapel, Cambridge, in which the builders seemed to have pared down every stone to the smallest limits consistent with the work it would have to do. Mr. Beale had stated that he did not know what example to name as the earliest spire in England, but he (Mr. Mitchell) thought there could be little doubt that it was that of Sompoting, in Sussex. That was a Saxon example, prior to the Norman ones by seventy or eighty years. Mr. Beale had mentioned the spire of Thaon, in Normandy, which was, perhaps, the earliest example of a Gothic spire. But he should like to add a curious piece of information to what had already been said, viz., that the interior of that spire was tied with wooden beams. He must dissent from the view which Mr. Beale had taken with reference to the entasis of spires. Mr. Beale had somewhat unfairly quoted Gaythorpe, where entasis had been carried to such an extent that the effect was almost hideous. An entasis of about 3 in. in 180 ft. of height was very small, and did not affect the stability of the structure. He should like to ask Mr. Beale one question, viz., How were the Medieval spires constructed,—with the led-joints horizontal or at right angles to the face? Mr. Beale had spoken of the peculiar formation at the top of the dome of the baptistery at Pisa, as suggesting a lantern; but he had not added that the excessiveness in question was really the top of a large cone, which was carried up from the bottom of the large external dome. The case of the failure of the tower of Pisa could not be attributed to the wind pressure, for we knew that the builders, while building the tower, found that it was rapidly becoming out of the perpendicular, and it was curious to notice how, when they had realised the fact that the tower was leaning, they had tried, by varying the thickness of the masonry and by making the colonnades on one side higher than on the other, to get it into the perpendicular again.

Mr. C. H. Brodie supported the vote of thanks to Mr. Beale, and said he thought their special thanks were due to him and to Mr. James Cubitt for the collection of photographs.

The Chairman (Mr. T. E. Pryce, Vice-President), in putting the motion, said that with regard to the position of towers, he thought that that was a matter of taste. He was more particularly speaking about the small parish churches scattered all over the land; but with great cathedrals it seemed best to place the tower at the crossing. Another thing that struck him as being a matter of taste was the building of detached spires in this country. They were common enough in some parts of England, notably so in Herefordshire. He was not disposed to think that the isolated position of the tower was always due to defensive considerations. He then on an extremely interesting one and the discussion especially so.

The vote of thanks was then put and carried by acclamation.

Mr. Beale, in reply, said he had very few points to reply upon. He had previously had experience of a scientific discussion at that Association, and he thought that it testified very strongly to his view that they did not pay sufficient attention to scientific matters. He had, perhaps, not made himself sufficiently clear to some gentlemen in what he had attempted to say about the diagram of the Pisa tower. What he said was that he thought the tower was perfectly safe against being overturned by the ordinary effects of wind. As regarded the settlement of the tower showing the sinking of the soil, his calculations showed why it sunk, because there was $7\frac{1}{2}$ tons on the foot on ground which was only capable of carrying $4\frac{1}{2}$ tons to the foot. Reference had been made to the fact that the tower had sunk before it was completed, but his figures would show that it would sink before it was half its height. The upper story, which was added much subsequently to the general erection, was made with a thickness which varied, so that the light section was on the lower side of the tower and the heavier masonry was on the upper side. There was an enormous excess weight of marble masonry used, or the tower would not have failed. He had been asked how his calculations would be of service in such an emergency as the unknown percolation of water beneath the structure; but, of course, all calculations of that kind must be taken in a practical spirit, as applying to known facts. His idea was to arrive at a mere estimate by which they might

compute the bearing power of soil, and beyond that he did not go. When engineers and scientists were called in to advise upon any scientific construction, they had to bring common sense to bear, and architects should do the same. A question had been asked as to what knowledge he had of the inclination or otherwise of the heads of the joints of the masonry of ancient spires. His observation was that in Medieval spires the joints were at right-angles to the face, and not horizontal.


Mr. Cresswell here mentioned that the subject had been discussed very fully in a series of letters in the *Builder* some years ago.

Mr. Beale, continuing, said he did not think that discussion came to anything more than what he had mentioned. With regard to the restoration of the tower of St. Michael's, Coventry, he thought that the thickness of the walls was excessive.

The meeting then terminated.

Illustrations.

SKETCHES FROM THE TUDOR EXHIBITION.

 We give this week a number of drawings of various bits of decorative work from objects in the Tudor Exhibition, most of which were alluded to in our note on the Exhibition a week or two back. They are selected of course, for their artistic and not for their popular interest, though the remarkable cup originally given by Queen Elizabeth to Drake includes both kinds of interest. The sword hilts, a few out of a considerable number in the Exhibition, are worth note for their effective treatment.

THE WEIGH-HOUSE CHAPEL.

The Congregational Chapel, School, Institute, and Minister's House, having frontages in Duke-street, Robert-street, and Thomas-street, Grosvenor-square, W., of which we give an illustration, are now in course of erection for the Trustees of the Old King's Weigh-house Chapel, which formerly stood upon the site of the Monument Station, Fish-street-hill, E.C. Mr. A. Waterhouse, R.A., is the architect. The materials are red brick and terra-cotta, the latter manufactured at the Burmantofts Works of the Leeds Fire-clay Company. The general contractors are Messrs. J. Shillifoe & Son, Bury St. Edmunds.

DESIGN FOR PROPOSED HOSPITAL, WEST HAM, ESSEX.

The design, illustrated by perspective view and key-plan, was submitted in an open competition by Messrs. Arthur Crow, A.R.I.B.A., and Philip Henry Tree, A.R.I.B.A. Accommodation was required for twenty-four beds, with provision for extending the building at some future time. These requirements were met by the adoption of two circular ward blocks, on the system advocated by Professor Marshall, each of two floors branching off right and left from a central administrative block. In order to secure, as far as possible, the thorough isolation of the wards, the corridors connecting the same with the administrative block are reduced in height to 7 ft. 6 in., and a space is thus provided for the passage of air above and below same. The small blocks containing the bathroom, w.c., laundry, &c., having been similarly isolated from the wards, an uninterrupted circulation of air is obtained on all sides.

The administrative block contains, on the ground-floor, a casualty-room and matron's sitting-room, with access from central octagonal hall, and opposite the entrance a broad corridor leads to the operating-room at the rear of the building, which is provided with lantern and north lights. Attached to the operating-room is a small consultation-room for surgeons, with w.c., lavatory, &c., in conjunction therewith. A board-room is also provided on this floor. An open well-staircase, planned to receive a patient's lift, leads to the first-floor, on which are placed a small suite of rooms for the resident surgeon, comprising sitting and bed rooms, bathroom, lavatory, and w.c. A convalescents' ward is provided in front of the building, with access to a balcony over entrance. A bedroom for the matron and a single ward are also provided on this floor. On the second-floor are placed the kitchen, offices, and bedrooms for nurses and servants.

As the very restricted nature of the site

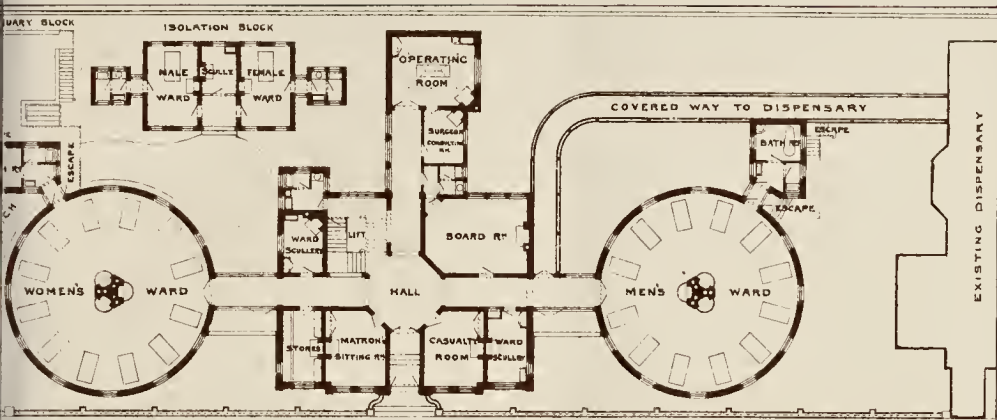




DRAWN BY M. E. HODKINSON

DESIGN FOR PROPOSED WEST HAM HOSPITAL.—MR. ARTHUR

18, 1890

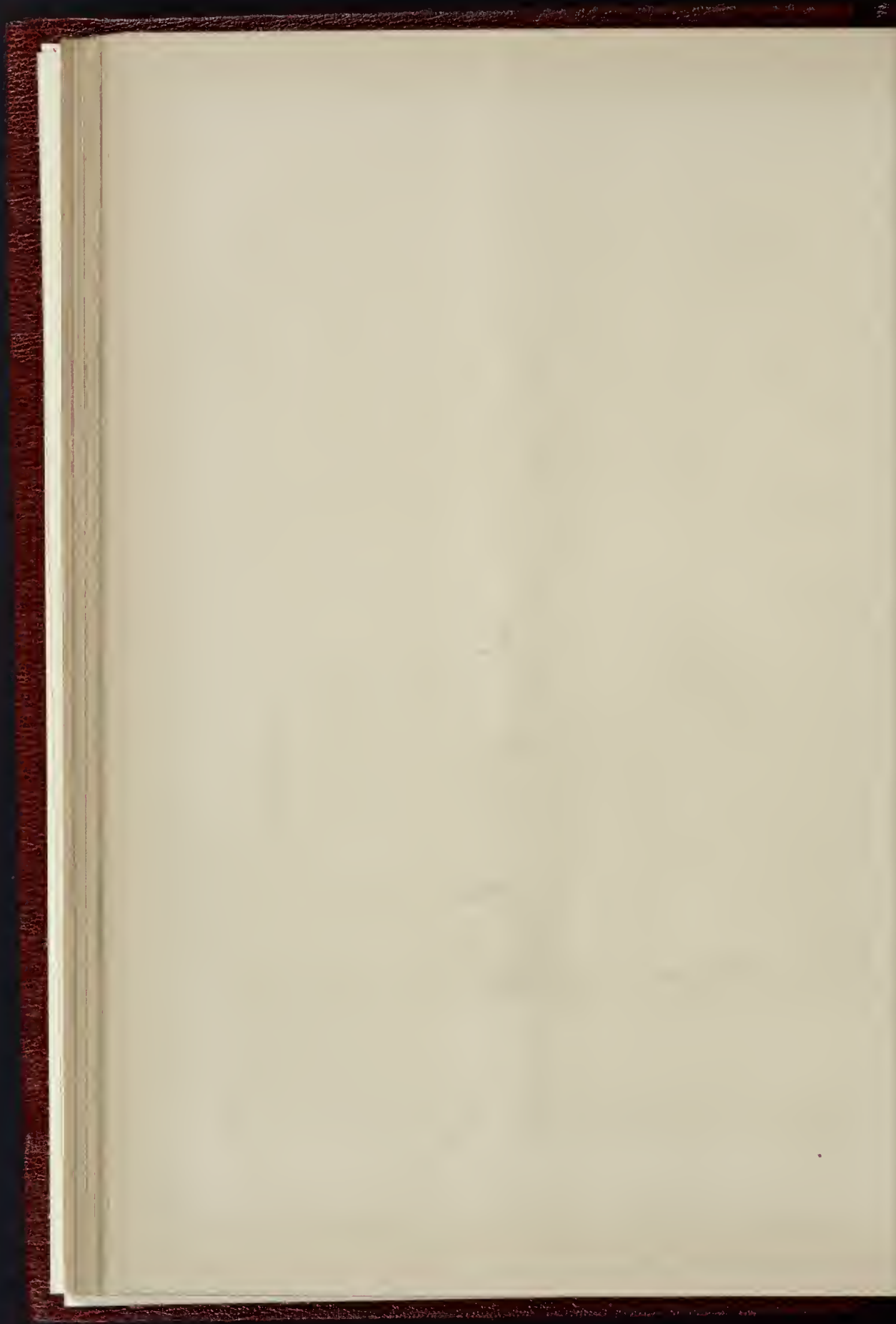


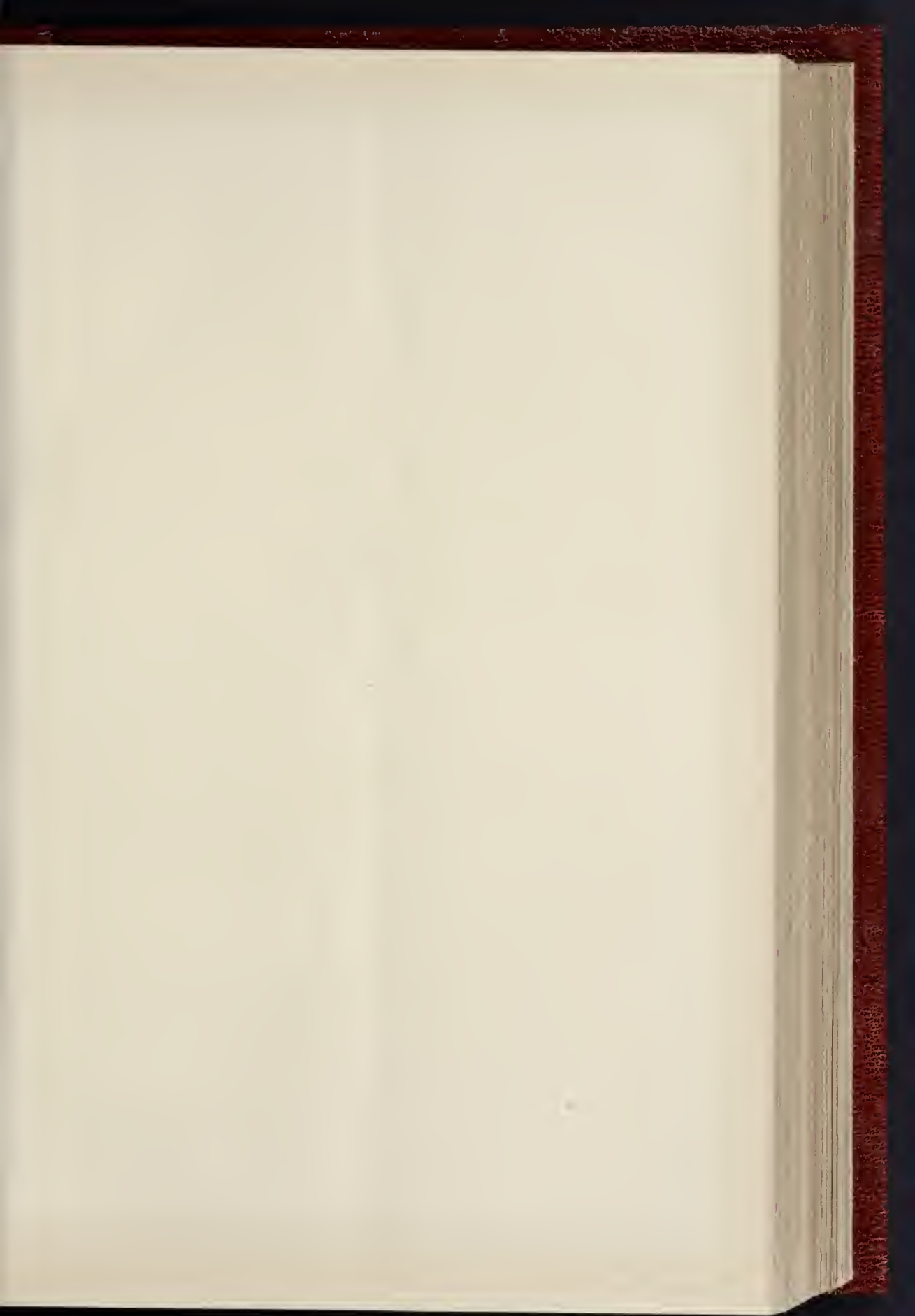
GROUND FLOOR PLAN



TAK PHOTO, SPRADUE & CO. 22 MARTIN LANE, CANNON ST., LONDON E.

R.I.B.A., AND MR. PHILIP H. TREE, A.R.I.B.A., JOINT ARCHITECTS.





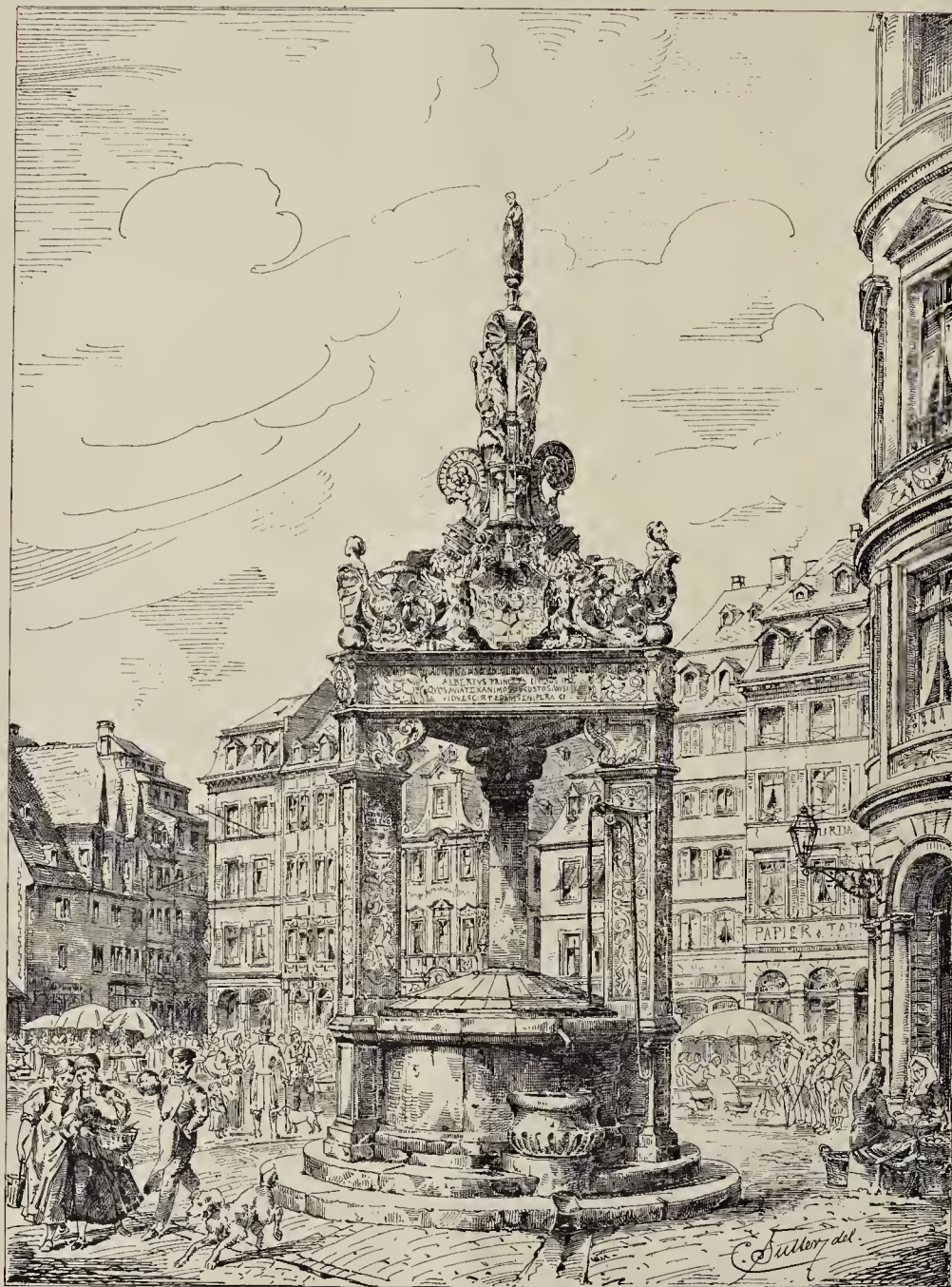
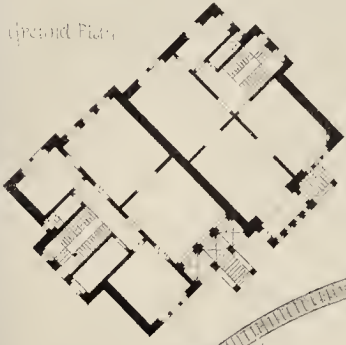


PHOTO LITHO - MADE IN AUSTRIA BY H. L. L. & CO. - VIENNA

THE OLD FOUNTAIN, MARKET PLACE, MAINZ.

Ground Plan

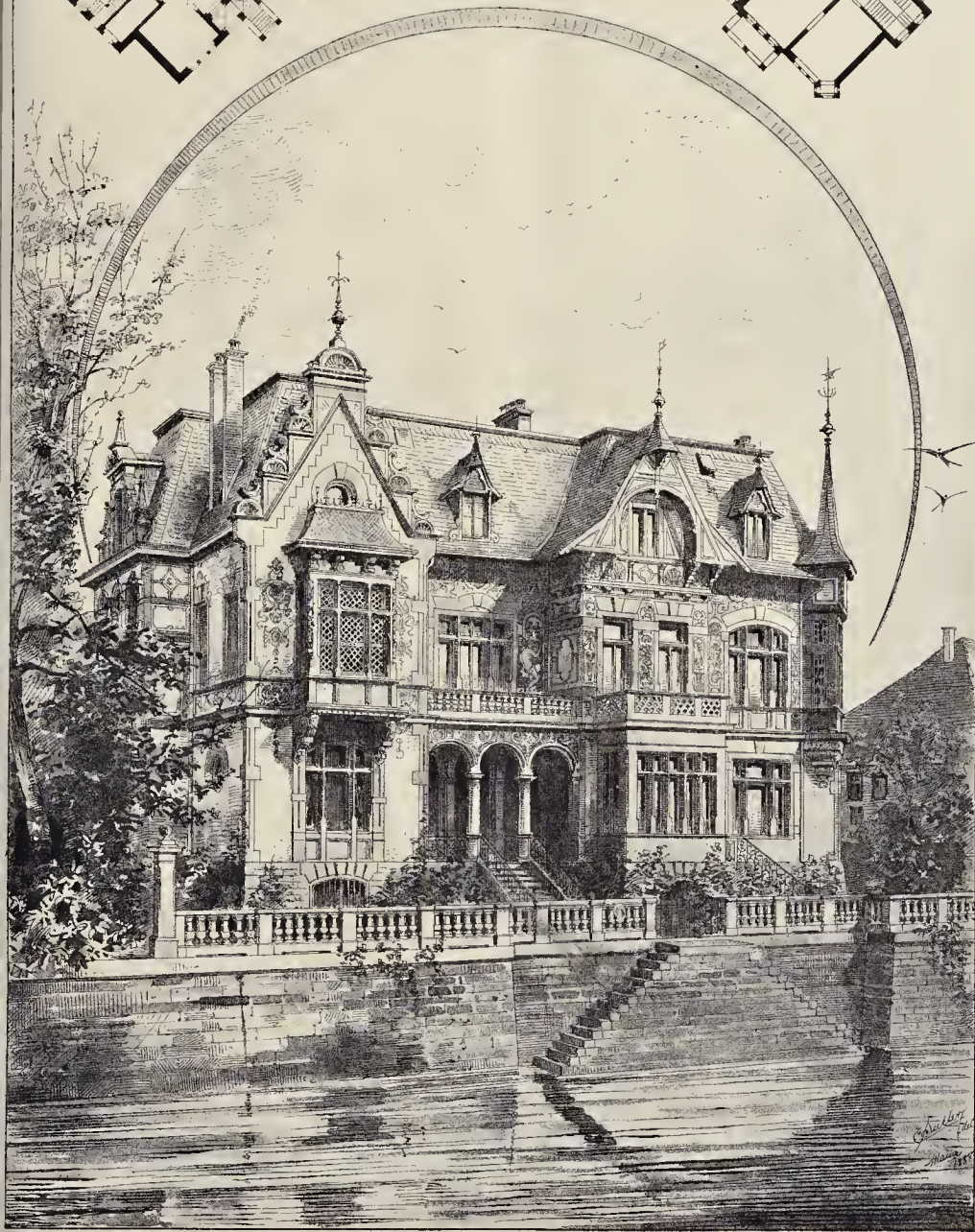
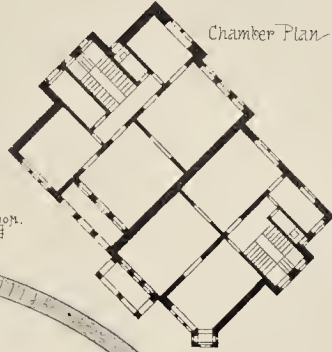


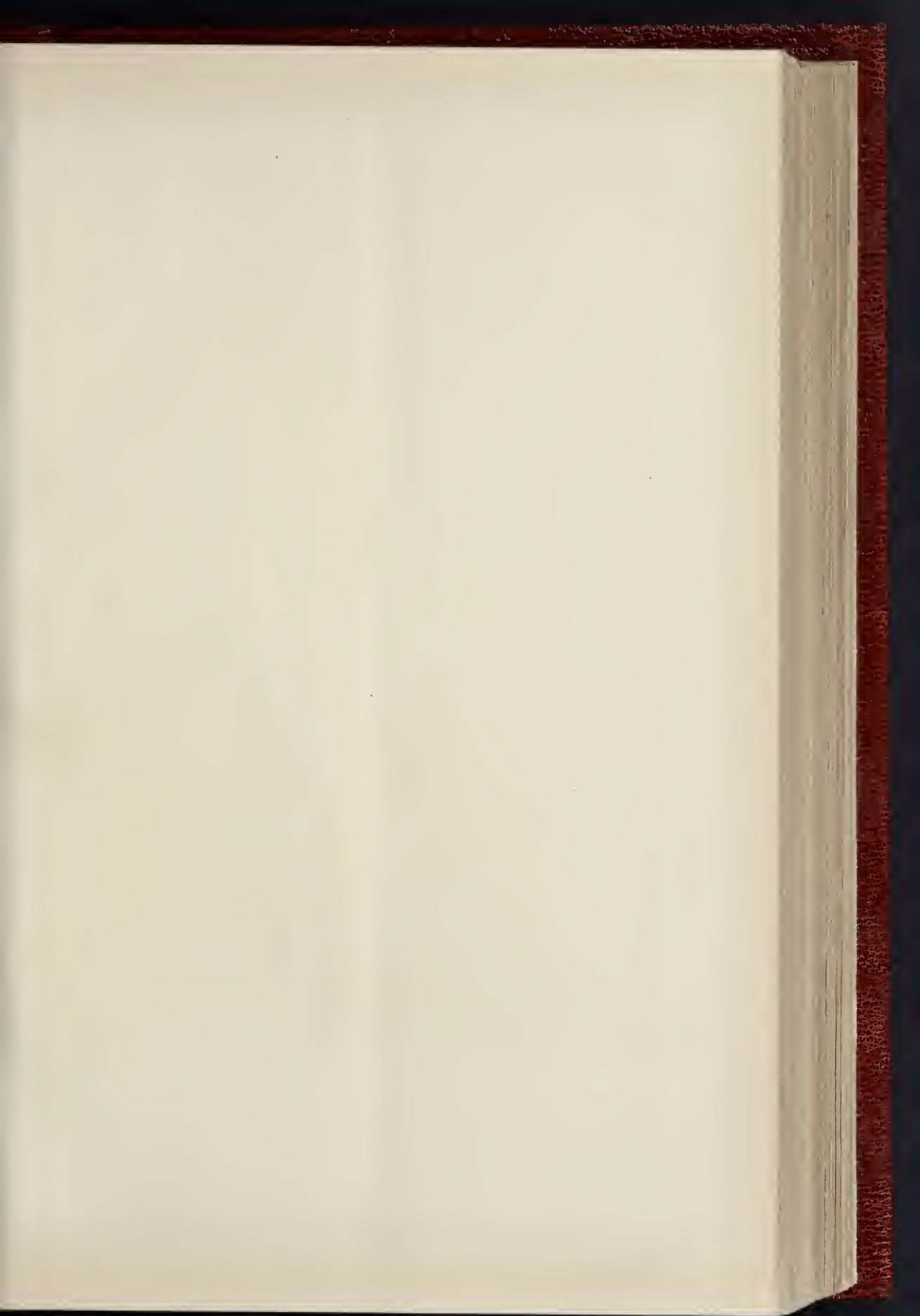
STRASSBURG I.E.

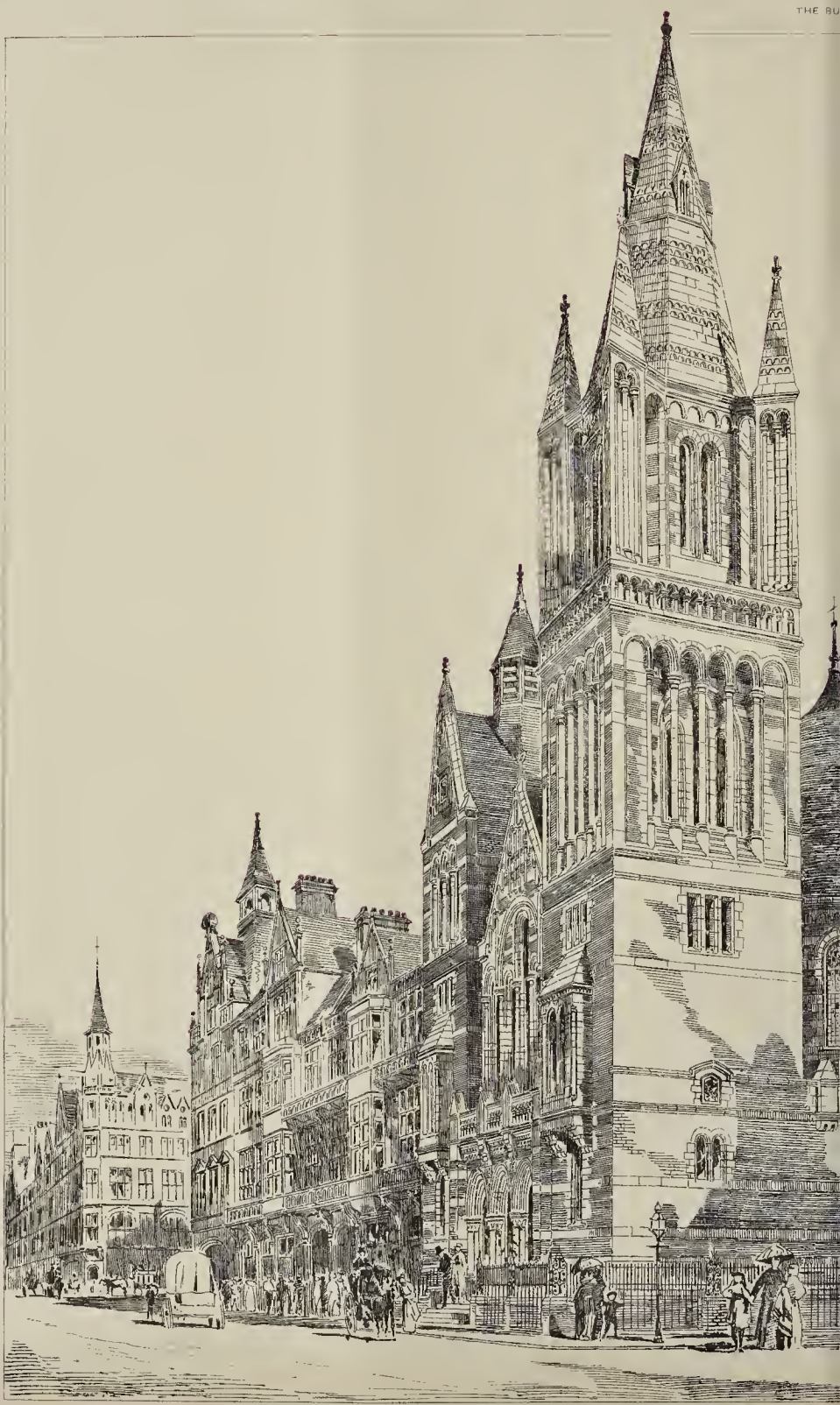
Cottage

Mr. G. Ziegler, Architect
Karlsruhe

Chamber Plan









THE LONDON COUNTY COUNCIL.

THE London County Council held its first meeting since the Christmas recess on Tuesday afternoon last, in the Council Chamber, Guildhall, Lord Rosebery in the chair.

The Proposed Fountain at Piccadilly Circus.

—The Improvements Committee presented a report, in which they said:—"We have proceeded upon the references of the Council relative to appropriating the vacant space at Piccadilly-circus, and we have considered various suggestions. The site in question is of triangular form, containing about 1,620 superficial feet, is a conspicuous and important one, and is therefore specially adapted for some ornamental object, although the surrounding buildings offer little or no architectural attraction. After mature consideration, we formed an opinion that an ornamental fountain, so constructed as to avoid splashing and the carrying of spray by the wind, would be the most appropriate method of utilising the site, and we gave instructions for designs to be prepared accordingly; but just at this juncture we received a communication from the Duke of Westminster, as Chairman of the Shaftesbury Memorial Committee, suggesting that the site might be appropriated to the fountain which the Memorial Committee had ordered to be constructed. We are unanimously of opinion that the spot in question, which is at the termination of Shaftesbury-avenue, is peculiarly suitable for a memorial to this distinguished philanthropist. We have seen the model at the studio of Mr. Alfred Gilbert, the sculptor, and we are assured that it will fulfil the conditions as to spray and splashing. The dimensions are apparently well designed, being as follows:—Height of fountain from base to summit, 30 ft.; height of platform, 2 ft. 6 in. The base of the fountain is octagonal, measuring 10 ft. 8 in. from face to face, surrounded by a platform 2 ft. 6 in. wide, and approached by six steps, the whole occupying an octagonal space of 23 ft. from face to face, and covering a total superficial area of about 450 ft. A margin of pavement would be left of 6 ft. in the narrowest and 2 ft. in the widest part of the present triangular plot. The model is not finished, and the artist hesitates to complete it until the site shall have been decided upon, because certain details will be designed to harmonise with the surroundings. It is, therefore, difficult for us to arrive at a definite decision as to its artistic suitability. We suggested to the Shaftesbury Memorial Committee that a model should be placed on the spot to afford an opportunity of judging of its merits, but again occurred the difficulty of its incompleteness. Neither are we in a position to provide a sketch for the inspection of the Council. Under these circumstances we recommend—

"That a communication be sent to the Duke of Westminster, Chairman of the Shaftesbury Memorial Committee, suggesting to the erection of the fountain at Piccadilly-circus, but with the understanding that in the event of its not proving to be adapted for the site, or not receiving the approval of H. M. Commissioners of Woods, &c., as required by the Metropolitan Improvements Act, 1889, it shall be removed to some other spot, for which facilities will be given by the Council."

This was agreed to without discussion.

The Bethnal-green "Poor's Land."—The Parks and Open Spaces Committee submitted the following report:—"We have again had our attention called to the question of the waste land in the parish of Bethnal-green, known as the 'Bethnal-green Poor's Land,' adjacent to the Bethnal-green Museum Garden, which latter is already under the control of the Council. The Poor's Land is 6½ acres in extent, and is subject to a trust, the provisions of which, since we last reported on the subject, viz. on April 9, 1889, have been dealt with in a draft scheme by the Charity Commissioners. The Commissioners propose that of the 6½ acres, about one acre and a quarter shall be devoted as a site for a public library and town hall (the ground surrounding which to be open to the public), and that a further area of 2½ acres shall be given up for a site for a parish infirmary, leaving 2½ acres to be laid out and maintained as a public recreation ground. Having carefully considered this scheme, we do not consider that it should be adopted in its entirety, as too great a portion of what is now an open space would be devoted to building purposes. The Council, on April 9, 1889, passed the following resolution:—

"That the Council do communicate with the Charity Commissioners, and ascertain if they are prepared to agree to a scheme, to be proposed by the Council, for laying out and maintaining the Bethnal-green Poor's Land as an open space; that the Commissioners be re-

quested not to agree to any scheme for building on the said land; and that the Parliamentary Committee be instructed to watch and report on any Bill promoted with respect to the same."

At that time, neither we nor the Council were in possession of the details of the scheme of the Charity Commissioners. Now, however, that we have had an opportunity of considering the scheme, we have arrived at a conclusion which we think would effect a fair compromise between the various parties interested. We recommend—

"That the resolution of the Council of the 9th of April, 1889, relating to the Bethnal-green Poor's Land, be modified, and that the Charity Commissioners be informed that, in the opinion of the Council, such land (with the exception of a part not exceeding two acres, which may be required for the erection of a parish infirmary) should be handed over to the Council free of cost, to be maintained in perpetuity as an open space."

This recommendation met with strong opposition, and was declared to be due to a "snatch vote" obtained in a thinly-attended Committee meeting called during the recess, both the chairman and vice-chairman of the Committee being opposed to the recommendation. Ultimately, the report was referred back to the Committee for further consideration.

Dealing with Surplus Lands.—On the subject of the mode of dealing with the Council's Surplus Lands, the Corporate Property Committee presented the following important report, the adoption of which was moved by Lord Hobhouse, the Chairman of the Committee:—

"We have to report on the following reference, made to us by the Council on April 11, 1889:—

"That the question of the manner of dealing with land which comes into the possession of the London County Council be referred to the Corporate Property Committee for consideration and report."

1. Land comes into possession of the Council by several different channels and under several kinds of obligations, and in all of these classes except one the powers of the Council to deal with the land are prescribed by law within very narrow limits of discretion.

2. The above reference was made by the Council upon an amendment to a motion made by Mr. W. Saunders in the following terms:—

"That land which shall come into the possession of the London County Council shall not be sold or let on fixed leases, but it may be let on perpetual leases, at rents subject to periodical valuation."

3. We conceive that both motion and amendment referred only to that land which the Council has to dispose of for the purpose of profit, and so as to recoup as far as may be the expense of its acquisition. In this report therefore we note the fact, but without entering into further details, that the following classes of land come into the possession of the Council with narrowly circumscribed powers of management and disposition:—

I. Land devoted to open spaces.
II. Land acquired under the Artisans' Dwellings Acts, and devoted to the provision of dwellings.

III. Those portions of land acquired under Improvement Acts, which are devoted by the same Acts to the restoration of habitations for the artisan classes displaced by the improvements.

4. The class of land to which we address this report is:—

IV. Land which is acquired under Improvement Acts, and which, not being wanted for the intended improvements or devoted by statute to artisans' dwellings, falls into the category of 'superfluous land.'

5. The quantity of superfluous land acquired under Improvement Acts, and now owned by the Council, is about 45 acres, of which about 35 acres are let on leases, at rentals amounting to about 94,000*l.*

6. The obligation imposed by the Lands Clauses Act, 1845, to sell superfluous land within a short time, has been relaxed in the case of the County Council. The periods for which land may be retained unsold are:—

(a) As to land acquired under Improvement Acts passed prior to 1881, the year 1921.

(b) As to land acquired under the Acts of 1885 and 1886, such period as the Council shall think fit.

(c) As to land acquired under the Acts of other years, the year 1941.

7. The modes of dealing with superfluous land allowed by Improvement Acts may be exemplified from the Act of 1888. That Act

would not permit of any ground being set apart as a garden for convalescents, provision was made for an airing-flat, with glazed shelter over each ward block, with access thereto by separate staircases from first-floor.

A small block, consisting of two wards and scullery, with w.c.s and lavatories, was arranged so as to be entirely disconnected from all other buildings with a view to the immediate isolation of any infectious cases which might break out after admission to the hospital.

A mortuary, post-mortem-room, and disinfecting-chamber constitute a separate block, with access from sloping way forming approach for ambulances. In view of the many recent disasters in public buildings through fire, provision was made in this design for easy egress from each ward by means of an escape staircase leading from the bathroom lobby to the ground level.

The size of the ward was calculated on the basis of 100 superficial feet of floor space per patient, and arrangements for ventilation were made by the provision of fresh-air inlets under the head of each bed, in conjunction with the hot-water radiators, so that an ample supply of pure air of enigne temperature could be secured for each patient, special fines of glazed stoneware pipe for the extraction of foul air being carried up in the central stack of fines. In addition to the hot-water radiators three open fire-places are shown in each ward. The internal finishings were intended to be of simple form, with a view to economy, as well as to facilitate the cleansing thereof, and to eliminate as far as possible all projections for the lodgment of dust, &c. The exterior of the building was also designed with due regard to economy, but at the same time a certain amount of character was aimed at to satisfy its demands as a public institution. With this end in view the walls were intended to be faced with red bricks in two tints, the strings, cornices and other features of the design being in terracotta.

THE OLD FOUNTAIN, MARKET-PLACE, MAINZ.

The old Renaissance fountain in the Market-place at Mainz is a characteristic example of a certain school of Renaissance work. The fantastic agglomeration of corrupt ornament which forms the terminal of the triangular erection over the fountain is certainly in very coarse taste, yet there is a kind of power about its exuberance which to some extent atones for the bad character of the detail.

VILLA NEAR STRASBURG.

THIS house, called "Strassburg le Cottage," we give as a typical example of contemporary German taste in domestic architecture. Without expressing admiration for the style of architecture it represents, we believe all who are acquainted with the tendencies of German "picturesque" house architecture will concur with us in thinking that this is a favourable example rather than otherwise of the style of domestic architecture of modern Germany.

MEDALISTS AND PRIZEMEN AT THE INSTITUTE.

At the business general meeting of the Royal Institute of British Architects on Monday evening last, the following awards were made, viz. :—

*Institute Silver Medal (and 10*l.* 10*s.*)*.—To Mr. Alex. Mackintosh. In the same competition, a Medal of Merit was awarded to Mr. J. E. Mowlem (Swanage).

Soane Medallion.—The Soane Medallion was not awarded this year, as elsewhere noticed. But in the same competition Medals of Merit were awarded to Messrs. F. W. Bedford, C. F. Spooner, and E. W. Gimson (Leicester).

Watt's Medal (and a certificate).—Awarded to Mr. James C. Watt, of Aberdeen.

*Grissell Gold Medal (and 10*l.* 10*s.*)*.—Awarded to Mr. W. Percival, of Longton (Staffs). Medals of Merit awarded in the same competition to Messrs. J. A. Pywell and F. F. Pennington.

Pugin Studentship.—Awarded to Mr. John Begg. Medal of Merit to Mr. D. J. Blow.

Godwin Bursary.—Awarded to Mr. A. C. Cox.

Ashpitel Prize.—Awarded to Mr. Herbert Baker.

Scientific Masonry Prizes.—10*l.* 10*s.* to Mr. H. A. Woodington; 5*l.* 5*s.* to Mr. A. W. Anderson.

gives to the Board of Works discretion to let on building leases not exceeding 99 years, with or without option to the lessees to purchase the fee-simple; in sell the reversions on such leases for reasonable prices; to sell at once for reasonable prices; and to let at rack-rent; but all subject to the obligation to get rid of the whole by February, 1941.

8. The legal modes, then, in which the Council may deal with its superfluous land may be thus enumerated:—

(c) By ordinary letting from year to year, or for short terms, at rack-rents. It is obvious that this mode is not applicable to any considerable amount of land, because nearly all that comes to the Council is cleared, and requires building on it in order to be profitable.

(y) By the building lease commonly used in London. The usual term granted by the Board of Works has been eighty years.

(x) By ordinary sale for a gross sum.

(w) By lease with premium. This is obviously not adapted for building land.

9. Another mode would be:—

(v) To sell the fee-simple on a fixed perpetual rent, or to grant a term of years tantamount to it (say 1,000 years) also upon a fixed rent.

The latter form of this mode, which is in law a lease, does not fall within the terms of our leasing powers, and it may be doubted whether the first-mentioned form is authorised by our selling powers.

This mode is not used in London. But it is the favourite method of dealing with building land in Manchester and many other large towns in England, and is also in general use in Scotland. Its advantages to the grantee of the land are easy to see; and those who are in favour of enfranchising leaseholds will probably think that it is more for the public advantage than the London system. Whether it is of equal advantage to the grantor is another question; probably it does not yield so much money to him, but it is difficult to tell without seeing the two systems at work side by side in the same locality.

10. We mention last:—

(z) The plan propounded by Mr. Saunders. The main principle of this plan is to keep the interests in and the profits of the soil quite distinct from the interests in and the profits of the buildings placed upon it. The landowner is to grant the perpetual use of his land, and to receive at once as much rent as the land without buildings will fetch in the market. The grantee is to build upon the land, but the land is never to become the property of the grantee, nor the buildings the property of the landowner. At frequent periods of time (say every five years) the land is to be revalued, not as it stands with buildings upon it, but as it would be without any buildings, and the rent is to rise or fall with the value of the land estimated on that hypothesis.

We are disposed to think, with Mr. Saunders, that such a plan would reduce the temptation which now exists to put up flimsy buildings, and would put an end to the hardships which are now felt by an occupying lessee, and to the contentions between him and the reversioner which at present are incident to the expiry of a long lease. But it is doubtful whether equal contentions between grantor and grantee may not arise from frequent readjustments of rent by valuation; and it is impossible to forecast the other consequences of the principle, as yet wholly untried, of effecting a separation in interest and in ownership between land and the buildings on it, instead of treating them as one entire thing in interest and ownership, which they must necessarily be in use and enjoyment.

Mr. Saunders also claims for his plan that it will diminish the risks of the builder, and so render the trade of building more healthy, and at the same time that it will be more profitable to the landowner. These are conclusions to which we cannot at present see our way.

It is clear that Mr. Saunders' plan is not within our existing powers.

11. It will be observed that there is no legal power for the Council to devote their superfluous land to the purpose of open spaces. It seems reasonable that a body immediately con-

cerned in the maintenance of open spaces should be able to devote to that purpose land which is in its hands, though acquired for another purpose. The power would hardly be needed except for small plots of ground. But we conceive that the Council would do well to ask for it on some fitting occasion.

11A. It appears also to be the case that superfluous land acquired under Improvement Acts cannot be applied in artisans' dwellings in the same manner as if it were acquired under the Artisans' Dwellings Act. Again, it seems reasonable that a body charged with the duty of erecting artisans' dwellings should have the power of using for that purpose land which it is under obligation to let or sell, but which it finds to be a proper site for dwellings.

12. With respect to the above modes (y) and (z) by which the great bulk of property has been dealt with, we have inquired what principle guided the Board in selecting between the two. We are informed that the Board preferred, as a rule, to let on lease, as being the most profitable course; and that they only resorted to sale in cases where they could not effect leases, or where it was inconvenient to hold plots of isolated land, or for some other exceptional reason.

13. We have next considered whether there is any reason for altering the course taken by the Board. If there is, it must rest on one of two grounds: either that more profit can be obtained by some other course, or that it will conduce generally to the advantage of Londoners.

14. As regards the economical ground, the Council are aware that both rent in case of a lease and purchase-money in case of a sale are carried to the Consolidated Loans Fund to meet the debt. But up to the present time new improvements and new loans have demanded much more money than has been either brought in by sales of land, or represented by the acquisition of land. The Comptroller has supplied us with figures which show that during the last ten years the amount of money received from sales, added to the value of the land acquired and retained as the property of the Council, does not exceed one-third of the capital amount expended on improvements. And there are constant demands on us for loans to other Municipal bodies in London.

15. If the question lay between the two alternatives of purchasing our stock at the market price on the one hand, and retaining land to produce rent on the other, it seems clear that the rents would exceed the interest of the stock purchased by selling them, and, though it must always be remembered that the possession of house-property involves charges and liabilities which must be set against the rent, it may be taken that the latter of the two suggested alternatives would be the more lucrative.

16. But so long as we want more money for capital expenditure and loans than can possibly come in by sale of land, there is a third alternative, viz., to sell our land, and to spend the price in the new improvements that are wanted. To work out the probable financial results of such a policy is a matter rather for the Finance Committee than for ourselves; and we have not attempted to solve that problem.

17. Passing from the economical question to that of more general policy, it appears to us that there are two reasons why we should not retain land. One has been already referred to in connexion with the enfranchisement of leaseholds. The property of the Council is, indeed, a very small matter in the mass of London, not equal to one of the larger private estates. Nevertheless, every building-lease that it grants goes to swell the number of leasehold properties, and to diminish the freeholds.

18. The other reason is that, in our judgment, it is not desirable that a Municipal Corporation should, in addition to its other duties and responsibilities, assume the position of an ordinary landowner. It is his interest to deal with his land in the way most profitable to himself, and he has no public or definite duty to the contrary. The Council owe a duty to the ratepayers to make their land profitable, and also have higher duties of control and supervision to perform. It is impossible to suppose that these two sets of duties will not occasionally come into conflict, or that the judgment will not be embarrassed or warped when such a conflict occurs. Moreover, the management of house property, even when let on building lease, requires a considerable amount of detailed supervision which the Council cannot exercise,

nor can its individual members. All must be done by paid agency. At every meeting of this Committee, we have before us numerous questions of detail regarding construction, appearance, insurance, lighting, servitudes, and other matters connected with the properties we let on building lease. In such matters, with trifling exceptions, we are dependent on the report of the Architect. It is impossible for us to act with the promptitude or the freedom of an individual owner, and almost impossible to act with as accurate a judgment. At best a certain amount, and not a very small amount, of energy, which had far better be given to public business, is absorbed into dealings with small details of private property. To a certain extent these mischiefs are unavoidable because we must buy and sell. But they are much enhanced by our letting on lease.

19. For the above reasons we are disposed to think that it is desirable for the Council, and therefore for London, that we should exercise powers of leasing more sparingly, and powers of selling more largely; and especially with regard to property acquired in future, or not yet dealt with.

20. It remains to add something with respect to the modes of dealing which we have classed under heads (r) and (v). We have above intimated that they are beyond our legal powers, but probably the requisite powers could be obtained if the operations were thought desirable. But mode (r) is not used in London, and it is not an easy matter to set afloat new modes of dealing with property among people long accustomed to their own modes. Such experiments are sure to be made, at least in the beginning, at the cost of those who try them. The Council is the owner, not of a large or compact tract of land, but of small plots scattered about London. It is not in a position to exert any great influence on the dealings in the London market. It is not so free to try hazardous experiments with the property of the ratepayers as a private owner is with his own property. And, as practical men, we cannot advise that any systematic attempt should be made to deal with the land of the Council according to this mode. At the same time we have been informed that there are practical men who think it likely that London land may be dealt with under head (v) advantageously both to grantor and grantee. Our own Architect is disposed to think so. And it may be well to have such a mode open to us, in case favourable offers should be made.

21. As to head (z), we have no such evidence. That mode of dealing with land is not only not used in London, but is unknown in England. The obstacles to introducing mode (z) apply with increased force to mode (v). We think it would be premature to make any move in that direction. But if this plan is really sound and practical, the present discussion will probably make it better known, and bring forward further opinion in its favour.

22. We have thought it our duty to answer the reference fully by exhibiting to the Council all such aspects of the question as have occurred to us. But such recommendations as we have to make lie within a very narrow compass. It does not appear to us desirable that the Council should lay down any rigid rule with respect to leasing or selling. The discretion of the Committee, which means the discretion of the Council itself, should, as we think, be left open in each case. But if the Council approves this report without correction, the result will be that, in the future, more sales will take place in proportion to leases, and the tendency of land in the ownership of the Council to increase will be to some extent checked.

23. The distinct recommendations we make are:—

I. That the Council should instruct the Committee to sell the land of the Council in preference to leasing it for 99 years, in cases where there does not exist any special reason for leasing it.

II. That the Council should acquire power to keep superfluous land as open space whenever expedient.

III. That the Council should acquire power to apply to the purposes of artisans' dwellings land acquired under improvement Acts.

IV. That the Council should acquire power to sell land, or demise it for any term of years for a fixed rent. No one of these objects can be called urgent. With respect to the application of purchase-money to new improvements, we are not certain whether any fresh legal facilities are required, but if any are, they will be best indicated by the Finance Committee.

Lord Hobhouse having spoken at some length on the general scope of the report, Lord Lingen referred to the general financial bearings of its

proposals, and moved that the report be referred to the Finance Committee for consideration. This was seconded by Sir John Lubbock, and agreed to *nem. con.*

Proposed Labour Bureau.—Mr. Thornton moved:—"That, recognising the need of a central establishment where masters and men may register their requirements, this Council would be willing, if desired by representative bodies of artisans and labourers, to assist in the establishment of a Labour Bureau." This gave rise to some discussion, and it was ultimately referred to the Contracts Committee to report whether it was possible and desirable to establish such a bureau.

After transacting other business, the Council adjourned.

ARCHITECTURAL SOCIETIES.

Edinburgh Architectural Association.—A lecture on "Some Early Scottish Architects" was given on the 9th inst., by Mr. J. Balfour Paul, advocate, to the members of the Edinburgh Architectural Association, in the hall, 42, George-street. Mr. H. J. Blanc occupied the chair. Having pointed out that few records as to the designers of our cathedrals and castles were available, the lecturer proceeded to mention some of the more prominent of Scottish architects of early times. He said (according to the *Scottishman*) that Gilbert of Moray, Bishop of Caithness, in the first part of the thirteenth century had the credit of designing and building at his own charges the church of Durnoch, the remains of which were still in existence, incorporated with the present parish church. The Castle of Kildrummie, in Aberdeenshire, was also probably erected by him. In the fifteenth century a family of the name of Merlyoun was largely employed by the king in executing work at Stirling Castle, Dunbar, and other Royal fortresses. Thomas Cochrane, the favourite of James III., who fell a victim to the vengeance of Angus and other nobles, was stated to have been an architect, though his exact position in the King's household had always been doubtful. Another architect of that century, Sir James Hamilton of Fyvie, it, about a violent end, being executed on a charge of inventing an infernal machine by which the king was to be shot from the tower of Linlithgow. A distinguished man, William Schaw, held the post of king's architect to James VI., and he restored Dumfermline Abbey, and was hurried there. After alluding to some of the nobles who were instrumental in erecting the leading mansions and castles of Scotland, the lecturer gave an account of the family of the Mylnes. Belonging to Aberdeen, they gradually came south, and in the seventeenth century John Mylne was located in Edinburgh, and was Member of Parliament for the city. He was buried in Greyfriars' Churchyard. His nephew Robert was the builder of Mylne's Court, and several other premises in Edinburgh. A descendant of his built the North Bridge, and another attained eminence in his profession in London. The lecturer subsequently made reference to the claims put forward for Inigo Jones, Wallace, Aytoun, and Balcanquhall as the designers of Heriot's Hospital. He also spoke of Sir William Bruce, of Kinross, who restored Holyrood in 1671. In conclusion, he gave sketches of James Gibbs, Colin Campbell, and the elder Adam. A vote of thanks was passed to Mr. Paul for his lecture.

Glasgow Architectural Association.—The usual monthly meeting was held on the 7th inst., when a paper on "Furniture" was read by Mr. Fred. M. Miller. The chair was occupied by Mr. Wm. James Anderson, vice-president. The paper was well illustrated by examples of old carved cabinet doors and some of Morris's work. A discussion was opened by Mr. Andrew Black, and taken part in by several other members, and at the close a hearty vote of thanks was awarded Mr. Miller.

Manchester Architectural Association.—The members of this Association met on Tuesday evening last at the Diocesan Chambers, when Mr. Lawrence Booth, F.R.I.B.A., a past President of the Association, read a paper on "Commission." The President, Mr. J. H. Woodhouse, was in the chair, and there was a large attendance. The paper dealt with the subject of "Commission" as understood and practised upon in business life, treating it in its several degrees of legitimate, through the questionable, to that of absolute dishonesty; and indicated that many industries were groaning under the

effects of the latter, as an incensus preventing their progress and prosperity. In its application to architectural practice the paper deprecated all secret commissions, and advocated complete candour on the part of the architect towards his client, as "suspicion always dogged the steps of secrecy." The author protested against a very general imputation that architects, being paid by commission, brought about extra expenditure in order to increase the amount of their own charges, and asked men of the world to consider for a moment whether any architect, so depraved as to be willing to squander his client's money in order that a shilling in every pound might find its way into his own pocket, would not be likely to devise some more simple and less palpable method of robbing his employer? Extras of a preventible character did make their appearance, and were frequently the result of the desire of architects, especially new beginners, to put in "all they knew in the way of decorative features and good architectural effect," in the hope of enhancing their own professional reputation. Such efforts had frequently the opposite result, and ought to be avoided, but fell very far short of deserving the condemnation bestowed on gross and corrupt motives. The main argument of the paper was directed against the remuneration of architects being regulated by the amount of money spent, or, in other words, against the principle of payment by commission, and in favour of payment by results, the writer saying:—"It is indeed doubtful whether the community would not long since have compelled us to adopt a more rational method in the assessment of our services if they had been less familiar with payment by commission in their other transactions." A cordial vote of thanks to Mr. Booth was proposed by Mr. A. H. Davies-Colley, seconded by Mr. F. W. Mee, and supported by Messrs. Hodgson, Smith, Mould, Chadwick, and the President. This was carried unanimously.

Royal Institute of the Architects of Ireland.—His Excellency the Lord Lientenant, in replying affirmatively to an address presented to him a few days ago, asking him to become a vice-patron of the Royal Institute of the Architects of Ireland, said—

"I am very glad to learn from your address that you have such good grounds for being satisfied with the results that have been achieved by your Institute during the last half century, and I sincerely hope that a similar success may attend your efforts for the further development of your most ancient and important art. But a few days ago it was my privilege to inspect the noble pile of buildings that have recently been erected for the Science and Art Department, and just what excellent work Irish architects of the present day can produce. I was specially struck by the beauty of the Irish marble that decorates its walls, for I own I had no idea that this country could produce so various and splendid specimens, which compare most favourably with Italy's celebrated marbles. I do not doubt that if their excellence were more widely known an important industry might soon be developed, for the public will not fail to show their practical appreciation once they realise the merits of this native product."

Sheffield Society of Architects and Surveyors.—The usual monthly meeting of this Society was held at the School of Art on Tuesday evening last. Mr. F. Fowler, the President, occupied the chair, and there was a fair attendance of members. Mr. J. B. Simpson was elected an Associate of the Society. Mr. J. B. Mitchell-Withers read an interesting paper entitled "Elementary Notes on the Mouldings of Medieval English Architecture." He quoted the late Mr. Edmund Sharpe's authority for the statement that "English architectural history was written as much in the mouldings as in the general outlines and masses of its old buildings." It was an easy matter for the architect who had diligently drawn and measured old work to understand and trace out its development from early to late forms. The nave of Westminster Abbey was a notable instance of the use in one general grand design of the various styles of mouldings from the thirteenth to the sixteenth century. No architect who had not an intimate knowledge of the subject ought to meddle with any old building, the humblest of which was generally a good school to study in, and young architects should diligently study and draw the buildings of their district. The late Sir Gilbert Scott had laid down that measured and full-sized drawings were far more useful to the architect than photographs, &c. The lecturer gave illustrations on the blackboard of the principles of grouping and designing mouldings of the different periods, and alluded to the best means of drawing them from actual work. He also noticed the nomenclature of Medieval mouldings, quoting from

William Worcester, who wrote at Bristol in the fifteenth century, and the late Mr. E. J. Willson's notes in Pugin's "Specimens." The illustrious French architect, the late M. Viollet-le-Duc, had said that "to the practical architect a knowledge of mouldings was of the first importance," and that the mouldings of the Greeks and thirteenth-century architects "satisfy alike taste and reason." In conclusion, he quoted Professor Ruskin, who, in counselling loving care and reverence in the repairing of ancient buildings, had very beautifully written "that the glory of a building is not in its stones or in its gold. It is in the golden stain of time that we are to look for the real light, colour, and preciousness of its architecture." The lecture was well illustrated by numerous diagrams and measured drawings of the author's, and full-size drawings of the stone details of the south transept of York Minster, lent by Mr. C. Hadfield. On the motion of Mr. E. M. Gibbs, seconded by Mr. C. Hadfield, a hearty vote of thanks was awarded the lecturer.

THE BARBER-SURGEONS' HOLBEIN.

Str.—In your notice (January 11, p. 24) of the large Holbein picture of King Henry VIII. granting the Charter to the Barber-Surgeons' Company, you remark, "Walpole avers that the picture had been retouched, but its owners say it has undergone no other change than by a careful cleansing in 1719, and again in 1878, by Mr. George Bedford."

I think it underwent some change for the better just a quarter of a century ago, when, with the other pictures of the Company, it was entrusted to the care of McLauchlan & Son, then carrying on business at 55, Berners-street.

That it had suffered damage at some period is evident from remaining (chiefly, I think, on the face and hands of the King) in a coarser mode than the rest of the picture. Those who knew the picture before 1855 will remember a very ugly seam from top to bottom, a crack nearly $\frac{1}{2}$ in. wide, which had been filled with putty and coloured in the roughest way to accommodate somehow the two sides of the gap which should have joined. The oak panel is a remarkable piece of work. It is made of two leaves doweled together, and the whole front surface has, apparently, been finished with the greatest care, but the back reveals that it is made of hewn boards, the joints (verticals) are very good, but the surface is as irregular as is possible to imagine, the substance varying from about $\frac{1}{2}$ in. to 1 in. thick. Some slight horizontal battens but at one time been fixed at the back, with the intention, no doubt, of adding strength, but with the effect of resisting shrinkage, and so causing several cracks to appear, and chiefly the opening of the doweled joint in the middle. It was not easy to deal with so large a panel (10 ft. 4 in. by 6 ft. 2 in.), which is very heavy, and I considered it undesirable to lay it flat, for the battens should give and other cracks be formed in the surface, so it was kept upright during the treatment it received from me. Stronger battens with bevelled edges were added between the old ones, but not fastened to the panel. Small blocks (nearly 100) having a corresponding bevel were attached to the irregular surface of the panel, securing it to the battens but allowing them to slide horizontally. As the old offending battens were tightly fixed and could not be removed without considerable risk of damage, small pieces were cut out of the middle of each of them. The two leaves were then pushed further apart, the old putty removed, and the joint made true. Through other blocks fixed near the joint coach screws were used to screw the leaves tightly together.

The surface of the picture was revived, but no attempt was made to remove the thick coatings of old varnish.

The long Latin inscription was in parts illegible, and I received instruction to rewrite it, and did so as nearly as possible over the old letters, leaving untouched the initials, which are finished with as much care as in an old manuscript. A gold ground, no doubt, exists to a considerable extent, and from its peculiar treatment must have been very effective in the early aspect of the painting. Besides the inscription, the only colour then used was a little oil-colour rubbed with the finger on the edges of the doweled joint. F. H. McLAUCHLAN.

Competition: Schools in the Isle of Man.—At the last meeting of the Braddan School Board, designs submitted in open competition by Mr. Thomas W. Cuhnon, architect, Birkenhead, were unanimously adopted for new school buildings about to be erected at Kewlaigue.

Sculpture in Relation to the Age.—This is the title of a course of three lectures to be delivered by Mr. Edwin Roscoe Mullins at the Royal Institution, Albemarle-street, on the following Thursdays, viz., Jan. 23, Jan. 30, and Feb. 6, at 3 p.m. each day.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—III.
MAGNETIC FIELD.

NOT only are lines of force of use in mapping out the contour of fields of force, but they afford graphical methods for solving problems in magnetism that would otherwise present considerable difficulties. The conventions adopted with respect to them, though in some respects similar, differ from those used in ordinary mechanics.

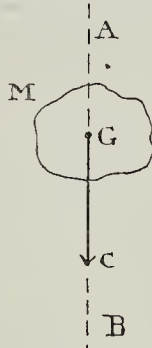


Fig 4.

Suppose M, fig. 4, to be a body near the surface of the earth. Every particle of it is pulled downwards with a certain force, and the lines of force, making up the gravitation field of force in which it is placed, pass vertically through every point in the body to the earth's centre. The effect of the attraction of the earth on such a body is the same as if the whole matter contained by the body were concentrated at a point G, called its centre of gravity. Imagine this done, then, one single line of force, A B, will indicate that part of the gravitation field of force which acts on the matter concentrated at G. The line A B shows no more than the direction in which the body tends to move; it does not in any way indicate the magnitude of the force acting at G. If this force is f number of dynes, imagine a portion G C of the line A C, such that G C is f centimetres long, to become visible; then G C denotes not only the line along which the force acts, but also its magnitude. Put an arrow-head at C, and G C will represent completely, in magnitude and direction, the total force due to gravity acting on M,—that is, its "weight."

It should be remembered that the weight of a body varies slightly with its position at the earth's surface, and also with its height above the sea level; but for the limited space through which any body is likely to be moved, G C may be considered constant.

If all magnetic fields, like the earth's gravitation field, consisted of parallel lines of force, the same means could be adopted for the purpose of completely showing the forces acting on any magnet or system of magnets; it happens, however, that magnetic fields are frequently very curiously shaped, and not only so, but the actual force acting on a pole of any given strength may vary enormously though it change its position very slightly. The force which acts on a pole depends upon the "strength of the field" at that point; the strength of a magnetic field at any point is measured by the force which unit magnetic pole would experience if placed at that point. The strength of a field at any point being F , a pole of strength m placed there will be acted on by a force of $m F$ dynes.

A graphical method, which will not only show the contour of a field but also its strength at any point, will enable us to tell both the magnitude and direction of the force acting on a pole, of known strength, placed anywhere in the field.

Take a simple case where the opposite poles of two magnets face each other, as in fig. 5; in the arrangement under consideration, let it be desired to represent graphically the shape and

strength or intensity of the portion of the whole field included within the dotted circle A B C.

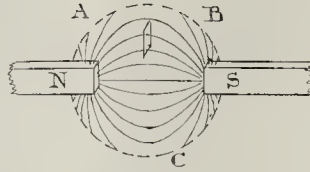


Fig 5.

A magnetic pole will experience some force if placed anywhere within A B C, no matter how weak or strong the poles N and S may be, hence the area selected must be full of lines of force. But by supposing only a certain number of lines to become visible, the number being made greater the stronger the field, such a picture will also indicate the strength of the field. This is done by drawing so many of the lines that if at any point in the field, where the strength is F , a little surface of area a square centimetres is put at right-angles to the lines of force, then n the number of visible lines of force passing through it shall be $a F$, so that since $n = a F$, $F = \frac{n}{a}$ in words—the number of [visible] lines of force per square centimetre of the surface is equal to the strength of the field at that point.

When lines of force are referred to, the word "visible" will be understood, but that the lines of force meant are not all the lines of force must not be forgotten, otherwise a magnetic pole could be placed between the lines of force in the figure where it would not be acted on by any force. This we know to be contrary to fact.

To those unaccustomed to graphical methods, this way of representing a magnetic field may seem artificial and unnecessarily complicated; but a few experiments, made by shaking iron filings from a muslin bag on to a card placed over a single magnet or any arrangement of magnets, and then tapping it slightly, so as to enable the filings more readily to take up their preferred positions, will soon make lines of force seem a reality to the student, and enable him to easily picture to himself the directions of the force, actually producing the effects of magnetism in the medium around a magnet.

Drawing only a certain number of the lines of force is indeed artificial, but it renders easy the solution of many problems that would otherwise require analytical treatment.

CURRENT.

The properties of electricity are so modified by the presence of matter that the older theories only recognised its existence in or upon matter.

Certain substances, pre-eminently the metals, appear to act like lubricants of electricity; the friction, or whatever it may be, which gears the particles of electricity together in space, being so reduced as to allow the free movement of the electricity, contained by these so-called conductors of electricity, within them. A perfect conductor, if such a thing could exist, would be a body which reduced this friction to zero; a perfect non-conductor, insulator, or dielectric is a body in which this electrical friction is infinitely great. Paradoxical as it may seem, pure electricity appears to be a perfect insulator, as space shows no evidence of possessing any conducting power at all. Conductor and insulator, as commonly used, are merely relative terms; it is a matter of opinion when a substance is so bad a conductor as to be called a bad insulator, or vice versa.

Electricity travelling through a conductor is called an electric current.

In all conductors an electric current experiences a force obstructing its flow; this obstructing force is not a constant one, but varies directly with the current, or the quantity of electricity passing any section of the wire or other conductor per second. Now, since there is every reason for believing that electricity is incompressible, if the current is doubled the speed with which the electricity flows past any point must be doubled, and it is found experimentally that double the driving force is required to meet the increased obstruction. This opposing force, then, in the conductor acts like the friction which opposes the flow of liquids. The obstruction which is offered

by a conductor to the flow of electricity is called its "electrical resistance"; and electrical resistance and liquid friction produce analogous effects. When anything is moved against the force of friction, which must necessarily be a force opposing the movement, heat is produced; here again the analogy holds, for an electric current generates heat and raises the temperature of any conductor through which it flows.

As electricity can move in a conductor, if the pressures or potentials at two points are different, a flow takes place until equality of potential throughout the mass is established. Any piece of apparatus, such as a voltaic cell, which is capable of maintaining a current, does so by pumping electricity into a conductor at one end, and pumping it out at the other before equality of potential can be established. Difference of pressure, or whatever causes electricity to flow along a conductor, or try to flow along an insulator, is called *electro-motive force*, frequently written E.M.F.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

18,144, Draining Land. J. H. Rimell and T. Clements.

According to this invention, a plough or tool with cutters is made for use by horse or steam power. In the channel cut by the first of the cutters, a second tool which makes an enlargement of the channel, and a third, smoothing, finishing, or sliding tool, are caused to make a smooth plain channel for drainage.

355, Machinery for Working Stone. F. Trier. By this inventor, many mechanical details are introduced to the ordinary make of machines and tool-holders. The axis of the cutter-spindle is set at an angle to that of the cutter-bush, so that by turning the latter in the socket it produces an effect called step-cutting. Internal and external angles may be cut with the one cutter, the trunion being so mounted as to allow the cutter to act in two angles alternately. Arising cutters and grindstone dressers are also provided by suitable mechanical devices, and connexion of the several parts of the machines.

2,539, Ventilating Apparatus. D. Pennefather.

According to this invention, air is drawn in by leading the pipes in which it is to be conveyed, sometimes by means of the jets employed to light the room; the products of combustion are led away outside the room, or space in which the flame is burning, by a pipe arranged so that it is heated by the gas or the products of the combustion from the gas used in lighting. In lamps of the regenerative type, suitable pipes are fitted from them to effect the thorough ventilation of the apartment.

3,041, Chimney-tops. J. Armitage.

With a view to prevent down-draught, in the periphery of the chimney-top are formed four vertical openings arranged opposite to each other. Each opening, or aperture is covered by a suitable door, which is hinged or pivoted to the framing or casing of the chimney-top, so as to open outwards, and close inwards, each in pairs by a chain to a suitable bar, so that when one door is closed by the air currents the opposite one will be opened for the exit of smoke or other gases. But should the air-current change or veer to the opposite side of the chimney-top, the door on that side will, by the pressure of the current, be instantly closed, also automatically opening the opposite one.

4,220, Sewer and House-drain Traps. W. Smith.

According to this invention, a jet of water is directed by a pipe from an overhead cistern to the bottom of a trap for the purpose of cleansing out any sediment or dirty water.

17,848, Folding Ventilators. F. H. Wilks.

This appliance is principally designed for ships, to conduct fresh air through the air ports. The top part of the ventilator is made of bent pieces of spring steel or sheet metal. They fold down, lapping one over the other; but when in use they are raised by means of a chain to a hood, from which the air is conducted by pipes to cabins or berths. The invention is also applicable to all classes of hooded ventilating cowls.

NEW APPLICATIONS FOR PATENTS.

Dec. 23.—20,604, C. Waddington and H. Butterfield, Drain-pipes, &c.—20,609, T. Kendrick, Bolt for Fixing Doors in any position.—20,612, J. Kaye, Temporary Closing-Doors, &c.—20,631, A. Myall, Composition for Finishing Wood Mouldings, &c.—Dec. 21.—20,691, R. Little, Warming Buildings.—20,692, J. Conter, Machines for Dressing Stones.—20,707, R. Mullaard, Paints, Varnishes, &c.—20,712, B. White and J. Boyd, Brick-making Machines.—Dec. 27.—20,736, R. Hirst, Opening, Closing, and Tempering Closing-Taps and Doors with one action.—Dec. 28.—20,814, A. Padmore, Drying Bricks.—20,833, W. May and A. Padmore, Window-fasteners.—20,843, F. Parker, Hinges.—20,848, A. Smith,

Artificial Stone.—20,849, M. Cahn, Device for Removing Broken Screws, &c.

Dec. 31.—20,914, A. Klapperstruck and A. Meyer, Fireproof Cellings and Walls.—20,957, R. Hadden, Water-closets.—20,976, H. Johns, Roofing Sheets and Fabric.—20,993, S. Taylor and W. Miller, Sash Pulleys, &c.

Jan. 2.—65, E. Hesketh and A. Marcet, Cooling the Air in Rooms, &c.—85, W. Beale, Paving Streets.—87, D. Hart, Screw-drivers.

Jan. 3.—97, M. Walker, Ventilators.—137, J. Lyon, Building and Glazing Greenhouses, &c.

Jan. 4.—162, M. Adams, Construction of Fire-places.

PROVISIONAL SPECIFICATIONS ACCEPTED.

19,724, H. Aland, Rotary Fans for Producing Currents of Air.—19,854, E. Jessurun, Screw-drivers.—20,148, C. Thompson, Fire Grates or Stoves.—18,076, H. Lake, White Lead.—19,246, J. Wilson, Hearths, &c.—19,260, C. Carnont, Treads for Floors, &c.—19,308, D. Grant and others, Water-closets.—19,399, J. Scholtes, Draught-excluders for Doors.—19,453, J. Robbins, Dish-castings for Sawers, &c.—19,575, S. Burgess, Sash Windows.—19,616, M. Warrle, Hanging Window-sashes.—19,657, W. Davies, Flushing Apparatus.—19,664, W. Scott-Moncrieff, Urinals.—19,699, W. Cook, Baker's Ovens.—20,107, W. Akerman, Brick Kilns, &c.—20,240, A. Linford and others, Sash-fasteners.—20,254, S. & S. Eaton, Chandeliers.—18,834, J. Wilkinson, Window-fastener.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

1,262, A. McLean, Artificial Stone.—3,354, A. Ponton and others, Blocks or Bricks, composed of siliceous materials.—3,563, H. Lord, Water-closets.—13,765, J. Tall, Construction of Doors, &c.—15,825, C. Earl, Outside Shop-fittings.—18,846, F. Phillips, Mortising Machines.—3,254, E. Showell, Bolts or Fasteners.—3,580, F. Berry, Electric Bell or Gong.—4,347, J. Homan, Fireproof Structures.—4,486, W. Priedaux, Screws.—10,070, J. Atherton, Door-handles.—16,897, J. King, Treatment of Iron.—17,764, J. Tall, Sash-frames, &c.—17,660, W. Thompson, Artificial Stone.—19,942, E. Winchester, Door-latches.

RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

JAN. 8.—By H. S. HAWLEY & CO.

Walthamstow.—The Pavement, at 86 yrs., gr. £3, 10s. r. 50 p. a. 4550
 Stockwell.—E.g.r. of £80 p.a., with reversion in 70 yrs. 2,820
 E.g.r. of £100 p.a., with reversion in 70 yrs. to e.r. of £240 200

By J. ROSS.

Clerkenwell, Great Bath.—E.g.r. of £130, reversion in 23 yrs. 2,780

[Contracts used in these lists.—E.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; y.s. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

New Public Building at Eton.

The Daily Telegraph informs its readers that "a handsomely designed building, in the Tudor style of architecture," is being erected by the Bridge Trust at Eton. The edifice, which is of red brick and Bath stone, occupies a prominent site in the High-street on the south-west side of Barnes Pool, and will contain offices for the Trust and the Local Board of Health. The architect is Mr. Robert Aborn, of Eton, and Messrs. Goddard are the builders. The Bridge Trust, from whose funds the cost of the building will be defrayed, originated in the time of Edward I., when a local benefactor left a quantity of land for the construction and maintenance of a bridge connecting the college and town at Barnes Pnol. From a few pounds yearly the annual income derivable from the testator's property has increased to about 350l., and has enabled the Trust, with some extraneous aid, to expend 3,000l. on the erection of the present fine girder bridge between Eton and the school, and the new offices in the High-street.

Engineering Works on the Elbe.

The City of Hamburg is on the point of laying out a sum of 150,000l. in widening, deepening, and otherwise regulating the course of the river Elbe below that city, a plan long contemplated. The Prussian State will also contribute a similar sum upon the work. A plan is also under consideration for the carrying out of similar works on the Upper Elbe, between Magdeburg and Hamburg, which would be of great importance to central Germany.

Museum of Art at Bergen.

A museum of art and industry,—the first of its kind,—has just been opened at Bergen in Norway.

MEETINGS.

MONDAY, JANUARY 20.

Royal Institute of British Architects.—The President (Mr. Alfred Waterhouse, R.A.) will deliver an Address to Students, and will present the several Studentships, Medals, and other Prizes for the year 1889-90. 8 p.m.

Society of Arts (Former Lectures).—Mr. Silvanus P. Thompson, D.Sc., on "The Electromagnet." 1. 8 p.m. Leads and Lectures on "Public Libraries."—Mr. E. W. Mountford on "Public Libraries." 7.30 p.m.

TUESDAY, JANUARY 21.

Institution of Civil Engineers.—Further discussion on Mr. G. F. Lyster's paper on "Recent Dock Extensions at Liverpool." 8 p.m.

Glasgow Architectural Association.—Mr. A. Roche on "Decoration." 8 p.m.

WEDNESDAY, JANUARY 22.

Society of Arts.—Mr. R. B. Carter on "Vision-Testing for Practical Purposes." 8 p.m.

THURSDAY, JANUARY 23.

Royal Institution.—Mr. E. Roscoe Mullins on "Sculpture in Relation to the Age." 1. 3 p.m.

Institution of Electrical Engineers.—Adjourned discussion on the President's address on "Magnetism." 8 p.m.

Edinburgh Architectural Association.—Rev. Edward Sugden on "Synthesis." 8 p.m.

FRIDAY, JANUARY 24.

Royal Institution.—Professor Dewar, M.A., F.R.S., on "The Scientific Work of Joule." 9 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. T. H. Chapman on "The Up-Keep of Metalled Roads in Ceylon." 7.30 p.m.

SATURDAY, JANUARY 25.

Glasgow Architectural Association.—Visit to the Prudential Insurance Company's new office, Renfield-street.

Miscellaneous.

Registration of Plumbers.—The Mayor of Hull, Dr. Sherburn, presided a few days since at a public meeting held in the Town-hall, Hull, for the distribution of Certificates of Registration granted by the Plumbers' Company, London, to plumbers in the Hull district. There was a large attendance of members of the plumbing trade.—The Mayor, in opening the proceedings, said the work which the Plumbers' Company was carrying on deserved the very highest praise from every citizen, not only in Hull, but throughout the entire country.—Alderman Fraser said the Corporation Sanitary Committee, of which he had the honour to be the chairman, was anxiously desirous of working hand in hand with the plumbers in their efforts to raise the educational status and increase the efficiency of their craft, in the common interest of its members and the public.—Mr. Ferguson, A.R.I.B.A., said he made it a practice to separate the plumbers' work from all other work in his building contracts, and he strongly recommended architects in general to do likewise.—Mr. Councillor Cohen remarked that he believed the effect of the registration system would be to give the public confidence in plumbers, as a body of tradesmen competent in sanitary matters.—Dr. Mason, Medical Officer, supported the remarks of Mr. Councillor Cohen, adding an expression of his opinion that the registration system would be the means of gradually weeding out the incompetent workmen, and thereby, in a great measure, insuring the public against the evil effects of defective plumbers' work.—Several other speakers having addressed the meeting, Certificates of Registration were distributed to a number of master and operative plumbers, and the proceedings terminated with a vote of thanks to the Mayor.—A requisition, signed by the Mayor of Plymouth and a number of representatives of the plumbing trade and the public, has just been received by the Plumbers' Company, desiring that a centre should be formed at Plymouth for carrying out, in South Devon, the Company's national system for the technical education and registration of qualified plumbers.

Death of Mr. Daniel Adamson, C.E.—We regret to see the announcement of the death of Mr. Daniel Adamson, who was the leading promoter of the Manchester Ship Canal scheme during its Parliamentary struggles in the years 1883-85. As chief of the firm of Messrs. D. Adamson & Co., Hyde- junction, he was largely concerned in the introduction of Bessemer steel. He was President of the Iron and Steel Institute in 1887, and was a distinguished member of other mechanical and scientific associations. Born at Shildon, in the county of Durham, in 1818, he was 71 years of age at his decease, which took place at Didsbury on Monday last, after about a year's illness. His early engineering experience was gained in superintendence of the works of the Stockton and Darlington Railway. He was afterward's manager of the Shildon Engine Works.

Royal Meteorological Society.

The annual meeting of this society was held on Wednesday evening last, at the Institution of Civil Engineers, Dr. W. Marcet, F.R.S., President, in the chair. The Council, in their report, congratulated the Fellows on the generally prosperous state of the Society; the past year's work, though not in any respect exceptional, having been thoroughly successful. The total number of Fellows is 650, being an increase of twenty-five on the previous year; the finances are improving, and the Library is overflowing. Mr. Baldwin Latham, M. Inst. C.E., was elected President for the ensuing year. The retiring President, Dr. Marcet, then delivered an address on "Atmospheric Dust," which he divided into organic or combustible, and mineral or incombustible. The dust scattered everywhere in the atmosphere, and which is lighted up in a sunbeam or a ray from an electric-lamp, is of an organic nature. It is seen to consist of countless motes,—rising, falling, or gyrating, although it is impossible to follow any of them with the eye for longer than a fraction of a second. It is difficult to say how much of the dust present in the air may become a source of disease, and how much is innocuous. Many of the motes belong to the class of micro-organisms which are frequently the means of spreading infectious diseases. Many trades, owing to their dusty nature, are very unwholesome. Dust, when mixed with air, is inflammable, and liable to explode. After giving several instances of explosions due to fine dust in flour mills and coal mines, Dr. Marcet referred to inorganic or mineral dust, and gave an account of dust-storms and dust-pillars in India. He then proceeded to describe volcanic dust, which consists mainly of powdered vitrified substances, produced by the action of intense heat. The so-called ashes or scoria shot out in a volcanic eruption are mostly powdered pumice, but they also originate from stones and fragments of rocks, which, striking against each other, are reduced into powder or dust. Volcanic dust has a whitish grey colour, and is sometimes nearly quite white. Dr. Marcet concluded with an account of the great eruption of Krakatoa, in August, 1883. The address was illustrated by a number of lantern slides.

Electinn of City Engineer of Liverpool.

The Liverpool Post announces that a special meeting of the Liverpool City Council was held on Wednesday at the Town-hall, the Mayor presiding, for the purpose of considering the recommendation of the Health Committee that Mr. Henry Percy Boulnois, Borough Engineer of Portsmouth, be appointed City Engineer, in the room of Mr. Clement Dunscombe, at a salary of 850l., with an annual increase of 50l. till it reached 1,000l. Mr. E. H. Cookson, in moving the adoption of the Health Committee's recommendation, read a letter from Sir Frederick Bramwell, in which he said that having had frequent opportunities of observing the mode in which Mr. Boulnois had carried on his work at Portsmouth, he had much pleasure in recommending him to the Corporation of Liverpool. Mr. Cookson said Mr. Boulnois had had an extensive experience. The Health Committee had selected him out of forty-two candidates, and had eventually been unanimous in recommending him. Mr. John Houlding seconded the motion, which was passed without a dissentient. The Corporation of Liverpool are to be congratulated, we think, on what strikes us as a very good appointment.

The English Iron Trade.

Mainly owing to gambling in Scotch warrants, the regular course of business in the iron trade was somewhat interfered with last week, but the market once more emerges from the ordeal in a steady condition, a sign that trade generally is still in as healthy a state as it entered the new year in. Pig-iron has been depressed by the operations in Scotch warrants; but although the latter have experienced a considerable drop, prices of Scotch makers' iron, for which there is a fair demand, have remained steady. Midlands brought pig has lost 3s. 6d. a ton since last week, but hematites in the north-west remain unchanged with makers, and in other districts the value of pig-iron is fairly well maintained. In finished iron business is pretty active, and rates are steady, the result of the quarterly meetings being to confirm the stability of prices. Steel is slightly quieter, but there is no going back from recent advances. Shipbuilders are busy, but no fresh orders are reported this week. Engineers are briskly engaged, with plenty of fresh work offering.—Iron.

The Proposed Fine-Art Galleries and Museum for Glasgow.—Some time since we referred to a report prepared by Mr. Carrick, Master of Works for the restoration of the West-End Park after the removal of the Exhibition buildings, and providing also a site for the proposed Fine-Art Galleries and Museum. In this report Mr. Carrick suggested that the area of the park to the east of Radnor-street should be appropriated for the site in question, and that the portions fronting Sandyford-street and the Park should be set apart for dwelling-houses. This scheme, it was calculated, would have resulted in the realisation of fully 24,000*l.* from the feuing ground, exclusive of the value of the area reserved for the museum and art galleries. About three months ago this report was delineated upon by the committee entrusted with the matter, and various suggestions were made which the Master of Works was asked to consider and to embody in an amended report. This has now been prepared, and we believe that it differs materially from the former one. The feuing proposal has been entirely given up, while the site of the proposed Art Galleries and Museum has been carried westward, as we are informed, to the ground occupied by the machinery section of the late Exhibition. The site extends to 10,000 square yards, carrying a structure 450 ft. in length by 200 ft. in width. Although different in form from that of the earlier plan, the space for the various art departments is virtually unchanged. The proposal is to have a grand central hall, surrounded by corridors, and entered from Sandyford-street and the Park. On the western side will be placed a museum of science and art, with public galleries for housing the collection under the management of the Corporation. Then follow a suite of salons adapted for the exhibition of pictures and sculpture, and an institution of fine art, including the School of Design and Haldane's Academy. The whole accommodation may be placed *en suite* when required, and the scheme of the plan admits of the structure forming the central part of any group of Exhibition buildings that may be projected in the future.—*Glasgow Herald.*

Society of Biblical Archaeology.—The Report of the Secretary (Mr. W. Henry Rylands) for the year 1889 contains the following passages:—"During the past year the Society has suffered severe loss by the death of some of its members, and it is with no ordinary pain that I have to record the names of the Right Rev. J. B. Lightfoot, D.D., &c., Bishop of Durham, Vice-President, and Professor William Wright, D.C.L., LL.D., &c., both of whom from its commencement took the warmest interest in the Society. To Professor Wright we have been often indebted for valuable papers and notes. In vol. ix. of the Proceedings, he commenced a description of the Kufic grave-stones in the British Museum, and he is asked, with his usual kindness, willingly undertook to place the members in possession of descriptions and translations of these ancient and curious memorials of those who lived and died 800 to 1,000 years or more ago. Commenced in June, 1887, a melancholy interest is attached to his second and last communication, which appeared in our Proceedings of June, 1888. Another distinguished member has passed from us, Philip Henry Gosse, F.R.S., well known from his many valuable works on natural history. Although his favourite line of study was foreign to the objects of the Society, his interest in our subjects was very great, and as one of our earliest members, he ever gave the assistance and support in his power, which was continued to the last. It is true our loss has been great, but I am pleased to be able to state that the number on the roll of members, although the increase is not so extensive as might be wished for the welfare of the Society and advantage of present and future members alike, is fairly maintained."

The London Sewage Question.—The adjourned discussion upon Sir Robert Rawlinson's paper on this subject (see last volume of the *Builder*, pp. 444, 457) was continued and concluded at the meeting of the Society of Arts on Wednesday evening last. We hold over our report until next week.

Royal Institution.—The evening meetings will begin on Friday, January 24, at nine o'clock, when Professor Dewar, F.R.S., will give a discourse on the Scientific Work of Joule.

The Clerks of Works Association.—We hear that the annual dinner of this Association takes place on Feb. 10. Mr. J. Macvicar Anderson, V.P.R.I.B.A., is in the chair.

Newspaper Offices, Sydney, N.S.W.—New offices have lately been completed for the Sydney *Daily Telegraph*. They have been erected by Messrs. Harrison & Sons, from designs by Messrs. Mansfield Brothers, to the order of *The Daily Telegraph* Company. The block consists of four floors and a basement let into the solid rock which forms the foundation, and from the footpath to the top central figure of the parapet the height is 71 ft. Our Sydney contemporary thus describes the architectural character of its new building:—"Commencing at the ground-floor, two substantial Doric columns are observed, with rusticated piers on either side to correspond. Two doors give access to the building,—the one on the left leading direct to the stairs communicating with the Henry department, and the one on the right admitting to the commercial section of the establishment, where advertisements are received and all the financial business of the company is transacted. Over the doors are moulded archivolts with carved keystones in high relief, and the window is treated in the same way. Above the columns of the ground-floor come the moulded cornice, frieze and architrave, all agreeing harmoniously with the Doric columns and piers, and the enrichments generally. Here, in raised gun-metal, appear the words '*The Daily Telegraph*.' From the first-floor to the third the front is embellished with fluted columns and pilasters of the Corinthian order. These columns and pilasters are monoliths, and such very fine stones were not easily obtainable. The windows in between are treated with moulded and carved caps and moulded impost, keystones and archivolts, the windows of the first and second floors being divided by moulded hands with Grecian key enrichments. The handsome pilasters and columns are surmounted by Corinthian entablature, with cornice embellished by carved modillions, dentils, and carved panels *en suite*. Then next in order are the frieze and moulded architraves, in strict keeping with the surroundings. The central portion of the cornice is emphasised by a pediment, with similar ornamentation to that of the cornice, and finished off with carved terminals. On the fourth and last story the pilasters of the Doric order supersede the Corinthian, which enrich the central portion of the front. These Doric pilasters have fluted shafts and moulded caps and bases, surmounted by a moulded cornice with segmental pediment, harmonising with the decorative porticos below. The windows are treated with moulded caps and bases, but the central one is varied. This window is brought into prominence by a carved panel in spandrel, moulded architrave, and moulded keystone. Over the top story is a balustrade with moulded base and capping, and with piers and terminals on either side. The central feature of the parapet is raised above the balustrade with moulded cornice, carved terminals and moulded and carved consoles, and thus makes the central portion of the front in keeping with the general treatment of the elevation. The whole of the front is in best quality of rich brown-coloured Pyramont freestone, unrelieved by other stone, and is handsome without being 'loud.'"

A Gift to Leicester by Mr. G. F. Watts, R.A.—In accordance with a promise made some time ago, Mr. G. F. Watts, R.A., has presented to the Leicester Art Gallery his picture, "Orlando pursuing the Fata Morgana," the subject of which is taken from the Italian poet Boggio. The picture has been on view at Birmingham, and is to be sent to Leicester very shortly. In the letter announcing the gift Mr. Watts says:—"My reason for presenting it are desire to help in forming the collection of pictures which I believe the town contemplates making, as I am confident art is a great humanising factor, and I greatly desire to lend what aid I may in aid of general progress. On this occasion I give one of my best pictures in recognition of the services your townsman, Mr. John M. Cook, is rendering, especially in Egypt, to the nation, making its name respected by admirable administration and honourable dealing."

Swedish Glass-painting Industry.—An industry hitherto foreign to Sweden has been that of manufacturing painted glass for architectural decoration, such work having been imported from Germany. Now, however, Herr R. Callander, a well-known Swedish painter, has opened an establishment at Gothenburg for the production of stained glass, which is being well supported by Swedish architects.

New Stock Exchange, Edinburgh.—Hitherto the Edinburgh Stock Exchange has been accommodated in premises held on lease, but a new building for its accommodation has been erected, from designs by Mr. John MacLachlan. The site is at the angle of North St. David-street and Thistle-street, in the immediate vicinity of St. Andrew-square. Mr. MacLachlan has treated the building in a free Classic style. The facade is richly decorated with carving, which has been executed by Mr. John Rhind. Besides the foliated detail, there is a large panel with a figure representative of Commerce, and medallions of female figures emblematical of the four quarters of the globe. The entrance, at the base of an angle tower, opens upon a vestibule giving access to an inner hall, both of which have high dados of Burmantofts faience. The hall in which the business of the Exchange is conducted is a lofty apartment, 46 ft. by 36 ft., lined to the cornice with oak, having large windows filled with tinted opalescent glass and flanked by oak pilasters. The hall is pronounced to be, in every respect, well suited for its purpose. The basement under the hall is occupied as the telegraph department, and in the remainder of the basement are lavatories, heating apparatus, &c. The secretary occupies rooms in an entresol; on the first-floor are the clearing-house and committee-rooms, and on the top flat there is a smoking-room and a care-taker's house. To provide for further extension, should such be required, the adjoining building, to the north, has been designed, and the existing premises are so designed that any addition made to them may add to the general effect. The entire cost of the building, including both sites, is about 25,000*l.*

The Norwegian Stone Industry, 1889.—The Norwegian stone industry last year was not so profitable as in the year before, prices being lower and the demand smaller. This was particularly the case in London, otherwise the best market,—whither less granite was shipped than in 1888. The export amounted to 30,000 tons in 1889, as against 36,000 tons in 1888. However, the demand and prices for paving-stone were good.

The Nicaragua Canal.—Advice from Nicaragua state that the work upon the canal is progressing satisfactorily, and is being carried on with great vigor. The Nicaraguan Government has decided upon forming a large town and constructing a fine harbour at the Atlantic end of the canal, to which end engineers have been dispatched thither. It is to be called "America."

The North-Sea-Baltic Canal.—In order that the work on the North-Sea-Baltic Canal may not be retarded, operations are now being carried on on several sections after dark by the aid of the electric light.

PRICES CURRENT OF MATERIALS.

TIMBER.		£.	s.	d.
Greenheart, B.G.	..... ton	7	0	7 1/2
Teak, B.I.	..... load	12	0	14 0
Sequoia, U.S.	..... foot cube	0	2	0 3/4
Ash, Canada,	..... load	3	0	4 5/8
Birch	.....	3	0	4 1/2
Elm	.....	3	0	4 1/2
Fir, Dentist, &c.	.....	2	0	3 0
Oak	.....	2	0	10 0
Canada	.....	5	10	7 0
Pinie, Canada red	.....	2	10	3 10
Latih, Dentist, yellow	.....	3	0	5 5/8
St. Petersburg	.....	5	0	6 10
Walvescot, Kelga, &c.	..... log	0	0	0 0
Dens, Finland, 2nd and 1st. std.	.....	8	10	11 0
4th and 3rd	.....	7	0	8 0
Deals—Kelga	.....	7	0	9 0
St. Petersburg, 1st. yellow	.....	11	0	14 0
2nd	.....	9	0	10 10
white	.....	6	10	10 0
Swedish	.....	7	10	16 0
White Sea	.....	9	0	17 0
Canada, Pinie, 1st.	.....	16	0	26 0
2nd	.....	11	0	17 10
3rd	.....	8	0	10 10
Spruce, 1st.	.....	9	0	11 0
2nd and 3rd	.....	7	0	9 0
New Brunswick, &c.	.....	6	0	8 10
Battens, all kinds	.....	6	0	17 0
Flooring Boards, sq. 1 in. prepared, First	.....	0	11	0 14 0
Second	.....	0	8	0 10 0
Other qualities	.....	0	6	0 9 0
Cedar, Cuba	..... foot	0	4	0 0 5
Honduras, &c.	.....	0	4	0 0 4 1/2
Mexico, Cuba	.....	0	5	0 0 6 1/2
St. Domingo, cargo average	.....	0	5	0 0 6 1/2
Mexican, cargo average	.....	0	4 1/2	0 0 5 1/2
Tobacco	.....	0	5 1/2	0 0 6 1/2
Box, Turkey	..... ton	4	0	13 0
Rose, Rio	.....	15	0	20 0
Bahia	.....	14	0	18 0

TIMBER (continued).

Satin, St. Domingo,	0 0 9	0 1 3
Porto Rico	0 0 10	0 1 6
Walnut, Italian	0 0 41	0 0 63

METALS.

IRON.

Bar, Welsh, in London	7 15 0	8 5 0
Do at works in Wales	7 5 0	7 15 0
Do Staffordshire, in London	8 10 0	9 10 0

COPPER.

Best selected	59 0 0	60 0 0
Sheets, strong	66 0 0	0 0 0
Chill, bars	50 10 0	0 0 0

YELLOW METAL.

At works	0 0 51	0 0 0
English, in London	13 17 6	14 0 0
Sheet, English	10 10 0	10 10 0
Pipe	17 0 0	0 0 0

METALS (continued).

TIN—Strada	94 10 0	0 0 0
Australian	65 0 0	0 0 0
English Ingots	99 10 0	0 0 0

OILS.

Linseed	20 12 6	20 17 6
Cocunut, Ceylon	26 10 0	0 0 0
Ceylon	23 15 0	0 0 0
Palai, Lagos	25 10 0	0 0 0
Rapeseed, English pale	32 15 0	0 0 0
Do refined	31 0 0	31 5 0
Cottonseed, refined	32 0 0	32 5 0
Tallow and Oleic	21 0 0	40 0 0
Lubricating, U.S.	5 10 0	6 10 0
Do refined	7 0 0	12 0 0
TAR—Stockholm	1 6 0	0 0 0
Archangel	0 17 0	0 0 0

CARDIFF.—For the erection of two shops, High-street, Barry, for Dr. Byers. Messrs. Richards & Gethin, architects:—

G. Griffiths, Cardiff	£1,636 18 3
F. Bralley, Penarth	1,620 0 0
W. Crisp, Cardiff	1,600 0 0
Jones Bros., Cardiff	1,550 0 0
R. Price	1,485 0 0
D. J. Price	1,438 0 0
J. Jones, Penarth	1,399 0 0
M. H. Tape, Penarth	1,300 0 0
J. C. Edmunds, Penarth (accepted)	1,125 4 3

CARDIFF.—For the erection of forty-two cottages in Loughor-street, Barry, for Messrs. Jenkins & Tees. Messrs. Richards & Gethin, architects:—

J. C. Edmunds, Penarth (accepted)	£4,956 0 0
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CARDIFF.—For making Burlington-street, Barry Dock, for Messrs. Jones & Roberts and Mr. J. James. Messrs. Richards & Gethin, surveyors:—

J. Brock, Cadoxton	£486 5 8
R. Smith, Cardiff	419 0 0
D. Love, Cadoxton	370 3 11
Milward & Co., Cadoxton	365 6 0

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

COMPETITION.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
Market House and Public Offices	Gainsboro' Local Board	26l. ss. and 5l.	Mar. 7th	ii

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Kerbing, Tarpaving, Metalling, &c., Works Sewering, Paving, and making-up Roads, &c. School Buildings, Fencing in Site, and Land Drainage and Making Roadway	Lewisiam Id. of Wks. Chesnut Local Board Clayton and Keymer School Board	Official	Jan. 21st	ii
Yark Paving	Mole and Vestry	E. J. Hamilton	do.	ii
Paving Down Old Prison, Clerkenwell	School Bd. for London	J. M. Knight	Jan. 24th	x
Repairs to Water Vans and Carts	St. Pancras Vestry	W. B. Scott	Jan. 27th	x
Sewage Works	Compton Gifford L. B. Strand Union	J. W. Manserch	do.	ii
New Roof and Repairs to Schools, Edmonton Road Materials and Oil	Bexley L. B.	R. E. W. Boulter	Jan. 29th	ii
Works and Materials	Chelsea Vestry	T. W. E. Higgins	Jan. 30th	ii
Engine and Boiler Houses, Chimney Stack &c.	Works Co.	G. D. Harrison	do.	x
Postal Sorting Office, Clapton	Com. of H. M. Works	Official	Jan. 31st	x
Street Cleansing, Watering, and Removal of Dead Works	St. Margaret, &c. (Westminster) Vestry	G. R. W. Wheeler	Feb. 5th	ii
Re-building Enclosure Wall, Chapel, Holloway-road	St. Mary, Islington Churchwardens	Wm. Smith	Not stated.	ii
Iron Enclosure Fence	ditto	do.	do.	ii

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Clerk of Works	York Corporation	2l. 10s. per week	Jan. 25th	xvi.
Surveyor	Stroud Local Board	150l.	Jan. 30th	xvi.
Roads Foreman	Abergevenny Imp't Com.	Not stated	Jan. 30th	xvi.
Road Surveyors	Storfolk Highway Com.	2l. per week each	Feb. 1st	xvi.

TENDERS.
 [Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

AUDENSHAW.—For sewerage, levelling, kerbing, flagging, and paving Paradise-street, Providence-street, Mount Pleasant-street, from Manor-street to Providence-street, and Manor-street. Also for levelling, kerbing, flagging, and paving only Mount Pleasant-street from Tame-street to Manor-street for the Audenshaw Local Board. Mr. J. H. Burton, surveyor, Ashton-under-Lyne:—

Underwood Bros., Duxfield.
 (Accepted at per schedule of prices.)

AUDENSHAW.—For sewerage, levelling, kerbing, flagging, and paving Lord-street for the Audenshaw Local Board. Mr. J. H. Burton, surveyor, Ashton-under-Lyne:—

Worthington & Pownall, Manchester.
 (Accepted at per schedule of prices.)

BARMOUTH.—For extension of cast-iron outfall sewer. Mr. Thomas Roberts, Assoc.-M.Inst.C.E., Engineer, Portmadoc:—

Evan Williams, Bangor	£2,980 0 0
Griffith Griffiths, Cricketh	2,969 0 0
Owen Morris, Carnarvon	2,855 0 0
Abraham Williams, Aberdovey	2,400 0 0

[Engineer's estimate, £2,493.]
 * Accepted.

BECKENHAM.—For the erection of a residence, for Mr. G. H. Manger. Mr. G. Warren Cooper, architect, Brompton. Quantities by Mr. A. R. Brede, Bedford-row House, W.C.:—

E. R. Palmer, Beckenham	£1,670	Billiard-room.
Graham & Co., Beckenham	1,650	£290 0 0
Mid-Kent Building Works	1,000	200 0 0
Beckenham	1,000	200 0 0
Mitcock Bros., London, N.	1,597	103 0 0
Brayton, Rochester	1,585	120 0 0
Loudon, W.C.	1,533	193 0 0
S. J. Jerrard, Lewisham	1,440	175 0 0
C. W. Brice, Beckenham	1,440	175 0 0

* Accepted.

BROMLEY (Kent).—For the erection of a detached villa residence at South Hill Park, Bromley, for Mr. J. J. Baxter, Messrs. Baxter, Payne, & Lepper, architects, Bromley:—

Arnold & Son	£1,542 0 0
Crawley	1,355 0 0
H. Payne	1,230 0 0
Hy. Sanford (accepted)	1,100 0 0

[All of Bromley.]

CARDIFF.—For erecting new premises at the corner of the Market Hill and Petty Cury, Cardiff, for Mr. W. Bond, J.P., Mr. G. McDonnell, architect, London. Quantities by Mr. James Yarrow, surveyor, 16, Milford-street, Cardiff:—

Prime	£5,020 0 0
Bell & Sons	4,574 0 0
Willmott & Sons (accepted)	4,225 0 0

[All of Cardiff.]

CARDIFF.—For making roads at Barry, for the Barry Dock Sanitary District. Messrs. Richards & Gethin, Surveyors. Quantities by Surveyors:—

Bowers & Co., Hereford	£7,409 0 0
Makay & Co.	6,872 0 0
Dav & Son, Cardiff	6,185 0 0
J. L. Pearson	6,050 0 0
J. Allen	4,990 0 0
W. Crisp, Barry	4,900 0 0
R. Smith, Cardiff (accepted)	4,807 0 0
J. Barstow, Barry	4,688 0 0
D. Love, Barry	4,679 0 0

CARDIFF.—For the erection of 94 cottages in Sydenham and Fryatt-streets, Barry Docks, for Mr. J. Milward. Messrs. Richards & Gethin, architects:—

R. Smith, Cardiff	£16,030 0 0
D. Wallis	15,400 0 0
J. C. Edmunds, Penarth	15,000 0 0

CARDIFF.—For the erection of twelve houses in Moor-road, Cadoxton, for Mr. John Morgan. Messrs. Richards & Gethin, architects:—

Messrs. Mathews Bros., Cadoxton (accepted)

£1,800 0 0

JOHANNESBURG (South Africa).—For the erection of an arcade of shops and block of offices, for the Johannesburg Land and Investment Co., Limited. Messrs. Lennox Cauning & F. G. Good, architects, Johannesburg, Transvaal. (Contract No. 1, exclusive of castings, to be supplied by Messrs. Macfarlane & Co., Glasgow.) Quantities by the architects:—

Inkster & Co.	£16,000 0 0
McCott & Robertson	12,165 0 0
W. White	11,180 0 0
G. H. Langmaid	10,000 0 0
Abrey & Co. (withdrawn)	10,000 0 0
T. M. Cullinan (accepted)	9,732 0 0

LONDON.—For the erection of Mission Hall, Old Montague-street, E., for the Trustees. Mr. A. Beresford Pitt, E.R.I.B.A., architect, 5, Bloomsbury-square, W.C. Quantities supplied:—

Barrett & Power	£209 0 0
Salt	594 0 0
Knox	589 9 9
Barker	536 0 0
Potterton	533 18 6
Schlarer	573 0 0
Hoed	575 5 5
Holland	561 0 0
Loak	559 0 0
Winkley	545 0 0
E. H. Loughand	528 0 0
Edwards, Junr.	525 0 0

LONDON.—For alteration and fittings at Nos. 91 and 93, Rye-lane, Peckham, for Messrs. Davies Bros. Mr. John James Downes, architect, 11, The Parade, Lewisham High-road, S.E.:—

Barker	£100 0 0
Adams	106 10 0
Best (accepted)	106 0 0

LONDON.—For repairs, additions, and decorations at Tudor Lodge, Dulwich:—

J. Wilson	External. £1,500	Internal. £1,780
W. Downer	1,700	1,780
R. Simmonds	1,777	1,750
T. Thomas	1,770	1,638
A. Smith	1,735	1,694

LONDON.—For alterations and additions to 87, Cadogan-place, for Mrs. Barker, under the superintendance of Messrs. Girdwin, Baskley, & Co., surveyors, 28, Cadogan-place, S.W.:—

Langdale, Hallett, & Co.	£175 0 0
Lott & Son	159 18 0
Oldrey & Co.	169 0 0
Webber	152 16 0

LONDON.—For alterations and additions to 43, Fleet-street, Chelsea, under the superintendance of Messrs. Girdwin, Baskley, & Co., surveyors, 28, Cadogan-place, S.W.:—

Langdale, Hallett, & Co.	£144 10 0
Roberts	117 0 0
Oldrey & Co.	105 16 0
Webber	81 16 0
Lott & Son	79 19 0

LONDON.—For repairs, &c., to 83, West Cromwell-road, South Kensington, for Mr. T. Hingett. Mr. Walter J. Ebbetts, architect, 115, Strand, W.C.:—

F. Giles & Co.	£274 16 0
Toten & Sons	253 0 0
W. Steel	169 0 0
J. Barker & Co.	168 0 0
C. F. Kearley	166 0 0

LONDON.—For sanitary work at the Vestry Hall, Camberwell:—

Saunders	£385 0 0
Ising Co.	350 0 0
Jennings	329 0 0
Bickell	311 0 0
Foote	253 0 0
Coddman	243 0 0
Ham	243 0 0

CARDIFF.—For the erection of three shops in Holt-road, Barry, for Mr. David Jones. Messrs. Richards & Gethin, architects:—

G. Asbe, Barry	£2,105 10 0
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LONDON. — For the erection of the "Duke of Clarence" public-house, Red Post-lane, Upton Park, E., for Mr. John Hoppe, Mr. Fred. A. Ashton, architect, 177, Bonford-road, Stratford, E. Quantities supplied:—
 Baxter, Upton Park £3,860 0 0
 Hearle & Son, St. George's, E. 3,883 0 0
 Allerton & Fox, West Ham 3,837 0 0
 Mutter, Stratford 3,770 0 0
 North Bros., Stratford 3,658 0 0
 Nicholls, Leytonstone 3,520 0 0
 Linzell, Tottenham 3,492 0 0
 J. & F. Bane, Stratford 3,459 0 0
 Wyles (accepted), Upton Park 3,380 0 0
 Hood, Bethnal Green 3,365 0 0
 [Architect's estimate, £23,575.]

OXTED (Sussex). — For the erection of shops at Oxted. Mr. H. Warren Cooper, architect, Bedford-row, W.C. —
 W. J. Bailey, Croydon (accepted) £1,650 0 0

SOUTH MIMMS (Middlesex). — For South Mimms village sewerage, for the Barnet Rural Sanitary Authority. Mr. W. H. Mansbridge, Surveyor:—
 Hipwell £1,745 0 0
 Butcher 1,395 0 0
 South 1,305 0 0
 Alired 1,188 0 0
 Dickson 1,179 17 7
 Pezzy 1,170 0 0
 Bell 1,150 0 0
 Wilkinson Bros. 1,133 0 0
 Bloomfield 1,104 0 0
 Jackson 1,079 0 0
 Bottoms 1,070 0 0
 Hill 997 10 0
 Ballard 997 0 0
 Marriott 970 0 0
 Adams 963 0 0
 Stroud 938 12 2
 Prout 934 6 8
 Young & Son (accepted) 915 15 0
 *Capper 905 14 6
 *Tender incomplete, schedule not priced out.

TORQUAY. — For new pier and harbour works, Torquay. Mr. J. Abernethy, Engineer:—
 Pier, Quay Wall. Total.
 Woodhouse & Green £ 2,189
 Newport, Mon. 42,839 .. 8,350 .. 51,189
 Hill & Son, London 39,720 .. 7,450 .. 47,170
 J. Jackson, London 37,060 .. 7,233 .. 44,293
 E. G. Perkins, Lynn-
 ington, Hants. 28,000 .. 17,000 .. 45,000
 Pethick Bros., Ply-
 mouth 35,644 .. 8,800 .. 44,444
 T. W. Billey, Ply-
 mouth 36,000 .. 6,900 .. 42,900
 J. H. Lawton Bristol
 R. Lean, Newport 38,400 .. 6,600 .. 45,000
 Ammonthaire 34,000 .. 6,000 .. 40,000
 J. L. Whettam, Wey-
 mouth 32,797 .. 6,535 .. 39,242
 F. Matthews, Basing-
 combe 27,390 .. 4,800 .. 32,000
 John Reed, Plymouth 25,400 .. 3,500 .. 28,900
 J. "Ochreane & Sons,"
 Westminster 25,150 .. 4,600 .. 29,750
 * Accepted.

Building Nos. 8 and 9, Arundel-street, W.C. — For "Garnet," in last line of the list of tenders for this job, which appeared on p. 25 of last week's issue of the Builder, read "A. & W. Gunnar, Peckham."

SUBSCRIBERS IN LONDON AND THE SURBURY, by preparing at the Publishing Office, 18s. per annum (or 1s. 6d. per quarter), can ensure receiving "The Builder" by Friday Morning's post.

TO CORRESPONDENTS.

F. T. (after previous experience, we cannot accept your report). — E. O. S., Berlin. — F. R. W. — F. & G. — W. F. B. (notice in drainage cannot be considered a matter specially connected with schools any more than with any other class of building). — M. H. — I. C. W. — "Tall chimneys." — W. T. "will send his address he shall have answers to his questions. The subject has been fully discussed in our columns already." — J. D. M. (too late). — M. H. (too late). — A. & W. G. (we printed the list as we received it, but have made the correction).

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. Note. — The responsibility of rejected 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.

PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

THE INDEX and TITLE-PAGE for Volume LVII. (July to Dec. 1889) are given as a Supplement with the Number for Jan. 11th.
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Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on FRIDAY, but those intended for the front Page should be in by the same hour on WEDNESDAY.
 SPECIAL — ALTERATIONS IN STATION ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN 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 of the latter COPIES ONLY should be sent.

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 — MODELS AND SECTIONS ON VIEW. —
 LONDON: 352 to 362, EUSTON ROAD.
 LIVERPOOL: 6 and 8, HATTON GARDEN.
 GLASGOW: 47 & 49, ST. ENOCH SQUARE.

The Builder.

Vol. LVIII. No. 281.

SATURDAY JANUARY 25, 1896

ILLUSTRATIONS.

New Roman Catholic Church, Folkestone: Interior of the Lady Chapel.—Mr. Leonard Stokes, Architect	Double-Page Ink-Photo.
Church of St. Paul, Grangetown, Cardiff.—Mr. J. P. Seddon and Mr. J. Costes Carter, Joint Architects	Double-Page Ink-Photo.
House, "Sandgate," Sussex.—Mr. Walter Millard, Architect	Double-Page Photo-Litho.
Designs for Public Baths.—By Mr. Peter Anderson	Double-Page Photo-Litho.

Blocks in Text.

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Exhibition of Designs for the Sheffield Municipal Buildings.



ONLY eighty-three, or less than half the number, of the unsuccessful competitors in the preliminary competition for the erection of municipal buildings for Sheffield have thought it worth their

while to allow their designs to be exhibited for the edification, or mystification, of the public of Sheffield, and for the delectation of such of their professional brethren as may take sufficient interest in the matter to go and see them. Of these eighty-three, nine are anonymous. For the absence of the rest the critic, whose business it is to study the eighty-three, must be grateful; but since the six successful designs are also absent, it must be confessed that the exhibition is shorn of an appreciable amount of interest.

It is probable, however, that the designs shown, taken all round and one with another, fairly represent the whole. The particulars placed before competitors so complete and detailed that the general similarity existing among a large number of the designs is no ground for surprise, though in some particulars many of them are practically identical. One may fairly assume that exceptional treatment is not much more frequent among the absent drawings than it is among those that are present, and, though it might be of great interest to competitors to see those few exceptions, yet what is already hung is quite as much as or more than most other people can possibly digest.

To speak first of the points of similarity. Though a few competitors appear to have made the Surrey-street front as important in other respects as that to Pinstone-street, yet not one has ventured to disregard the suggestion that the principal entrance should be in Pinstone-street, and it has been made the central feature of the façade by all but a bare half-dozen. Sixty-three, out of eighty-three, have placed the three reception-rooms *en suite* along the Pinstone-street frontage, and in most of the other cases they come up to one of its corners. Thirty-eight sets of plans are laid out with a continuous internal corridor parallel to all the four sides of the site. No fewer than thirty-seven have placed the

Council-chamber behind the Pinstone-street frontage, facing a court-yard, and separated from the reception-rooms by the grand staircase or by a corridor only. Only one or two have found it possible to do without a mezzanine, or a second lower ground-floor, or a basement the greater part of which is treated as ground-floor. In the great majority of instances the two ground-floors are frankly accepted, and called the upper and the lower. Of the elevations only five could possibly be styled Gothic, and by far the larger number are more or less purely Classic Renaissance designs of one or other period or country. Several gentlemen have borrowed from Messrs. Webb and Bell's Birmingham Assize Courts, others from Mr. Colcutt's Imperial Institute, and one firm have taken Mr. Waterhouse's tower of the National Liberal Club, and stuck it bodily on the corner of their building.

Great difference of opinion seems to have prevailed as to the proper position for the various suites of offices; where a whole department has been relegated to the lower ground-floor, the Health Department has generally been the one chosen, but most competitors have preferred to so treat a few of the less important offices of each suite. The favourite positions for the important Borough Accountant's general office are in the middle of the site beneath the Council-chamber and to the right of the entrance, under the reception-rooms; but it is placed by one architect or another in almost every possible position. The large public lavatories, too, which were required by the conditions, seem to have found no obviously right place, on the whole. The corner of Pinstone and Surrey streets, for men, and the opposite corner, beside the churchyard, for women, of course on the lowest floor,—whether called a ground-floor or a basement,—have been most frequently chosen; the entrances being by staircases either in the areas or within the building, but with external doors to the street. The drawing office of the Water Department, which had to be on the first-floor, seems to have fared badly in many cases, and not infrequently has had to put up with south light.

A large number of competitors have paid no attention to the suggestion that part of the site should be left for future extension, having apparently come to the conclusion that this can hardly be done without spoiling the building now, or spoiling it when complete. Taking into consideration the awkward shape

of the ground, it appears that the accommodation required to be placed on it is as much as it will hold without adding another story to the building. Those who have left part of the site unbuilt upon have done so in one of three ways. Either they have cut their building short, and left a space at the Norfolk-street end; or they have left a corner or section of their building incomplete on the churchyard side; or they have a large internal courtyard, and have suggested the future erection of a connecting corridor and offices across it. In the first two cases the present plans are invariably spoilt, and in the latter the result of carrying out the suggestion would be disastrous to the light and ventilation of the future building.

Taking the designs in the order in which they are hung, the first that calls for mention is No. 12, by Mr. R. A. Briggs. The plan is laid out with a corridor parallel to the four frontages; but a part of the building facing the church is left for completion in the future, so that, for the present, the corridor is not continuous. On the Pinstone-street side it is double, with a grand staircase and two light areas between. The Accountant's general office is opposite a central entrance, and his other rooms to the right; the Water and Surveyor's departments occupying the rest of the ground-floor. The Health Department is on the lower floor, with the public lavatories occupying the two front corners of the building. On the first-floor the reception rooms are on the principal front, while beyond the grand staircase, and equally well served by it, is the Council-chamber, overlooking the courtyard, and approached through the ante-room, which has the cloak-rooms on each side of it. All this part of the arrangement is excellent. The elevation is, perhaps, too tame, but it is appropriate, in good taste, and beautifully drawn.

No. 34, by Mr. W. Henman, of Birmingham, is a plan very similar in general arrangement to the last. A larger part of the building is left to be added, and this part includes half the frontage to Norfolk-street. The Council-chamber is not approached from the principal stairs direct, but is placed further in the rear and reached through its ante-room from the corridor which gives access to the committee-rooms. These committee-rooms are all *en suite* on the churchyard front; which, one may remark, is evidently their right place, for it is sunny and comparatively quiet. It is a happy arrangement which thus connects the Council-chamber with the committee-rooms

directly and somewhat more distantly with the reception-rooms. In this design, as in No. 12, the Surveyor's department occupies, as is right, the most important corner of the ground-floor. The Health Department is to the right of the entrance, the Accountant's offices in the middle, and the Water Department in the rear. The elevation shows an unnecessarily lofty and heavy tower at the principal corner. It owes something to the Birmingham Courts, but is, on the whole, not unpleasing.

An anonymous set of drawings, numbered 48, deserve notice on account of the excellence of the elevation, which, though composed of commonplace elements, is well designed and scholarly; and also for the general convenience of the plan, which is laid out round two corridors parallel to Surrey-street. The Accountant's office is especially well placed, and has two public doors easily accessible from the entrances in Pinstone and Surrey streets respectively.

No. 49, by Messrs. Morris & Hunter, is another good design. As regards the elevation, the extreme severity of its long range of columns and windows may be right or wrong; most people would think it carried too far; but at least the work is that of a man of culture who knows more than most people of the art of architectural design. The plans are spoilt by leaving a ridiculous little corner on two of them for "future extension." The main corridors are chiefly parallel to the frontages, but that on the south side is bent in and joins the front corridor at a right angle, leaving a corner in which the Council-chamber, with the Rates Office beneath it, is placed. This contrivance looks a little awkward in the drawings, but would probably work very well in reality; especially as the Council-chamber is thus made a sort of connecting-link between the reception and committee rooms, and the whole could be made to form, on occasion, a very fine suite indeed.

No. 54, by Mr. R. Stark Wilkinson, bears unmistakable and regrettable marks of hurry. The setting-out of the plan is remarkable; the Surrey-street and Cheney-row frontages have been produced until they met, and the angle has then been bisected by a line which becomes the axis of the building; the general lines of the Pinstone and Norfolk street frontages have been taken at right-angles to it, and thus the general form of the plan has been reduced to a trapezium. It is the only way in which a symmetrical building of the size required could be placed on the site, and it is, architecturally, as satisfactory as it is ingenious. Of course a large corner of ground is thus wasted at the corner of Pinstone-street and Cheney-row, but by rounding the corners of the building, and projecting the middle of it, the waste has been greatly reduced; besides, as Mr. Wilkinson points out, it opens up a view of the old church from the obelisk, which is a matter not to be altogether overlooked. The rounded corners have the further use of hiding the sharpness of the angles. In detail the plans are fairly good, but so nearly like some of those already remarked on that they need not be described in detail. The elevation is well balanced, but too much broken up. Messrs. Farrow & Nisbett, 64, exhibit a prettily-drawn elevation, and a plan in which the reception-rooms are shown side by side instead of end to end, as is done in all other cases.

The clever elevation of No. 73—anonymous—is too good for the plans which accompany it, and which have evidently been spoilt by the supposed necessity for laying out the corridors at right angles, and for leaving a piece of ground at the end for extension. The elevation strikes one as being born before its day, and as belonging rather to the architecture of the future. It would be better still but for the heavy tower over the entrance, which most people would not admire until it became half-ruinous.

No. 83, by Mr. John Johnson, is a plan in which the main corridor runs round the three principal sides of the site only; the reception

rooms are on the main front, and approached by the grand staircase, which, again, gives access to the Council-chamber just behind it, as previously described. This plan is the best of its kind exhibited. Messrs. Boot & Chadwick have adopted the continuous corridor plan, and their elevation is a good study in French Renaissance. Mr. Coates Carter has borrowed from the Birmingham Assize Courts and the Imperial Institute rather too liberally in making his elevation, which, however, does not seem to have suffered thereby. Mr. John Robinson and Mr. Campbell Jones, 96 and 99, have each a creditable design both as regards plan and elevation. The elevation of 96 looks rather too much like a theatre,—that is, like what a theatre ought to be, not like what most of ours are. But the design, as a design, is well grouped, proportioned, and detailed.

No. 123, by Mr. Paul Ogden, is one of the most successful of the designs that have the corridors laid out at right-angles. They are double, and of L shape, parallel to the Pinstone and Surrey street frontages. The whole outline of the building is, too, of the same form, no effort having been made to fill up corners. The reception rooms are in the usual place; the Council-chamber, too, is opposite to them, and reached by a "grand communicating state corridor," which is another name for a space under a great central tower. The Accountant's general office is under the Council-chamber, which, owing to the shape of the plan, faces the churchyard. The whole is symmetrically and well arranged. No. 130, by Mr. W. J. H. Leverton, is another good plan, in which the author has departed from the common arrangement. A courtyard is formed, open on the Surrey-street side. The rooms are placed to right and left of a long central corridor which leads direct from the main entrance to the rear of the site; the scheme works out fairly well except for the circumstance that the corridor would be badly lighted.

Messrs. W. H. Seth-Smith & Fenning, Messrs. Heathcote & Rawl, Messrs. E. H. Selby & H. S. Daniels, and Messrs. Dunn, Hansom, & Dunn, have all good plans of the type so frequently mentioned, and Mr. Alfred J. Pilkington's is also a good one. It is due to these gentlemen to say that the accident of the order of hanging is alone responsible for the fact that other plans have been more fully described. A large number of the schemes are practically identical in their general arrangements; it would be of no public interest to go into the smaller details in which they differ; and it is therefore not desirable to attempt to decide upon the comparative merits of the individual designs.

As regards the plans as a whole, no one appears to have gained very much by departing from the simple and obvious arrangement of the continuous corridor on all four sides, more or less modified to provide for future extension and to bring in the large office required in the Borough Accountant's department on the ground-floor, as well as to provide a quiet situation for the Council-chamber. A large number of designs are of great merit, and would probably work out considerably more than creditably. On the other hand, there is nothing of a very striking character, except, perhaps, Mr. Stark Wilkinson's plan, which, however, is not as good in its details as some of the others, and is wedded to an inferior elevation; it suffers, too, from comparatively careless draughtsmanship. The elevation of No. 73 is the most original, and would be the most successful of those exhibited if it were not out in half by the tower, which is out of scale with the delicate detail of the side portions. Judging by these unsuccessful designs the six selected ones must be very good, and may very probably include two or three that will startle the architectural world when their turn comes to be seen.

The Sheffield public appears to take a considerable interest in the Exhibition; the rooms in the Mappin Art Gallery, where the drawings are hung, attract a comparatively large

number of visitors of all classes, although the building is at some distance from the centre of the town.

PHEIDIAS AND THE PARTHENON.

NOT a little excitement was caused, even beyond the limits of the archeological world, by the report current about a month ago that Dr. Puchstein (Assistant-keeper at the Berlin Museum) had discovered, or believed he had discovered, that the Elgin marbles were "not from the hands of Pheidias himself, but probably from that of Kallimachos, who lived later." The report appeared in the *Standard*, December 16, 1889, from which we quote. Of course, no serious archeologist has for long enough ventured to assert that the decorative sculptures of the Parthenon were literally "from the hands" of the great master. Probably those hands were better employed finishing off the chryselephantine statue of the Parthenon. The point is, were the sculptures of the date of Pheidias and the design by him? Here Dr. Puchstein's investigations promise to be of the deepest interest, and, as this interest is of a special kind to English readers, we translate in full the report of Dr. Puchstein's speech made at the "Winckelmann" anniversary festival at Berlin, and just published (Jan. 18) in the *Berliner Philologische Wochenschrift*. There may be internal reasons of which we know nothing, but in passing we may note that the *Wochenschrift* is almost a proverb of belatedness, and why a speech made December 9, on a subject of the greatest interest, cannot be reported till January 18, remains to the outsider a mystery. "At the end of the meeting Dr. Puchstein made the following remarks on Pheidias:—Of the art of Pheidias, whose works have entirely perished, the student is obliged to frame his conception from a study of the closer copies of the Athene Parthenos, and by the comparison of these with other works of the fifth century B.C. This leads to the conclusion that a peculiar characteristic of the original of the Parthenos was the markedly strong and simple treatment of the drapery, a style not specially adopted by Pheidias in the representation of the goddess out of respect for the Doric architecture of the Parthenon, but simply the natural result of the stage his own development had reached at the time. For the Parthenon, designed before 447 B.C., belongs to the same epoch as, e.g., the Hippodameia of the east pediment, or the Tortonia Hestia. There is, therefore, no justification for the attribution to the original of the Parthenos of the full freedom of style observable in the pediment sculptures or the frieze of the Parthenon. Nor, again, can we justifiably ascribe to Pheidias or his workshop this new, and especially in the treatment of drapery, more highly-developed style. Further, the composition of the pediments and the frieze do not date from Pheidias. For the one composition known to us in detail which is certainly assignable to Pheidias,—the recently-discovered Birth of Pandora, on the Pergamene Parthenon, answers closely in style to the centre group of the Olympian pediment. On the true sculptor of the Parthenon marbles (with the exception of the Metopes) it seems possible, by means of certain technical evidence, to lay a tolerably sure hand. The pediment figures and the frieze are the oldest sculptures in which the so-called *running borer* was employed. They and the reliefs of the Niké balustrade differ from other contemporary and later sculptures precisely by such effects as are producible by this instrument, which effects are absent in these other sculptures,—e.g., Parthenon Metopes, frieze of the Theseion, the greater portion of the frieze of the Niké temple, the Niké of Paionios, which are all executed without the 'running borer.' According to Pausanias, Kallimachos, the inventor of the Corinthian capital, was the first who worked marble with this borer. That this discovery was made just at the time when the Parthenon pediments were set up (434 B.C.) is evident from the fact that

the borer was not employed in the Ionic capital of the Propylæe, which was begun in 437 B.C., but was already manifestly in use in the capital of the Niké temple (B.C. 430 circa). Hence it is not unlikely that the discoverer of this new technique, Kallimachos himself, was the very man who executed the Parthenon pediments, and that in them we may recognise instances of the 'elegantia et subtilitas artis marmorarie' for which he was famous." Evidence of this strictly technical character is, we need scarcely point out, of more value than pages of vague discourse as to style. We wait for the full illustrated demonstration which is looked for from Dr. Puchstein, and meanwhile only note that, so far as we can judge, the theory that the marbles are later than Pheidias seems at once more important and more convincing than their attribution to Kallimachos.

NOTES.

THE proposed plan of the County Council for treating the portion of the Strand adjoining the Church of St. Mary does not promise well for the manner in which this part of their work of improvement is to be dealt with. Instead of attempting to preserve an open space in the line between the churches of St. Mary and St. Clement Danes, so as to get the greatest combined effect from the two buildings, the plan shows a scheme for a block of buildings with an irregular hulging curve of frontage projecting southwards of the present line of Holywell-street, crossing the line connecting the two churches and partially shutting out the one from the other. It has over and over again been urged, in our columns and elsewhere, that advantage should be taken of the opportunity to make a small strip of garden occupying the greater part of the space in the line between the two churches, with the roadway on each side of it; thus introducing a new and agreeable feature in the scene while bringing the two churches together as portions of a great architectural group. If this were well done, it would have a fine effect, and would be one of the best architectural improvements that has ever been made in London, and one that we believe would be fully appreciated. The laying out as proposed in the County Council plan would render any such effect for ever impossible, and entirely muddle and throw away a great opportunity. It is to be hoped this ill-devised scheme will be reconsidered. We have been spoiling all our best chances for London improvements, in an architectural sense, for years past; and it is very disheartening to see the same thing beginning over again under the new governing body.

MR. COURTENAY BOYLE having recovered from his indisposition, the Railway Rates Inquiry was resumed this week, and a large portion of the case for the railway companies disposed of. The representatives of no fewer than seven companies were examined on Monday (including the South-Eastern, the Great Eastern, and the Brighton line), and Sir Henry James stated that the case for the railways would probably be concluded this week. Mr. Stanforth, for the last-named company, made a statement which will surprise many,—including, perhaps, Brighton shareholders themselves. He says that their goods traffic, of itself, is carried at a loss. Earlier in the inquiry it was stated on behalf of another company that a certain description of traffic was carried at a loss on account of the low rates charged, upon which it was promptly pointed out by Mr. Balfour Browne that this state of things proved that an undue preference existed. He contended that in such a case the company must recoup themselves by charging proportionally unfair rates upon other classes of traffic. In the case of merchandise sent by the London and Brighton line, it certainly cannot be urged that the loss is caused through unduly low rates being charged;

nor, on the whole, that exceptionally high passenger fares are charged. "Cheap trippers" are favoured to such an extent that the average passenger fares on this line are not very excessive; and yet, apparently, the whole of the dividend is derived from them, besides a certain sum to make up for the loss on merchandise. Nothing, perhaps, which has previously transpired during the course of this inquiry, has so exemplified the difficulty which the Board of Trade has to overcome in deciding as to the reasonableness of the rates claimed for merchandise; for it illustrates in such a forcible manner the widely-differing circumstances under which the traffic is carried upon different systems. Some are entirely dependent upon their goods traffic; while others, it appears, are not only independent of it, but find it a clog,—even while charging rates which are often loudly complained about. But as it is practically out of the question on most lines to advance passenger fares, the margin for all contingencies must necessarily be provided for in fixing the maximum goods rates.

THE disaster at the Forest Gate schools, by which, early in the morning of New Year's Day, twenty-six poor lads were suffocated by the smoke from a fire,—which broke out, it is now supposed, through the ignition of some soot in a disused fireplace behind a wooden chimney-board,—is fraught with two or three important lessons. We have refrained from commenting upon the case while the inquest has been pending, but now that the jury have given their verdict, which does not impute culpable negligence to any one, we may say that we quite agree with the very obvious recommendation of the jury that where fireplaces have to be blocked up (especially those beneath flues into which iron stove-pipes from detached stoves are led) iron plates should be used instead of wooden screens. We also agree with the jury in thinking that there ought to have been a night watchman, and that there should be a responsible officer in charge of each dormitory every night. Boys ought not to be locked in alone. We cannot but think that in all probability none of these poor boys would have lost their lives had proper precautions been taken. In going over Dr. Barnardo's Home for Boys at Stepney nearly two years ago (see *Builder* for March 17, 1888) we were much impressed by the admirable precautions then taken to prevent catastrophes of this kind. In that institution a watchman (checked by a "Lincoln" tell-tale) visits each dormitory every hour. In a corner of each dormitory is a bed-room (with a window looking into the dormitory) for the officer in charge of that dormitory. In each of these officers' bedrooms is a button, by pressing which any officer on any floor can immediately open the safety-doors of all the dormitories. These safety-doors open on to an external iron staircase, specially provided for use in case of fire. The opening of these doors is effected by electrical apparatus, and the pressing of the button in any of the officers' rooms not only throws open all the fire-escape doors, but sets ringing a powerful alarm-bell in each dormitory. This bell continues to ring until the door is set wide open. The action of these doors is tested daily, and, as a further precaution, each dormitory officer is supplied with a key which may be used to open either of the doors in case of the failure of the electric current. The electric locks, &c., are by Mr. Julius Sax.

IT had been expected that operations would be now commenced on the Argyllshire Railway, a work sanctioned in the Session of 1887, and intended to be carried out at once, but afterwards, for various reasons, delayed from time to time; but further unexpected causes of delay seems to have supervened. This scheme, an account of which was given in the *Builder* of December 31, 1887, is to connect Glasgow and converging lines with Loch Crinan, an inlet of the Atlantic, by way of Helensburgh, Holy

Loch, Loch Fyne, and Glen Air, a distance in all of about forty-six miles, eleven of which are over water. The most interesting feature, perhaps, is the crossing of Loch Fyne, between Newton Bay and Furnace, about fifteen miles from the head of this long arm of the sea, where it is barely one mile in width. Here the trains, passenger trains as well as goods trains, will be ferried over bodily, accompanied in each case by the locomotive, which, by an ingenious adjustment of shore levels, will be enabled to draw its load on board at all times of tide, and in like manner steam on to the land-rails at the other side. It is expected, also, that from each crossing locomotive will be drawn the steam necessary for working the engines of the boat, thereby obviating the need of a separate force of firemen—an important matter where the trains, in winter at least, will amount to no more than two or three daily each way. From Helensburgh, on the Clyde, traffic will be transported by water to Sandbank on the Holy Loch where the new line begins, a distance of about ten miles. This service will be performed by the boats of the present North British Railway Forth Ferry between Granton (Edinburgh) and Burntisland, to be discontinued on the opening of the Forth Bridge now impending; and it is to differ from the mode of the Loch Fyne crossing above described, inasmuch as passengers will embark in the ordinary way, and no locomotives will be carried. For the goods traffic there are special boats with rails, on to which the trucks are lowered by an inclined plane, consisting of a hinged gangway which rises and falls with the tide. The new line crosses from the Holy Loch (an inlet of the Clyde estuary opposite Greenock) to the shores of Loch Fyne by way of Glen Eck, over the moderate summit level of 120 ft. only, and with a gradient which at no point exceeds 1 in 50. From Loch Fyne to the Atlantic seaboard at Crinan there is stiffer work, a summit level of 400 ft. having to be surmounted, but, the line being a single one and designed for light loads only, this will be overcome without difficulty. Within a few miles of its western terminus the new line throws off a short branch to Ardrishaig, on the inner shore of the Cantyre isthmus and an important tourist station, being the eastern termination of the Crinan Canal through which the chief stream of the summer Hebridean traffic is attracted. From the Loch Fyne Ferry there will be a boat connexion with Inverary, which is the capital town of this region, though really of quite small dimensions. The estimated cost of this ingeniously-devised line is 150,000, only, with powers to borrow 60,000, more. It will be in the hands of the North British Railway Company. Last week an inspection of the route was made by a company, consisting of Mr. Aird (of Messrs. Lucas & Aird, contractors), London; Mr. Forman, Glasgow, the engineer of the line; Mr. Walker, the general manager of the North British Railway Co., and some others.

THE failure of the Chelsea Trustee Savings' Bank raises the question whether the time has not arrived for an Act of Parliament to be passed putting an end altogether to this class of savings' bank. Not very long ago the Cardiff bank failed, and now comes the collapse of the Chelsea bank. By the institution of Post Office Savings' Banks, the country has laid it down as a principle that it is the duty of the administration to give facilities for thrift. Now that a national system of savings' banks exists, the necessity for trustee savings' banks has ceased. It would be far better, therefore, if these amateur institutions were taken over by the Government, depositors having their accounts transferred to a Post Office bank, and being allowed on old deposits the same interest as they now receive. It is a distinct blow to habits of thrift when institutions such as the Chelsea Bank collapse; and as this class of bank is gradually dying out, it would be better at once to administer a death-blow to the old system. At the same time, it may

be well to point out that the Post Office fails to bring the national system sufficiently home to the poorer classes. Leaflets pointing out the way in which money can be invested at post-offices should be distributed at all houses once a quarter by the postmen who deliver letters. These would reach thousands; at present men must go to the office for information, which many artisans and labourers will not do.

A CASE is reported in the current number of the Law Reports, which at first sight is likely to puzzle some readers. We refer to the decision "*In re an arbitration between the London, Tilbury, and Southend Railway Company and the Trustees of the Gowver Walk Schools.*" The facts were that the Trustees of the Gowver Schools erected a new building on the site of an old one, the windows of which enjoyed a presumptive right to the light. Some only of the new windows coincided with the old ones, and therefore in the case of an ordinary obstruction no complaint could have been made except in regard to the coinciding windows, as they may be termed. The above Railway Company erected a warehouse on the opposite side of the street to which the schools were, which obstructed the light both to the coinciding and the non-coinciding windows in the new building. The question then arose whether compensation could be claimed in respect of both classes of windows. The Court held that it could be, because under the statute all damages of whatever kind were to be paid by the Company under the Acts of Parliament by which the matter is governed. To say whether the decision be right or wrong would raise a long and complicated argument; it is sufficient now to state the actual result of the decision.

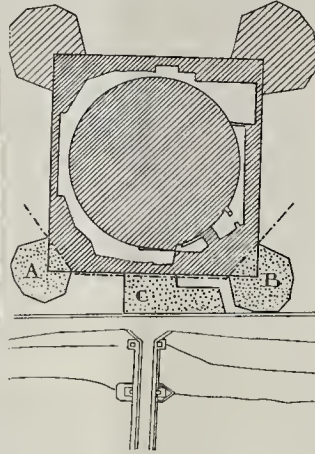
NOT one of the forty-nine designs sent in for the "New Houses of Parliament Competition" for Rome has been considered suitable for the purpose. Five premiums of 5,000 fr. each have, however, been distributed, the winners being the architects Moretti, Broggi & Sommaruga, Quaglia & Benvenuto, Basile, and Ristori.

COLOGNE is to have a memorial statue of the late Emperor William,—the figure on horseback, but whether in connexion with a fountain, as suggested, is as yet uncertain. The cost is not to exceed 15,000*l.*, and the design will be selected in competition amongst German artists only. The names of the jury are published, and consist of five gentlemen, namely, two architects, two sculptors, and one painter. There will be five prizes,—one of 300*l.*, one of 200*l.*, and three of 100*l.*

IT seems that there is a section of traders in the West of Scotland opposed to the formation of the proposed Forth and Clyde Ship Canal. The promoters are doing their utmost to convince their opponents that, instead of being a disadvantage to the Clyde, the canal would still further develop shipping and commerce in Glasgow. It is considered that the North of Ireland would be greatly benefited by the canal, and the scheme has been most favourably entertained in that quarter. Baltic traders are also said to be in favour of the project. Meetings are to be held in Edinburgh and Glasgow for the purpose of discussing the scheme with a view to disarming opposition to an application to Parliament for the necessary powers.

WE have before mentioned that important works are now being executed in Rome for the improvement of the Tiber, but that, unfortunately, these works, which are indispensable for the hygienic condition of the city and for its growth, have considerably damaged some ancient monuments. (See *Builder*, April 6, 1889, "Ancient and New Bridges across the Tiber.") At this moment, the construction of the great drain on the right shore, and of the embankment wall, is said to necessitate the demolition of a great part of the Mediæval fortifications belonging

to the Castle of St. Angelo, especially of those near the river (see plan). It is very difficult



to ascertain the exact date at which the castle was first used as a fortress; some say this happened under Honorius, about A.D. 423; others, on the contrary, are of opinion that Theodoric, King of the Goths, was the first to fortify the Mausoleum of Hadrian. At any rate, it is certain that since the fifth century it has been used as a fortress. In the course of its later history it was temporarily occupied by the adventurer Crescentius Nomentanus, who endeavoured to revive the ancient office of Consul in his own person, and increased the fortifications to defend himself against the Emperor Otto III. From this personage it acquired the name of "Castellum Crescentii." In the eleventh and twelfth centuries it was held by the Orsini. The castle was reduced to its present condition by Alexander VI. in 1499, as we learn by the great inscription which can still be seen on the castle keep. Pope Borgia faced with masonry the central part of Hadrian's edifice, which had become a simple mass of stones after its coating of marble blocks had been removed. He put a finish to the repairs by a row of battlements, which can still be distinguished perfectly well among the subsequent repairs executed on the summit of the castle by order of Paul III. and Clement VIII. Alexander VI. completed also the covered gallery which leads from the castle to the Vatican, begun by John XXIII. on the foundations of the Leonine walls. But the most important parts of the works executed by Pope Borgia are doubtless the fortifications round the Mausoleum, consisting of four strong polygonal bastions, built of masonry, with travertine angles, and a scarp; the whole was surrounded by a moat, very deep and wide, in which the Tiber water flowed. The bastions were united by a very thick stone wall, faced with masonry, and battlemented. The works were confided to Tuscan artists, under the direction of Sangallo, who had already built the forts of Civita Castellana and of Suhiaco, and some towers for the defence of the coast, by order of Pope Borgia. It is the front part of Sangallo's fortifications that the office of "Genio Civile" now proposes to demolish for the improvement of the Tiber, and by this scheme the two foremost bastions, A, B, and a great part of the wall that unites them, would be destroyed. A general cry of indignation has risen against this project, which would injure one of the most characteristic monuments which have come down to us from the Middle Ages. But, fortunately, the last word has not yet been spoken, and it is hoped that good sense will triumph, and that the Office for the Preservation of Ancient Monuments will resolutely oppose the fulfilment of the scheme.

Captain Signor Borgatti will shortly publish an important book, the outcome of patient and diligent researches for some years past, concerning the castle.

THE last number of the *American Journal of Archeology* (vol. v., No. 3) is in the main devoted to a full report of the American excavations at Sikyon, the chief interest of which has certainly centred in the theatre, and especially in the arches by which the *καίον* was entered on either side. A detailed plan is given, and two views,—one of the stage foundations, the other of the seats and conduits surrounding the orchestra. The report is written by Mr. M. L. Earle, a member of the American School, and he also publishes the one statue of any considerable interest found at Sikyon; he devotes to the interpretation of this work an amount of learning and careful ingenuity which we must say seems to us excessive, and finally concludes that we have in it a statue of the youthful Dionysos, of good workmanship, a product of Sikyonian art, and that the work may be assigned to the third century B.C. So far, few will dispute his conclusions, but Mr. Earle goes on to say that presumably it is by one of the more distant followers of Lysippus,—for this not a scrap of positive evidence is advanced; further, we are told that "Thoinias, son of Teiskraes, was active at Sikyon and elsewhere in the Greek world in the middle and latter half of the third century B.C." and lastly, that "we have in our work a certain pan-Hellenic spirit, such as we may apprehend could have been exhibited by Thoinias." The reader is left with a sort of shadowy implication that the statue may, or might, or could have been by Thoinias. The desire to bring literary and monumental evidence into relation is just now engendering a perfect plague of hypothetical attributions, and it is a tendency against which, in the name of English common sense, we feel bound to protest.

IN connexion with the University Extension Society, Miss Harrison intends to give a course of ten lectures on "Athens, its Mythology and Art," on Friday afternoons, at 6.15 p.m., commencing January 24. The first lecture will be given at the Chelsea Town Hall; the remainder of the course at the South Kensington Museum. According to the prospectus issued, the aim of the lectures will be to give a detailed picture of the City of Athens; its rise from the small beginnings of a primeval rock city; its growth and development. The course will embrace not only the famous monuments, already widely familiar, such as the Parthenon and the Dionysiac theatre, but also recent discoveries about the agora of Athens, its great hospital known as the Asklepieion, and the early temple of Athene on the Acropolis lately laid bare, as well as the remarkable series of archaic figures found near the Erechtheion, which have gone far to revolutionise existing theories as to early Greek art.

UNDER the supervision of an officer of the Royal Engineers, workmen are engaged in removing a portion of the Castle Rock of Edinburgh. Such an operation would justly be stigmatised as an act of vandalism were it not a necessity. It appears that certain portions of the rock to the south-east, below the junction of the old hospital and the surgeons' quarters, have become loose, and that there is danger of their falling upon the roadway beneath, with the probable result of damage both to life and property. Besides a quantity of *débris*, there has been removed two masses of rock containing about 30 cubic feet and 50 cubic feet respectively, and of the weight of about 3 and 4½ tons each. There is another huge boulder, estimated to weigh between 50 and 70 tons, which looked at from certain points of view seems to be in a very dangerous position as regards stability, but when looked at from above it seems to be securely placed. The chief risk involved in leaving it where it is arises from the fact that there is a space behind it and the solid rock

where water may lodge, which, if frozen, would by expansion loosen the houlder and cause its dislodgment. Efforts have been made to remove this mass of rock, but, as yet, unsuccessfully. It is stated that from its position it would be very difficult to dispose of it in detail, and to remove it in mass, in regard to which there would be little difficulty, would be most dangerous. The operations are carried on in a very simple manner by means of a rope attached to the bars of a window in the basement of the surgeons' quarters, which reaches to the base of the rock; by this means the workmen, by dint of hard scrambling, attain the point to be operated upon.

IMMEDIATELY to the eastward of the scene of operations above referred to similar work had to be done, several years ago, on the southern bank of the esplanade. This bank exhibits what Sir Roderick Murchison considered one of the most interesting and instructive lessons in geology. The Castle Rock consists of trap rock almost perpendicular on the three sides to the north, west, and south: but there is a gradual slope from the east side forming the esplanade. This slope is formed principally of earth, through which there run layers of sandstone; and it was these layers of sandstone which gave way, where exposed, and had to be operated upon. The theory of Sir Roderick Murchison was that, during the geological period, the rock stood in the midst of a vast stream flowing from west to east, and that the esplanade was formed by the deposits made by that stream.

BY order of the late Miss Edwards's trustees, as appointed by her will, the freehold of Langham House,—No. 11, Portland-place, western side,—will be offered for sale by auction at the Mart on the 17th proximo. This mansion and its opposite neighbour recall, by their names, the original Foley House and the once adjoining residence of Sir James Langham, Bart. Foley House is distinguished by name in R. Wilkinson's Map of London, 1799, and is shown with grounds extending from Mortimer-street to Duchess-street. It is also cited in John Lockie's "Topography of London" (1810), as being on the eastern side of Chandos-street. Here it remained for a few years more; its low elevation and high wall stretching across the southern end of Portland-place, where a few of the garden trees are yet preserved. It is said that Lord Foley, himself not a rich man, gave the means wherewith to live to Lord Mansfield before he had begun to earn much at the Bar, and here, until recently, stood the town mansion of the Lord Chief Justice's successors in the peerage. Southwards lay the former Langham House, of which John Nash was architect—according to a note written by Frederick, father of the late John Gregory, Craze, on one of the two water-colour views thereof in the British Museum. The eastern front had along its entire length an octastyle portico, of the Ionic order. Foley-house was purchased for 70,000*l.* for the laying-out of Regent-street, over the sites in this quarter of the then Ogle and Bolsover-streets. Nearly the whole of the sites of the three houses we mention is occupied by the Langham Hotel, erected about twenty-five years ago, from the designs of Messrs. Giles & Murray, architects.

WE read that the Right Hon. W. H. Smith, M.P., has subscribed 2,500*l.* towards the restoration fund for the two churches of the united living of St. Germoe and St. Breage, near to Helston, in Cornwall. In the churchyard of the former is a supposed burial-vault over which stands a stone seat, carved in stone, popularly known as the throne of King Germocus, or Saint Germoe's chair. It measures about 6ft. by 3ft.; the central division of the triple seat bears the curving of a head with an ancient crown; on the other side are three rounded columns carrying two pointed arches. In St. Breage Church are

monuments of the Godolphin family, including one to the wife of the first Earl (1678) Godolphin, *olim* Godolean, is the name of a hamlet in Breage. William of Worcester mentions "Godollen Castle" in his Itinerary of Cornwall, *temp.* Edward IV.; the "Carne Godolean" is cited by Leland. Sir Francis Godolphin, who rebuilt the castle in Queen Elizabeth's reign, effected productive improvements in the working and smelting of the tin and copper ores of this district. His descendant, Sir Sidney, was elevated Baron Godolphin of Rialton, and advanced Earl Godolphin. He was the celebrated Lord High Treasurer in the reign of Queen Anne. In 1744 these estates passed to the house of Osborne by the marriage of Mary, sole heir of Francis, Lord Godolphin, with Thomas, fourth Duke of Leeds.

MR. BRUDENELL CARTER'S lecture at the Society of Arts on Wednesday, on "Practical Vision-Testing," ought to be of interest to the general public as well as to scientific men. The fact, as stated by Mr. Carter, that a red-blind eye nevertheless sees a red light, not as red but as a fainter light than a white one of equal intensity,—a different light in one sense but not in the intended sense,—shows how unsatisfactory a railway-test must be in which a man is merely asked to say which of three lights is red, green, or white, he knowing beforehand what colours are among the three. As Mr. Carter says, the object of a test should be not merely to show that a man does not make a mistake in one instance, but that he will not make mistakes in a number of instances. Holmgren's test, which Mr. Carter recommends, requires a man to select from a number of variously-coloured skreens all that tally in colour with a given sample, without troubling him with names. This, it is obvious, if properly carried out, must be a severe test of colour-perception; quite different from showing a man two or three coloured lamps to pick out the "stop" signal from. An engine-driver at the meeting, who questioned whether any railway accidents had really been traced to want of perception of colour on the part of the driver, may have been right, as drivers are always taken over the road many times before working it themselves; but the possibility of such an accident ought to be ensured against by a real and not a possibly fallacious test.

AS might be expected, the artistic interest of the exhibition of "Works of Art connected with Sport" at the Grosvenor Gallery is not of the highest. There are some good pictures, and others which are historically interesting; among the latter may be named the two cricket pictures, that by Richard Wilson "Cricket at Hampton Wick" (75), painted for David Garrick, and the well known one by Hayman belonging to the Marylebone Cricket Club, and representing "Cricket in Marylebone Fields" (111). In this are shown the curved hat of the period, and the wicket consisting of two stumps only; and both show the old cricketing costume with the tall hat, to our modern ideas so peculiarly unsuitable to any athletic game. There are naturally a good many Landseers, among the most interesting of which are the well-known large picture of "The Swannery Invaded by Eagles" (68); the small sketches and studies of stags and dogs in the East Gallery; "The Pensioners" (15), a couple of old hunters in a paddock excited at the sight of the hunt; and the life-size picture called "The Chase" (189), a stag pursued by a hound, a picture which was painted, it appears, to serve as a target, but which the owner framed, and Landseer completed the picture by adding the dog and placing his nose so as to cover the mark that had been made as a bull's-eye to show the right spot for hitting a deer. The agonised expression of the hunted animal's eye is painfully true. Landseer's portrait of himself with

* Holmgren's test is fully described, and illustrated by examples, in Mr. Charles Roberts's little work on "The Detection of Colour Blindness and Imperfect Eyesight" (J. & A. Churchill; 1884).

two dogs looking over his shoulder at his drawing, "The Connoisseurs" (115) is a welcome old friend; but the well-known painting of "The Sanctuary" (67) looks sadly hard and commonplace now. Ansdell's "Grouse Driving" (185), painted fifty years ago, though old-fashioned in style, is a real picture, beautifully composed, and far less hard and finer in colour than the works of the artist's later years. One of the finest paintings in the gallery is "The Lost Royal" (172) by Mr. Stuart Wortley, who first made his mark at the Grosvenor Gallery with a sporting subject; this shows a hunted and exhausted stag crouched on a hill overlooking the sea. Randolph Caldecott's "The Last Flight" (178) and Rosa Bonheur's "Otter-hounds" (166) are among the fine paintings in the collection, and Ward's "Cub-hunting" (58), a huntsman taking a leap (very different from the average hunting picture, and reminding one rather of Moriand), and some of Stubbs's horses. Of the arms the only specimens that are of artistic interest are some of the old powder-flasks in the cases in the East Gallery. There are a number of specimens of plate which have been made as turf prizes, of which it may be said that the majority of the modern ones exhibit not the slightest artistic interest or value of any kind, and only serve to illustrate painfully to how low a pitch English taste, invention, and execution have sunk in such matters.

ROYAL INSTITUTE OF BRITISH ARCHITECTS:

THE PRESIDENT'S ADDRESS TO STUDENTS.

THE fifth ordinary general meeting of this Institute for the present session was held on Monday last, Mr. Alfred Waterhouse, R.A. (President), in the chair. The minutes of the recent special and business meetings having been read by Mr. Aston Webb, hon. sec. (in the absence of Mr. William H. White, the Secretary, who was said to be suffering from influenza).

The President said: Before we proceed to business, perhaps you will allow me to express the sorrow I feel as a member of the jury in the competition for the refronting of Milan Cathedral, that an architect of very great promise,—Signor Brentano,—whose design was selected above all others as best fitted for adoption, has died, at the early age of twenty-seven. I believe that little or nothing had been done towards realising his project before his death, and his loss is certainly a very great one, not only to Italy, but I may say to Europe.

The President then delivered the following address to students:—

Gentlemen,—Last year, when I had the honour of addressing you before the annual distribution of prizes, I spoke to you on the subject of competitions, and ventured to give a few hints to those who might be intending to try their fortunes in these contests. Having lately had fresh experience of the vital interest this question must possess to most young architects, I propose this evening again to revert to the subject, with a few remarks on a recent competition.

I should be glad to think the day not far distant when competitors would be rarely, if ever, resorted to, except for works of the greatest national importance. I lament their frequency chiefly because of the enormous amount of unproductive labour they involve, and I confess I do not see at present any tendency towards their diminution. This being so, it seems most important that those who are concerned as assessors in drawing up instructions should see that they are prepared not only to secure the best results from the promoter's point of view, but also to subserve as much as possible the interests of the profession,—first, by saving the architects competing from all unnecessary work; and secondly, by not hampering competitors with vexatious restrictions, thus leaving them free to solve in their own way the problem put before them, without the feeling that if all the accommodation asked for is not exactly of a certain size, and every room of certain dimensions, they will be adjudged out of the competition. I would have every competitor put as nearly as may be in the position of an architect acting for a private client, who, though he may have suggested his requirements, would probably listen to his professional

adviser if he gave good reasons for not literally adhering to them in all cases. I have endeavoured, when acting as assessor, to use my influence to keep the instructions thus elastic; but I have frequently had to regret that they had not been more so, when, after the designs themselves had come under review, some of general excellence had to be set aside for breach of conditions in some point of minor importance, on which the instructions, unfortunately, had been allowed to speak too decidedly.

Having lately, as I have already hinted, been engaged upon such a labour (a very arduous one, owing to the way in which the profession had responded to the invitation) in the first or sketch competition for the Sheffield Municipal Buildings, and being very much interested in the work, and full of the subject, I have thought that I could not do better to-night than bring before you some special facts in connexion with that competition and some special considerations which may prove of use to some of my hearers.

The instructions in this particular case were issued in August last, and invited certain drawings to $\frac{1}{16}$ in. scale, viz., a plan of each floor of the proposed building, two cross-sections, and one elevation. They were all to be on stretchers of the smallest possible size, — 2 ft. by 1 ft. 6 in., — so as to be kept near the eye-line when hung on wall or screen, and easily handled for reference. No mottoes or distinguishing borders or devices were allowed. When a case containing a design was opened, it was numbered by a progressive number, and every drawing and document within the case was marked for identification with the same number. Alternative schemes were ruled out of court altogether; for I believe that, as a rule, those architects whose exuberant imagination would induce them to send in alternative schemes, or to cover their plans with flaps, showing how they could vary their arrangements, lose much by so doing. They may show themselves men of varied resources, but hardly architects convinced of the perfection of the scheme they propose for adoption; and I submit that the time spent in preparing two schemes would be much more profitably spent in perfecting one.

I must, however, ask permission to leave Sheffield for the moment, to tell you of one exception to this rule which I encountered many years ago. It was in a competition for the Bristol Assize Courts. I was asked by the Corporation to assist them in awarding the three prizes they had to dispense for the first, second, and third best designs among those sent in which agreed with their instructions. I had not much difficulty in discovering what, in my opinion, were the best of the series, nor of placing them in their order of merit; but though they were in different types of Gothic, — one round-arched, another thirteenth-century, and the third of a later style, — I confess I was somewhat troubled in dividing, and that for two reasons, that they were all by the same hand. The first it was difficult to be sure about, as the lettering, mounting, and colouring of each set were entirely different, as well as the styles and disposition of plan; but they had all a vigorous character and individuality about them which appeared to flow from one and the same source of inspiration. Secondly, they all showed on their block plan an insignificant feature of an adjacent building, which I had myself observed in visiting the site, but which was not on the lithographed block plan given to each competitor, and which was omitted from all other designs in the room. When meeting the Committee, therefore, for the purpose of making my report, I thought it desirable to inquire whether it would in their opinion be proper to give all three prizes to one competitor, provided the three designs, best, according to the judgment of the assessor, should prove to be by one and the same hand. At first they said "No"; but one of the Committee, who appeared to be conversant with affairs of the turf, remarked that if he entered three horses for a race, and they all three reached the winning-post before the rest of the field, there was no reason against his being accredited with the first three places; and that what was fair with horses was equally fair with architects' designs. This argument settled the point. I gave my award, the seals were broken, and the late gifted E. W. Godwin carried off all three premiums. What Edward Godwin might venture upon with success, it is not given to everybody to imitate with equal success, — and, as it was, this brilliant exploit did not secure him the execution of the work.

Another competition was decided upon, in which, after what I have told you, I declined to act again as assessor.

But to return to Sheffield. The accommodation there required was given in the form of a schedule, in which the sizes of rooms were only suggested sizes. A general compliance with the dimensions contained in this schedule was all that was insisted upon. The total number of superficial feet of suggested accommodation was also given at the end of the schedule, the blank columns of which had to be filled in by each competitor to show at a glance what he was providing in each particular case, and also what was the total aggregate of his accommodation. The schedule so filled up has been of the greatest use in the examination and comparison of the different designs.

As usual, no sooner were competitors fairly at work than numberless letters came from them on the subject of the instructions. They did not like being compelled to limit the amount of their work, and would have preferred sending in more drawings. Partners would have liked each to send in a separate design. Others wanted to make more elevations, and detailed drawings, and perspective views. In fact, it seemed difficult for some of them to see that the rigour of the rule against receiving more than the prescribed drawings was really made in their interest, and not in that of the Corporation of Sheffield.

At length, in the beginning of October, it was thought that the time had come to send answers to all the questions which had up to that time been received. So on the 9th a copy of the printed replies to 121 questions was sent by the Town Clerk to everybody who had obtained instructions; after this we answered no further questions.

Early in December the designs were sent in, — 178 in all. One of the competitors transgressed the instructions by applying a motto to his stretchers. Three or four other designs were sent in so unfinished as to be hardly in a condition to enter the lists; while a few, — but very few, — had not kept to the letter of the instructions in other points. On the whole, however, the competition was to be looked upon as a great success. An unusually large number of good thoughtful designs were submitted, many of them in their elevation showing an excellent originality. Whether the shape of the site, verging towards a triangle, suggested it or not I cannot tell, but a considerable proportion of the plans bore too great a resemblance to a recent building erected for a nearly similar use, the details of which I have reason to be familiar with, and which in some cases has been followed even to its faults. One of the greatest faults in the Manchester Town Hall has always seemed to me the position of its Council Chamber, overlooking as it does Albert-square, a position its architect thought unavoidable owing to the public hall occupying the centre of the site. But in Sheffield no public hall is required, and therefore that position is available for the Council Chamber; as is also the south front, where there is a good light, and no thoroughfare for carriages.

Perhaps owing to competitors not having been allowed to submit an elevation of the south front, which will in reality be very conspicuous even from a distance over the adjoining disused churchyard, many designs have a very jagged outline on plan on this side, something like the west coast of Norway, and which their authors would, I think, find it very difficult to clothe with dignity, or even picturesque-ness, were they asked for its elevation.

The west front, an elevation of which was alone asked for in this competition, is about 200 ft. in length. Across the adjacent street on the north is a new building (the Yorkshire Penny Bank and Albany Hotel) about 56 ft. high, while on the south is the before-mentioned churchyard, with the church in its centre having a tower surmounted by a spire. The height of the adjacent buildings does not appear to have been duly considered by every competitor; perhaps some had not visited the site; and no doubt the instructions suggesting the required accommodation almost exclusively on the ground or first-floor had a good deal to do with the unfortunate fact that this, the principal front of the Municipal Buildings, was sometimes drawn with a parapet not more than 45 ft. from the street level. The want of height in the horizontal features of the front has been, however, generally made up for either by a central tower on a line with the front, or by one set back behind the State apartments,

which apartments naturally, in the greater portion of the designs, occupy this front (in the latter position the effect of such a tower would be in a great measure lost), or by a tower at one or other extremity of the front. In some cases this lateral tower was placed, not on the western front at all, but facing the side street just behind the principal apartments where it would fulfil the useful function of interposing a break between the lofty State rooms and the lower business offices which overlook the side street. These towers, many of them, show great ingenuity in their design. One had its square trunk surrounded by four gables, not subtending the whole width of each side, but long and slender, with a pierced arcade parapet on either side in the style of Bishop Gower of St. David's, through which passed the high-pitched, slated, and hipped roof, filling in the angle spaces between the gables. The whole was surmounted by a well-designed fîche, and formed altogether a very original and elegant campanile. I dwelt on some of these Sheffield towers with tenderness, and when they had to be put aside, with sincere regret. Many of them were of great beauty, and some few were entirely free from all suspicion of ever having served an ecclesiastical turn in another state of existence, — in fact, they seemed quite original. In some few instances a dome took the place of a tower.

When placed behind intervening roofs the dome suffers more than the tower, but in one or two cases the dome was brought to the front of the building. These massive features do not in all cases stand on sufficiently massive supports. Are we most of us occasionally tempted, or forced, to use iron or steel more freely than is desirable in support of walls, but would it not be well to make a rule to dispense with any feature of a non-essential character in a monumental stone building, whenever its introduction demands the use of iron girders and stanchions?

Another frequent feature at Sheffield, — like the tower, entirely optional (neither being mentioned in the instructions), — was the *porte-cochère*. Among the 121 questions was one asking whether such a feature might be thrown out beyond the prescribed limits of the site. Leave to introduce this feature being in this way obtained, by far the greater part of the competitors availed themselves of it, but I cannot say generally to the improvement of their elevations. I would ask you why it is so difficult to make the *porte-cochère* marry with the elevation against which it is placed, — unless, indeed, the same treatment, e.g. arading, is carried through the whole of the ground-floor of the front, and the *porte-cochère* also? I can conceive some unity of effect thus obtainable, even if the arches in the building itself were afterwards partially filled in. I say nothing about the draughtiness of the carriage-porch, and of the gloom it occasions in the interior, if the entrance-hall, unless the latter happens to have windows beyond or above the roof of the feature in question. These disadvantages may be set against the comfort of being set down by one's carriage in the dry. It is its unfortunate effect on the elevation of the building to which I would draw special attention. By the great projection of the *porte-cochère* it hides half the front from view if seen in quick perspective; by its height and projection it seriously dwarfs the elevation; or, if to avoid these disadvantages it is kept very low, it looks very mean. Lastly, its peculiarities of construction involve too often a want of harmony between it and the building it serves. The best treatment I have seen is when the carriage-way goes behind an open arcade which supports an advancing central gable; and where the wings of the façade also advance there is, I think, much to be said for this arrangement. This, however, was not in favour in Sheffield, though in one case the carriage-way was carried within the walls of the building. I noticed, also, in connexion with the main entrance, that it seemed to be in many cases intended to provide a pair of heavy outer doors only, without the usual inner swing-doors, two pairs of which, one within the other, one would suppose necessary to keep out the wind on a western front.

At Sheffield I again observed what is but too general in most competitions, that the anxiety to get all the accommodation of the suggested dimensions into his plan has often prevented the competitor from ascertaining that his rooms have been made of a proportion which would be intolerable if carried out, — e.g., 50 × 30 × 12 ft

high. Also, many plans that looked at first most promising were found to have their walls over voids, the chimney-stacks on the lower story giving no account of themselves on the upper floors, and staircases shown on plan which could never have been constructed.

Then, again, there is the great light question. In the majority of cases the use to which the light from small areas was put was the best possible,—that is, it was used to give side light to corridors, which, as they were seldom more than 7 or 8 ft. wide, could, of course, be lighted across their width much more easily than a room 30 ft. from back to front could be. And yet in other designs there were such rooms only about 12-6 high, and with windows inconveniently low for a room of such a depth,—even if the light came uninterrupted from the horizon,—which windows were expected to give light enough for important office-work in a smoky town, where the holdings opposite were lofty. When such windows look into a deep and narrow area, nothing but disappointment must be the result. I confess that the exceptional favour some competitors expect from the sun fills me with amazement. For the sake of light, air, general cheerfulness, and architectural effect, it is most desirable that internal areas in a building should be as few and as large as possible, instead of many and small. If one large area be adopted instead of many small ones, which has, of course, the advantage of securing a much better architectural effect, it may be difficult to light the corridors only from this source; but if thus deprived of a continuous side light by the interposition of rooms looking into the area the skillful designer will see that they are never dark, especially at their extremities, where they turn, or where there is a change of level,—if, indeed, such be necessary in any case.

With regard to staircases, it ought not to be necessary to say that a principal flight of stairs in such a building could hardly with propriety have steps less than 6 or 8 ft. wide, with treads and risers 12 in. by 6 in., or, better, 12½ in. or 13 in. by 5½ in., and that until you are able to secure so much ease of going and space in a single staircase it would be folly to think of double flights in the same staircase, still less of twin stairs in all respects repeating each other. One dignified stairway, well considered, thoughtfully designed, with something unusual in it, if attainable without sacrifice of convenience in any way, is infinitely to be preferred to a couple of commonplace, steep, and cramped ascents. In one design I observed that additional charm had been secured to such a single principal stairway as I have described for approbation, by allowing a business staircase to be separated from it merely by a stone screen or open arcade, so that one stair could be seen from the other, greatly adding to the effect of both. These business stairs also should be so placed as to be as accessible as possible from the offices in their neighbourhood, thus avoiding all needless traversing of corridors to reach them; and yet none should be inserted not absolutely needed. In no case should a staircase run up in the ordinary width of a corridor, so reducing its width and the view down it, as is common in goals, and there permissible for a strictly utilitarian reason.

In municipal buildings in places where, as in Sheffield, there is no special residence for the chief magistrate, there will almost certainly be a suite of reception rooms. These rooms and the approaches thereto should be so arranged as to be cut off from the business portion of the building when required without in any way interfering with access to the latter; further, such rooms as the Council-Chamber and the Committee-rooms, while having, as is frequently found desirable, approaches from the corridors of the reception suite, should invariably be accessible also from the departmental corridors for ordinary business purposes. The corridors of approach to these reception-rooms should be at no point cramped, especially at the head of the grand staircase, or, on crowded assemblies, an inconvenient block will necessarily ensue.

Sanitary considerations make it imperative that closets should each be lighted with a separate window, and that the ante-room of approach should be lighted and ventilated otherwise than through the closets themselves. This is not always remembered by architects competing, who seem to forget that buildings which met with approbation some years ago may have sanitary arrangements then regarded as satisfactory which may now be condemned.

One well-lighted and well-ventilated closet is worth half-a-dozen of the sort one so frequently sees on competition plans. It is also most desirable that such sanitary appliances should be kept as much as possible together both on plan and vertically.

I have enumerated some of the points I thought most open to criticism in the Sheffield sketches, but there is no doubt that the design of the elevations especially is of a higher average than that which has distinguished some late competitions, as those of you will see who care to visit Sheffield, where all the designs are now, I believe, on exhibition,* except the six selected for the second and final competition, and those whose authors wished to withdraw them before the exhibition. Wherever the authors are so willing, their name is now attached to their designs, and I trust that the publicity thus given to merit may be some compensation for the absence of other remuneration.

In the case of the six, their sketches are to be hung side by side with their elaborated designs when complete; but in accordance with precedent, for which there is something to be said, they are not to be exhibited until the final competition is over.

I believe that in many a competition the expenses to which our profession is put before any contract drawings are prepared for a building thus competed for would, if accurately calculated, be found to amount to many times the total of the successful competitor's commission. So that, except for the educational benefit to be derived from having designed and elaborated the details of some important building, there is to the hody of the candidates very little profit to be gained from a system which most of us deplore, but do not at present see how to supersede.

I must apologise to you if I have occupied your time unworthily or at too great a length on design as applied to competitions. My remarks, I know, have most of them been trite remarks; but I have been addressing students. I must ask those of my hearers who could lecture me on this subject with so much profit to myself to forgive my prolixity, and, as assessors in other competitions, to excuse my having ventured to suggest a way of making them as useful as possible to our profession. I would ask the students also to take my remarks in good part. I hope that what I have said will offend no one, but conduce, in however feeble a way, to the help and encouragement of the earnest student of practical architecture.

Mr. J. Macvicar Anderson: I think, Sir, your address should scarcely be allowed to pass unnoticed. I believe I may venture to say that in some respects we have made progress in the Institute of late years. I do not say made "reforms," because I do not like the word "reform"; but I certainly think we have made improvements, and one of the most conspicuous is in relation to the subject for which we have met together to-night, viz., the students' work and prizes for the year. In place of the designs being submitted in one portion of the year, as formerly, the awards announced in another, and the prizes presented when we had forgotten who the competitors were, as well as their work, we have now so arranged the matter that the whole thing is brought into one focus. We receive the drawings; they are immediately hung; the awards are affixed; and no time is lost in presenting them. A further improvement, I think, has been the institution of the custom of offering a few words of encouragement and counsel to the students from the President on these occasions. I think that not only the younger members of the profession who are present to-night, but those who have had experience in these matters, may take his words of counsel to heart. They are words which come from a man with probably more experience in these matters than is possessed by any other man in the profession. I hope, therefore, you will allow me to move a very hearty vote of thanks to you, Sir, for the excellent counsel which you have embodied in your address this evening.

Mr. Campbell Douglass (Glasgow): I have much pleasure in seconding the very well-timed remarks of Mr. Anderson. I am sure there are many valuable hints to us all contained in the President's excellent address.

* As will be seen from our article in another column, only about half of the designs that were sent in are actually exhibited.—Ed.

The motion was then put, and carried by acclamation.

The President then presented the prizes to the successful competitors.

The Institute Silver Medal and 10l. 10s. fell to Mr. Alexander Mackintosh; and in the same competition a Medal of Merit was awarded to Mr. J. E. Mowlem, of Swanage.

In the Soane Medallion Competition, three Medals of Merit only were awarded this year, viz., to Messrs. F. W. Beaford, C. F. Spooner, and E. W. Gimson (Leicester).

The Tite Prize of 30l. and a Certificate fell to Mr. James C. Watt, of Aberdeen.

The Grissell Gold Medal and 10l. 10s. were gained by Mr. Walter Percival, of Longton, Staffordshire. Medals of Merit in the same competition were awarded to Messrs. J. A. Pywell and T. F. Pennington (associate).

The Pugin Studentship was awarded to Mr. John Begg, and a Medal of Merit to Mr. D. J. Blow.

The Scientific Masonry Prizes were awarded as follows:—10l. 10s. to Mr. H. A. Woodington, and 5l. 5s. to Mr. A. W. Anderson.

The President, in this connexion, regretted that Mr. Arthur Cates, who was interested as one of the donors of these prizes, was unable to be present. The Class, he might say, had set itself to improving one of his own vaults, and he believed it was the opinion of Mr. Harvey that they had done so very successfully. The Class was one which deserved the most hearty support, because those who took the trouble,—for it involved hard work,—of mastering the problems Mr. Harvey set before them, would be more efficient both as assistants and principals.

Mr. Octavius Hansard considered that a debt of gratitude was due to the three gentlemen who had given the Scientific Masonry Prizes. They could scarcely be expected to do so every year, and if twenty men could be found to give a guinea each for so good a purpose, he would be prepared to head the list.

Mr. Macvicar Anderson said he also would be very happy to subscribe.

The Godwin Bursary for 1890 was gained by Mr. A. A. Cox (associate).

The Asplintel Prize was awarded to Mr. Herbert Baker.

The President, at the close of the presentation, said: I think we must all very much regret that there have been no candidates for the Essay Prize. It is a great pity, and I can only hope that many gentlemen are holding themselves in reserve for another year. I think I ought also to say that Mr. Masey, who has just completed his work in Italy for the Soane Travelling Studentship, had to return home ill before he had quite finished the time he had intended to be there. For the future the Soane Studentship will be held for a shorter length of time than hitherto, which will be of advantage to the students of the future.

The President then intimated that the next meeting would be held on Monday, February 3, when a paper would be read by Mr. J. A. Gotch, on "The Renaissance in Northamptonshire."

EXAMINATION IN ARCHITECTURE: IN THE PAST, THE PRESENT, AND THE FUTURE.

AT the ordinary fortnightly meeting of the Architectural Association, held in the rooms of the Royal Institute of British Architects on Friday, the 17th inst., Mr. Arthur Cates, Vice-President, R.I.B.A., read the following paper on the Architectural Examinations:—

Mr. President and Gentlemen,—In response to the request of your Committee that I should read a short paper to open a discussion on the Progressive Examinations, I propose to place before you a succinct account of the Examination, from the first steps taken towards its establishment, with some observations on the new programme which is coming into force.

The subject of a diploma for architects having been much discussed in France, there appeared in August and November, 1854, and in March, 1855, in the "Encyclopédie d'Architecture" (vol. iv., pp. 113 and 167; vol. v., p. 33), three articles under the title "Du Diplôme d'Architecture." These articles dealt in detail with the education of an architect as it should be, and were brought by me under the notice of members of the Architectural Association, of which I was then secretary.

The propriety of conferring a diploma on architects was the subject of a paper read before

the Association in the summer of 1855 by Mr. J. H. Chamberlain.

In his address, at the opening meeting of the Association for the Session 1855-56, on October 5, 1855, Mr. Alfred Bailey, the President of the year, dealt at considerable length with the intention of the Association to memorialise the Institute on the subject. He urged the necessity for the institution of a public architectural examination, not necessarily compulsory, but

"Let the examination only be a good one and a stiff one, let the 'plunkings' be tolerably numerous, and he was sure that there would be no necessity for a penal law to create candidates."

Mr. William Tite, M.P., who attended as a visitor, spoke at length on the question of scientific education. He considered the great defects were the want of a good, sound, elementary education, and proper examination afterwards by the Institute or some competent body, so as to give the scientific teaching at lectures or in the architect's office a proper direction.

Mr. Tite, further, on November 5, 1855, in his observations at the opening of the Session 1855-56 of the Royal Institute of British Architects, made special reference to Mr. Bailey's Address, and warmly commended the object he had in view, the institution of an examination, and of its necessary result, a diploma.

The three articles above referred to having been reprinted in pamphlet form, a copy was presented by the author, M. Adolphe Lance, through Mr. John W. Papworth, to the Royal Institute of British Architects.

On November 19, 1855, Mr. John W. Papworth read before the Institute a Paper, "An Abridgment of M. Lance's Essay, entitled, 'On a Diploma in Architecture,' with Remarks and Suggestions."

In the meantime, the Association had prepared and transmitted to the Institute the memorial determined on in October, which was read to the meeting on December 3, 1855, as follows:—

"TO THE PRESIDENT AND COUNCIL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The Memorial of the Architectural Association.

MY LORD AND GENTLEMEN,—Your memorialists, representing the younger members of the architectural profession, beg to lay before the Royal Institute of British Architects their desire for the establishment of an examination, which should eventually serve as the basis for the issue of such a diploma as shall certify that the holder thereof is fully qualified to practise as an architect. They have been induced to take this step, from the consideration of the difficulties which, in the present day, beset the early stages of architectural education.

In preparation for entrance upon their articles, in studies during the period of their sojourn in an office, and in the critical interval from the completion of their articles to the moment of commencement of practice, the students of architecture are without sufficient guidance. In no case have they that important and valuable direction given to their several studies which is found to be so successful an inducement to the complete mastery of other professions, and this evil produces its more important effects when students of architecture, having completed their articles, commence practice on their own responsibility.

The want of proper knowledge on the part of the architect, combined as it is with a want of information on the part of the public, leads to many of the anomalies which are now so frequently observed in the practice of the profession, and the presence in its ranks of many who have not the power, and in many cases of those who have not the will, to uphold its credit.

So much attention has been lately turned towards the necessity of testing by examination the competency of all candidates for public employment, that your memorialists are led to submit that the present is a highly opportune period for bringing the subject under your consideration. They feel that they are addressing those who represent the architectural profession, and by whom only an authoritative step towards the establishment of an examination, or the granting of a diploma, could be taken. They are also assured that the senior members of the profession could hardly take the initiative till the necessity for that course had been brought before them by those who have more recently entered the profession.

Your memorialists do not feel themselves called upon to enter into further details, because they are convinced that the members of the Institute must, from their position, be fully cognizant of the evil aspects of the present system; and, therefore, do not doubt that the Council will take an early opportunity of organizing an examination, such as shall be found best calculated to aid and direct the student, and to bring the real qualifications of the architect before the public.

ALFRED BAILEY,
President of the Architectural Association."

It seems to me, Gentlemen, that that Memorial might almost have been sent up by us quite recently. Affairs moved slowly; active opposition, and not less formidable veiled hostility, raised obstacles, not the least of which was the idea that the architect being an artist must, like the poet, be born, and therefore could not be made: such a course of education as was shadowed forth by the Memorial was by many deemed not only unnecessary, but actually un-

desirable; while others thought that the "run of the office" was quite sufficient to provide all the "education" a young architect could require; and it was not until June 25, 1860, that the Institute arrived at the conclusion "that it is desirable to afford an opportunity for a Voluntary Professional examination"; and at a Special General Meeting held on January 14, 1861, it was resolved

"That the Council be instructed to proceed with the preparation of a curriculum and by-laws, and be recommended to appoint a Committee to this end, and to report to a General Meeting."

This resulted in the establishment of the Voluntary Architectural Examination, the Programme of Regulations, and Course of Examination, with list of books recommended to candidates, and a sketch of a form of Examination Paper, being issued in May, 1862.

These documents, elaborated in the most careful manner, were widely comprehensive, and so complete, that they have been used effectively in the arrangements for the Examinations now in force.

Mr. Arthur Ashpitel took the most lively interest in the success of the Voluntary Examination. On November 29, 1862, he attended a meeting of the Association, and in an earnest address advocated its adoption; he also, by bequest of certain shares (since added to by other donations), founded in 1872 the "Ashpitel Prize," now annually awarded to the candidate recommended as having most highly distinguished himself in the Examinations held in the current year.

The first Voluntary Examination (Proficiency) was held in January, 1863, and the last in June, 1881.

Within this period of nineteen years twelve examinations were held, at which forty-seven candidates passed the Preliminary Examination, which lapsed in 1879; thirty-seven passed in the Class of Proficiency, four of whom had passed the Preliminary. While of those who had passed the Proficiency Examination, only three passed the Class of Distinction; these I may mention by name as R. R. Bayne, R. Phené Spiers, T. H. Watson—deserving of all honour.

Notwithstanding the great care taken by the promoters of this Examination in the preparation of the admirable programme, it did not satisfy the requirements of the day, and as it was gradually failing to command any interest in the student class, some effective measure was necessary to meet the needs of the architectural student as expressed in the Memorial of 1855.

This was in some degree attained by a resolution of the Institute passed on March 14, 1877, establishing a new by-law, by which it was provided that

"All gentlemen engaged in the study or practice of civil architecture, before presenting themselves for election as Associates, shall, after May, 1882, be required to pass an examination before their election, according to a standard to be fixed from time to time by the Council."

The regulations and programme governing this qualifying or obligatory Examination were adopted by the Institute on January 3, 1881, and are those now in force for it.

The first of these Qualifying Examinations was held in March, 1882, and since that date fourteen examinations have been held in London, two in Manchester, and one each in Glasgow, Leeds, and Liverpool—nineteen examinations in all. At these examinations, 310 candidates have passed, and twenty-three who have been relegated to their studies are entitled to come up again without further payment.

Thus, in nineteen years (1863-81) the number of candidates passed in the Voluntary Examination Class of Proficiency was only thirty-seven. In eight years (1882-89) the numbers passed in the Obligatory Examination were 310—the candidates who passed in the year 1889 having been seventy-nine, with twenty-three relegated to their studies, to come up at future examinations. The number of candidates who passed in each year is: 1882 twenty-one, 1883 nine, 1884 twenty-one, 1885 seventeen, 1886 thirty-nine, 1887 forty-four, 1888 eighty, 1889 seventy-nine. The steady increase, as the examination has become better known and appreciated, is most satisfactory; and there is good ground for believing that this success will continue.

The system of relegation, by which candidates who, while not failing entirely, have not succeeded in obtaining a sufficient number of marks to pass, are permitted to come up at a future examination, either for the whole, or for that particular section in which they may have

failed to satisfy the examiners, has been most successful, and in a remarkable degree so advantageous to the candidates that it will be continued in the Progressive Examinations now established.

Until the "Final" of the Progressive Examinations comes into force, in not less than three years time, the Qualifying Examination as at present conducted will be continued; it is, therefore, desirable that young men in practice, whether in London or the provinces, who ought to appreciate the great advantages to be derived from the preparation for and passing this examination, should in that interval follow the good example of so many similarly situated, who have passed this test satisfactorily, and greatly to their own benefit; it is for young architects of this class that this examination is particularly adapted. The close relationship now being established between the central body in London and the local societies should materially promote the accession of candidates from the provinces, and it cannot be too distinctly understood that the special circumstances of architects who may have been in practice for a few years, and offer themselves for examination, receive the fullest consideration from the Board of Examiners, and thus all ground for hesitation on their part should be removed.

Satisfactory as has been the working of the Qualifying Examination, and well adapted as it is to meet the requirements of young architects between the ages of 23 and 30, the experience gained in the past eight years, much conference with the younger candidates, and careful study of the answers to the questions set, made it evident that in the interests of the student it would be desirable to establish a more elementary examination, which would secure that they were well grounded in the first principles of the subjects to be dealt with before proceeding to more advanced studies.

The first public step in this direction was taken on May 4, 1887, at a meeting of the General Conference of Architects on "Education," when, after the reading and discussion of various Papers tending more or less directly to this end,* the following resolutions were unanimously adopted:—

1. 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.

2. That to realise this end the Royal Institute of British Architects should prepare a scheme of a complete system of examinations.

3. 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 of earlier, for the general principles of Art and Construction—those passing this to be "Students R.I.B.A.;" 3rd, Final, an examination to qualify for A.R.I.B.A., at twenty-three years of age or earlier.

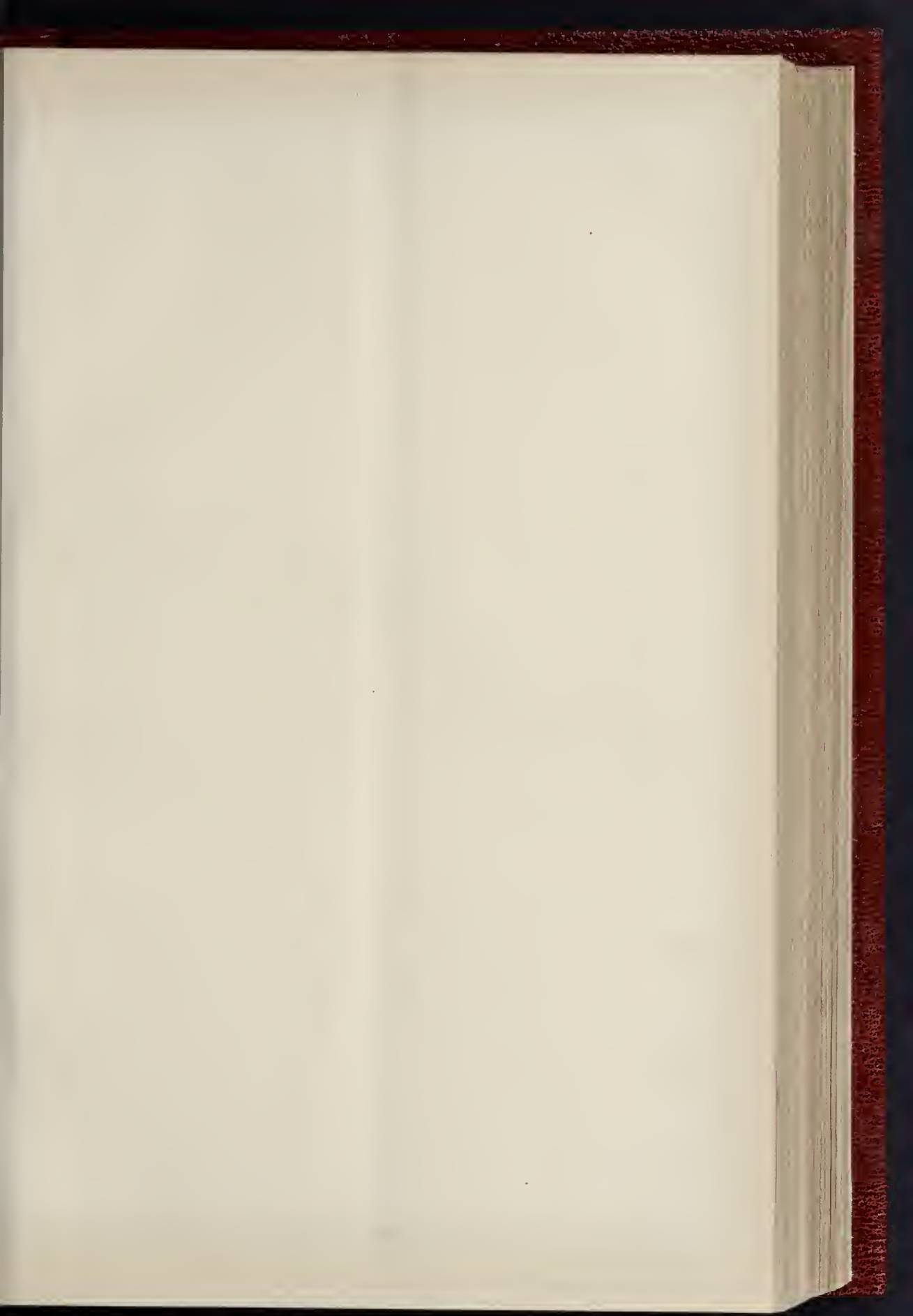
For some unexplained reason the proceedings of recent Conferences have not been reported and issued in the *Transactions* or in the *Journal* of the R.I.B.A.; but this meeting appeared to me to be of so much importance that I reprinted from the *Builder* report the papers read, added an appendix containing full details of the French and American systems of education, issued the whole in pamphlet form, sent a copy by post to every member of the R.I.B.A., and distributed a large number among local societies, and in quarters where the subject was likely to arouse interest.

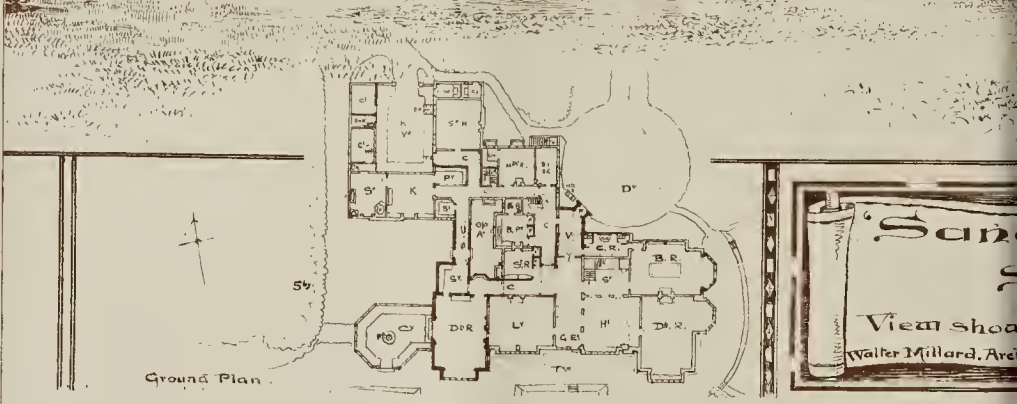
The three resolutions were formally referred to the Council, with a request to take the necessary steps to carry them out, and ultimately to realise this scheme.

The Institute, acting under the authority of the New Charter and By-laws, by resolutions passed April 8, 1889, established a system of Progressive Examinations:—1. Preliminary; 2. Intermediate; 3. Final or Qualifying.

The Preliminary Examination is to test the general knowledge of aspirants entering, or who have just entered, the profession. The first Preliminary was held in November last, and may be considered to have been satisfactory. An analysis of the result shows that out of 107 candidates who were admitted to the examination, 44 were declared exempt, 43 passed, and 23 were relegated to their studies: so that at this first examination 87 candidates have been entered on the Register of Probationers of the Royal Institute.

* These Papers, by Professor Babcock, Cornell University, U.S.A., Mr. E. C. Robinson, F.R.S., Sir Philip Magnus, Mr. Arthur Hill, B.E. (Cork), Professor Atkinson, A.R.A., Professor E. Roger Smith, Messrs. R. Phené Spiers, F.S.A., Lawrence Booth (Manchester), and J. Alfred Gutch (Kettering), with the discussion thereon, are to be found in the *Builder* of May 7, 1887, and merit careful perusal. A.C.





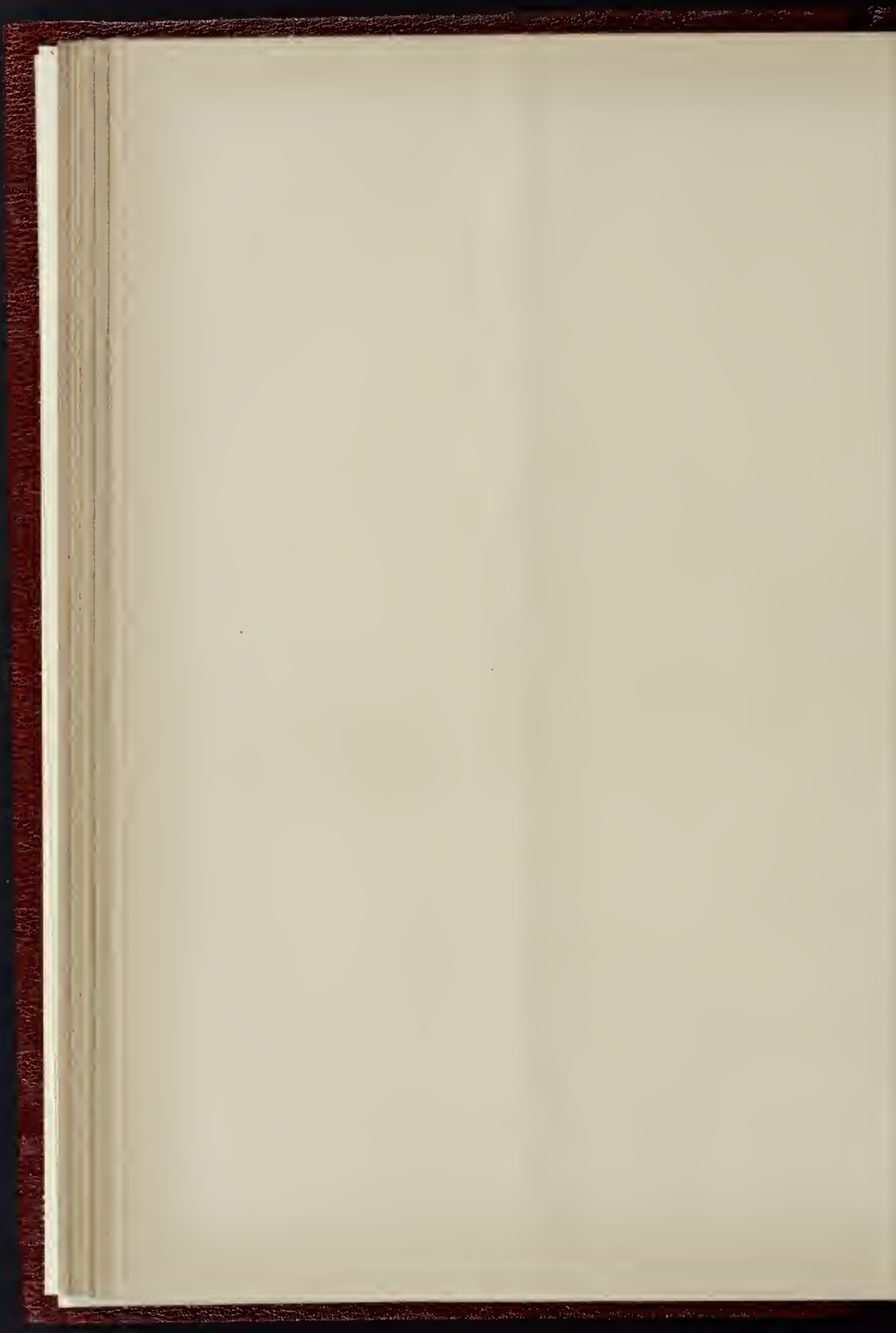
San
View sho
Walter Millard, Arch



Life'
see:
Mr V. Felton
additions.
1858



View previously.



The programme of subjects included in the examination is very clear; they are all of a simple elementary character, with which any intelligent schoolboy should either be acquainted, or be able with short preparation to make himself acquainted; but some of the candidates appear to have thought it unnecessary to trouble themselves to acquire any accurate knowledge in some of the subjects, and in consequence have been sent back.

Great importance is attached to this preliminary Examination, since when well-established, it will certainly influence the concluding portion of the school education of youths destined to enter the profession, and thus prepare them with a good foundation for their further studies.

The Probationers now registered will in not less than two years,* on submitting satisfactory "Testimonies of Study," as particularised in the programme, be admitted to the Intermediate Examination, the successful passing of which will qualify the student for registration as a Student R.I.B.A.

Not less than two years after having passed the Intermediate, the student—provided that he further "Testimonies of Study" he will be required to produce are satisfactory—he will be admitted to the Final Examination, to qualify or candidature as Associate R.I.B.A. Except as regards the "Testimonies of Study," which are of a more complete character than the "Probationary work" now required, this Final Examination will cover very much the same ground as the present Examination in Architecture; but with the preliminary training necessitated by the Intermediate Examination, it is anticipated that the results, so far as regards the attainments of the candidates, will be even more satisfactory than at present.

As in the present "Examination in Architecture" special provision is made for, and particular consideration given to, the candidature of architects actually in practice, so in like manner when this Examination in some three or four years' time has become merged in the final, some adequate provision will for a few years be made to meet the cases of architects in practice, whom it would not be reasonable to require to pass the two previous examinations, and from whom it would be equally unreasonable to require the full Testimonies of Study which the student candidate would produce in the ordinary course of his preparation.

Although it is to be presumed that every one who takes an interest in the subject is fully acquainted with the details of the Programme of the Progressive Examinations, published at length in the *Kalendar of the R.I.B.A.*, or if not so acquainted, will, by acquiring the *Kalendar*, obtain the necessary information, I will venture to occupy your time, not by a dry recital of particulars there to be ascertained, but with a short comment explanatory of the views with which those details were settled; and, first, I desire to impress on you that these details have been arranged with a desire that the student, in whatever part of the country he may be, should be guided gradually forward in a sound course of study, but should at the same time he left quite free as to the sources from which he may attain the necessary knowledge, and that so far as possible in arranging such a course all unhelpful academic influences might be avoided, and the natural abilities and proclivities of the student allowed free play, consistent with the acquisition of sound elementary knowledge essential to enable him to practise his profession with advantage to his client and credit to himself. The Memorial of 1855 pointed out that students of architecture were without sufficient guidance at three periods of their career before entering into practice,—viz., "in preparation for entrance upon their articles," "during the period of their sojourn in an office," and "in the critical period from the completion of their articles to the moment of commencing practice." The Progressive Examinations meet these periods exactly, and the subjects which must be included in them are defined in the By-laws, which have been approved by the Privy Council, viz.:

By-law 2, Examinations, provides that

"The Examination for candidates for Association shall be written, graphic, and oral, and shall relate to the history of architecture, the characteristics and

* In compliance with representations made by some of the Probationers, the Council have decided that, should not less than six Probationers offer sufficient testimonies of study, and have fully advanced in their studies, they may, by special exception, be admitted to an intermediate Examination, which will then be held for that purpose in November, 1890.

details of architectural styles, the nature or properties, and application of building materials, sanitary science, the principles and practice of construction, the design and arrangement of buildings, professional practice, and such other subjects as the Council may from time to time determine."

The Preliminary Examination exacts knowledge of the elementary branches of an English education, and of one language—French, German, Italian, or Latin. Also the special knowledge of geometrical and freehand drawing, elementary perspective, and of elementary mechanics and physics, which should be readily acquired by a youth of about sixteen.

When this Examination is firmly established the managers of educational establishments will certainly take note of its requirements to secure the necessary qualifications in youths intended for the profession.

An important feature of the scheme for both the "Intermediate" and "Final" Examinations is the "Testimonies of Study," which must be submitted by the candidate and be accepted as satisfactory, as a condition precedent for admission to the Examination.

For the "Intermediate" these "Testimonies" consist of drawings—which in the Art section cover the elementary features of Classic and Medieval architecture, and in the Science section the elements of ordinary construction. These drawings will be used in the oral examination to test the candidate's knowledge of what he has drawn, and thus secure some protection from mere unintelligent, slavish copying.

Concurrently with the production of these "Testimonies," the student will be preparing for the Examination itself by acquiring the necessary knowledge on the subjects set out in the Programme—all of an elementary nature, but essential to be mastered as the sound basis for further study. Among these subjects the application of geometry to actual work, the projection of solids, and development of surfaces, will assume the importance they deserve.

The lines on which this Programme has been founded have been indicated by the deficiencies in elementary knowledge evinced by candidates at the Obligatory Examination. It is, therefore, hoped that students following this course with care will lay a good sound foundation for those more advanced studies required to secure a pass in the Final.

The work thus set out for the aspirant to enable him to pass the Intermediate may appear formidable on paper, but really does not demand any particular exertion from an ordinary student. Continuous and well-directed application by home or class study after office hours will, of course, be essential to attain success; but much of the work, especially the completed "Testimonies" of study and the necessary preliminary work, should be carried out in the office, under the eye and guiding hand of the architect-master who has undertaken to instruct his pupil in the art and mystery of the profession of an architect. Such master will certainly in every case greatly benefit by the improved intelligence of the pupil, and the more advanced knowledge he will bring to hear on the active work of the office, and may, in some instances, be rewarded for the loss of the services of such pupil as an office-help,—spending his days in endless tracing, copying specifications, drawing plans on skins for leases, and the like drudgery, profitable enough to the master, but the merest waste of time for the poor pupil,—by the conviction that he is in some degree fulfilling the obligation he undertook when he accepted the responsibility of taking the future of the pupil into his hands.

The subjects of study exactly follow the lines laid down in the By-law I have quoted, to which, I may say, particular attention was given by the Privy Council, who required the specific subjects to be particularly stated as there set out; but, of course, at this early stage these subjects can only be dealt with in an elementary manner to form the basis of more mature study.

This preparation, the experience gained by passing through this examination, the encouragement and advice the student is certain to receive at the Oral Examination, will induce him to enter on preparation for the Final, not only with a good elementary knowledge, but with an interest in the further prosecution of his studies which will naturally follow the acquisition of such knowledge.

This Final Examination fits in exactly with the third period of the Memorial, since it is neither desired nor expected that a student should offer himself immediately after the

expiration of his articles, for although if a candidate who has just completed twenty-one years of age should offer himself and satisfy the conditions, he could not be rejected, it is not desirable that any one less than twenty-three years of age should come up, and the instances in which one of younger age could pass would be few indeed.

The "Testimonies of Study" required for admission to the Final comprise three most important subjects not included in the examination which this will supersede—viz., drawings from some historical building made from actual measurement, with the joining of the masonry, &c., correctly shown, and the construction—with details of full size—the original sketches measured and plotted on the spot being appended, which will ensure that some attention has been given to the monuments of the past; while the satisfactory evidence of having followed the carrying-out of building works, and notes of the progress and conduct of such works which will be required, will provide for attention being given to the practical work which cannot be omitted.

The two sheets of diagrams of constructive masonry,—arches, vaults, or groined vaults, with the projections of the arch and vault stones,—are intended to promote the study of projection and geometry,—now, alas! almost absolutely neglected by the architect, but, when mastered, of the greatest value to him, and these drawings being obligatory, good results may be expected to follow. I may say, added Mr. Cates, parenthetically, that Mr. Lawrence Harvey, in his classes at the City and Guilds' Institute, had several building artisans, but only one young architect,—a fact which is, I think, hardly creditable to this Association.

The other subjects fixed for the "Testimonies of Study" touch on the principal points with which acquaintance is desirable, but the limits are so wide that the fullest opportunity is afforded to the student for the development and display of his particular ability; while the present Qualifying Examination, modified only to meet the more advanced position of the student, may be considered as fairly representing the written, graphic, and oral portions of the Final.

The interest which has been evinced in the Preliminary Examination by leading men in Dublin, Glasgow, Bristol, Leicester, Liverpool, Manchester, Newcastle, Nottingham, Sheffield, and other places, is of good augury for the future, especially as many of the candidates have been sent up by architects who are not as yet members of the Institute. Thus it may be hoped that by the aid of such centres, which year by year will certainly be extended, the pupil even in remote country places may be reached, and the whole of the rising students throughout the United Kingdom, and, hereafter, also in the Colonies and Dependencies of this Empire, be brought under the influence of these Progressive Examinations.

The first step towards this is that every architect, whether or not a member of the Institute, should appreciate that it is an obligation on him to see that his pupils are duly prepared for and successfully passed through the full course; and should further feel that in failing to do this he fails to fulfil the obligation he undertook when accepting the pupil; for I sincerely trust that such wicked waste of a youth's best years as giving him, in exchange for handsome money consideration, "the run of the office," will soon come to an end.

This Association can greatly help in forwarding the success of the undertaking, not only by its classes,—so advantageous to those to whom by good fortune they are accessible,—but also by the personal influence of individual members, so many of whom have passed one or other of former examinations.

Further, the Architectural Association of London has effected so much good for the young student by its system of classes, that so excellent a model might well be followed by the pupils and clerks engaged in provincial offices, who should, in every town where a sufficient number could be brought together, form an Association on lines similar to this, and, with the programme of the Progressive Examinations before them, work together and mutually assist in acquiring and maturing the necessary knowledge. I cannot but think that this Association might do good service for architectural students in the provinces could the executive take some measure to promote these local Associations—to work in conjunction with it; and this may now be the more readily initiated since in many

important centres there are in alliance with the Institute professional societies under whose guidance such junior Associations might be established, and whose effective assistance might be obtained by the originating idea being duly communicated to them through this Association.

In other towns, where such societies do not as yet exist, the young architects, students, and assistants may with great advantage combine to promote by mutual instruction the study of subjects included in the programme; it should surely need but the first suggestion, and the guidance which the experience of this Association would enable your executive to give, to lead to such associations being formed wherever a dozen, or even fewer, students could be brought together to work in harmony for one common end.

I earnestly commend this to the favourable consideration of your committee, and hope that effective steps will be taken for its realisation, being convinced that it is only by such combination, commencing with the first years of pupillage, and with a clear and definite programme of the *minimum* amount of knowledge which will be required being placed at once before the youthful aspirant, that the future of the profession can be influenced in the manner which we all desire, to the advantage equally of all its members and of the public, its clients.

[The discussion which followed was a very important one, and as it extends to great length, we hold it over until next week, as we desire to give an adequate report of it.]

STATUE FOUND ON THE SITE OF NERO'S VILLA.

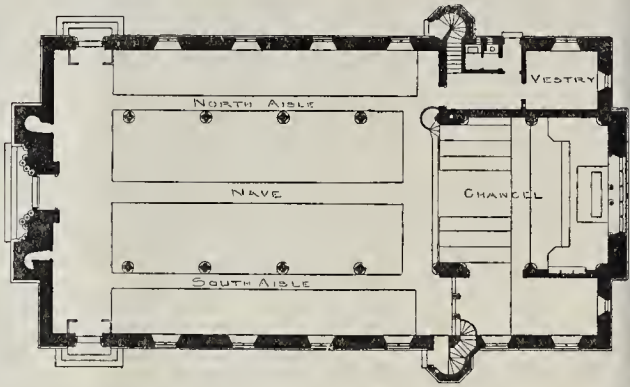
This is an illustration, reproduced from a photograph, of the statue found on the site of



Statue found on the site of the Villa of Nero, ancient Antium.

Nero's villa, at what was the ancient city of Antium, as mentioned in a "Note," page 6, ante.

The London Sewage Question.—We are again obliged to hold over a report of the discussion on Sir Robert Rawlinson's paper at the Society of Arts.



Church of St. Paul, Grangetown, Cardiff.—Plan.

Illustrations.

LADY CHAPEL, NEW (R.C.) CHURCH, FOLKESTONE.

THIS illustration shows part of the new R.C. church in Guildford-street, Folkestone, as originally designed by Mr. Leonard Stokes. The church, as executed, was illustrated in the *Builder* for June 1, by view and plan. The original drawing was exhibited in the Royal Academy of 1888.

CHURCH OF ST. PAUL, GRANGETOWN, CARDIFF.

THE Church of St. Paul, Grangetown, is being built by Lord Windsor to provide for the wants of a poor and rapidly-growing district of Cardiff. When finished it will accommodate 600 people, and will consist of a nave and aisles, with chancel, side-chapel, and vestries, with organ-loft above the chapel, and a second vestry above that shown on the ground-plan. The materials used are, for the external walling, a local limestone, in courses averaging about 2½ in.; the dressings of the doors and windows are of Penkridge stone; and the quoins and other plainer dressings are of Portland cement concrete cast in moulds. Internally the dressings are of the same materials, and the walls between them are plastered, and will eventually be decorated in colour. The roof is of red deal, and will also be decorated in colour. Externally it is covered with red Broseley tiles. The architects are Messrs. John P. Seddon and J. Coates Carter, of Westminster and Cardiff, and the illustration is from Mr. Carter's drawing.

"SANDGATE," SUSSEX.

THIS house occupies a fine site just within the South Down range, between Pulborough and Steyning. Originally of modest proportions, it was considerably extended some twenty years or so ago, under Mr. Wm. Milford Tenon, architect, when it assumed the form indicated in the small outline, "View previously." The building has now been completed by the present owner, as our illustration shows. A new dining-room and servery have enabled the dinner route to be diverted from crossing the entrance, and at the same time shortened by half; whilst a reconstruction of the entrance itself has afforded means of obtaining a gentlemen's cloak-room in connexion with it and with the billiard-room. Externally, on the south front, the new dining-room wing has been made to balance with the previously-existing drawing-room wing—a new parapet between the two being introduced with the object of hiding the whole façade into one composition.

The conservatory was shifted bodily into its new position without breakage of glass.

The contractors for the work that has been done are Messrs. A. Bush & Sons, and the architect is Mr. Walter Millard. The drawing from which our illustration is reproduced was exhibited last year in the Architectural Room of the Royal Academy.

DESIGN FOR PUBLIC BATHS.

WE publish this design under peculiar circumstances. The author, Mr. Peter Anderson, prepared it in competition for the Royal Academy Gold Medal and Travelling Studentship in Architecture, which our readers may remember, was not awarded on the last occasion at the close of last year, as none of the designs sent in were considered equal to the occasion. Mr. Anderson's design, which is better than any of those that were accepted and exhibited, was ruled out on account of the author having missed, as we understand it, one out of the series of lectures which the students are required to attend in order to qualify for the competitions. Mr. Anderson states that he inquired at the office of the Royal Academy as to whether he had fulfilled all the required routine, and was told that he had; but on sending in his design it was refused on the ground that one lecture attendance was wanting in his list. As it does not appear that there was any desire on the part of the candidate to evade his duties, and that it was a mistake, it appears to us that Mr. Anderson has been hardly used in being denied a competition which he would probably have won on a mere ground of "red tape"; and we are therefore glad to show our sympathy for his disappointment in a practical manner by publishing a design which, as a student's work, is certainly of considerable merit.

The author says:—

"In designing a large building of this description one of the principal objects is to have each portion of it separate, and, as far as practicable, complete in itself, and all parts of easy access from the central hall or vestibule.

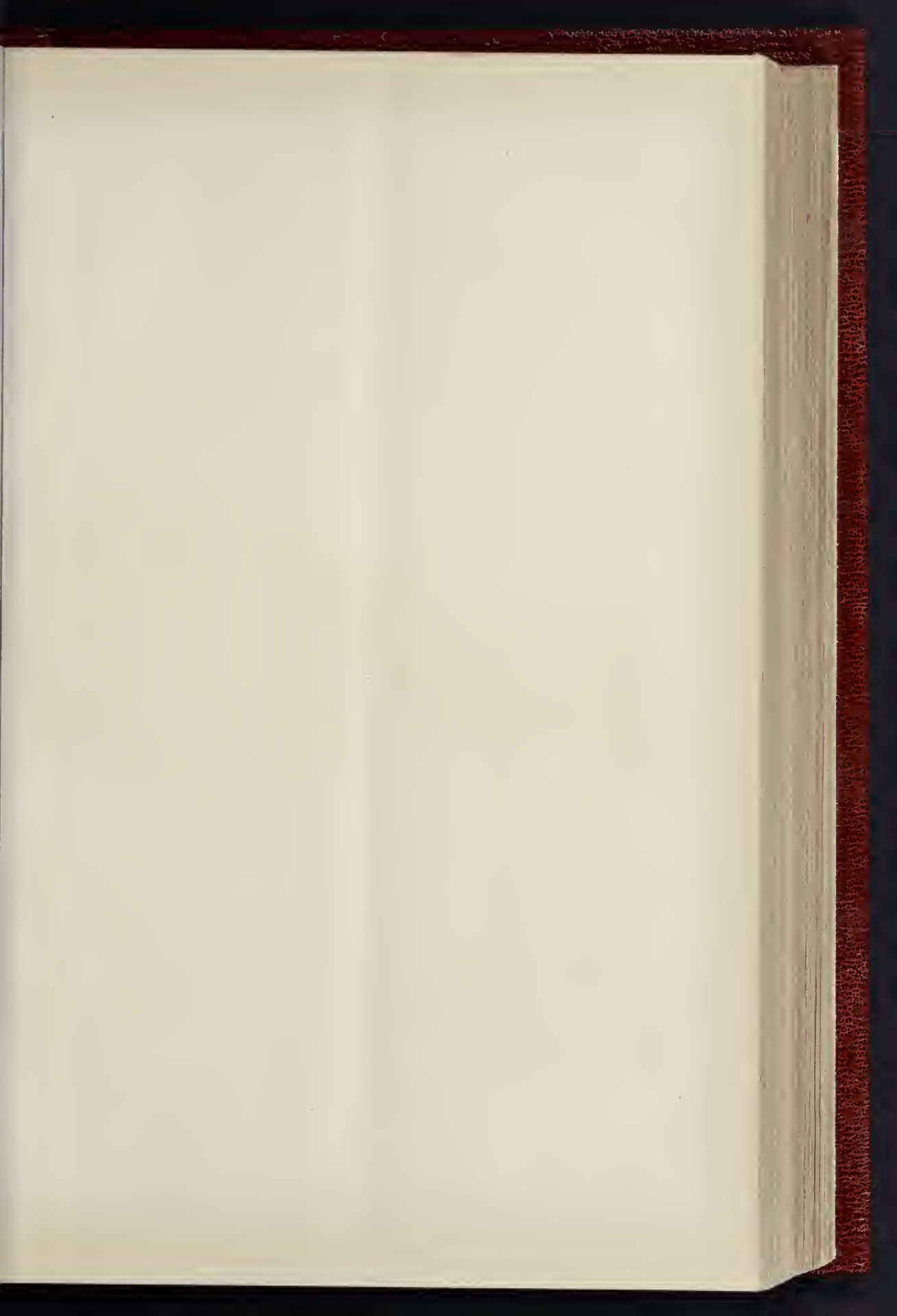
The large swimming-bath in centre is entered by a passageway, 10 ft. high, and, besides the dressing-boxes shown, has thirty-two similar boxes or balconies. The bath itself is formed of concrete from 2 ft. to 3 ft. 6 in. thick, faced with tiles, and open all round for the free passage of fresh air. The bath is entirely lit from the roof.

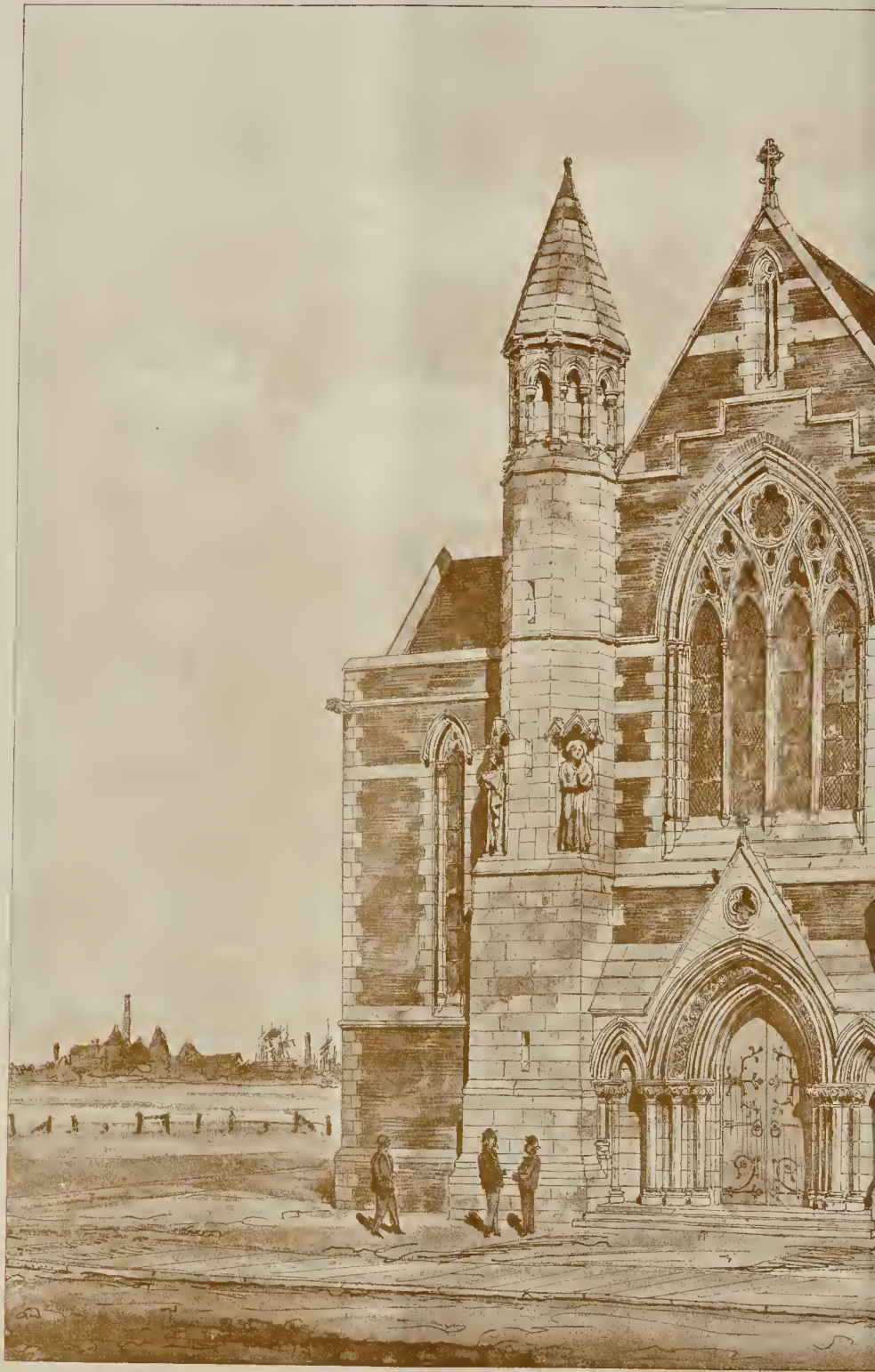
The gymnasium is separated from the swimming bath by a glazed screen, and which would be thrown open during any displays. A gymnasts' room fitted up with clothes-boxes, and having w.c.'s and urinal, is under the tepidarium of Turkish-bath. The instructor's-room is under circular end of laundry. The gymnasium is lit entirely from the roof. The Turkish-bath is on the left of entrance hall, the furnace-room for it being under the two end hot-rooms. A filter for the swimming-baths is placed here. A passage from this room along one of swimming-bath goes to laundry and boiler-house on opposite side.

The laundry is lit principally from the roof. The ladies' private and swimming baths are on the right of entrance hall, and although an exit is shown of this side from gymnasium, if it were not used, this could be kept entirely separate for ladies.

The gentlemen's private baths, 1st class (9), 2nd class (12), 3rd class (24), are on the floor over, extending along the entire side to boiler house.

There is a stair and lift from laundry to the floor. The hot-water cisterns are placed high up in the boiler-house. The central portion of front elevation on first floor contains a lecture-hall (seating 370) with raised side galleries, and under the lavatories, &c., for ladies and gentlemen. There is a lecturer's-room at side. Over the Turkish bath as far as the tepidarium, there is a library and

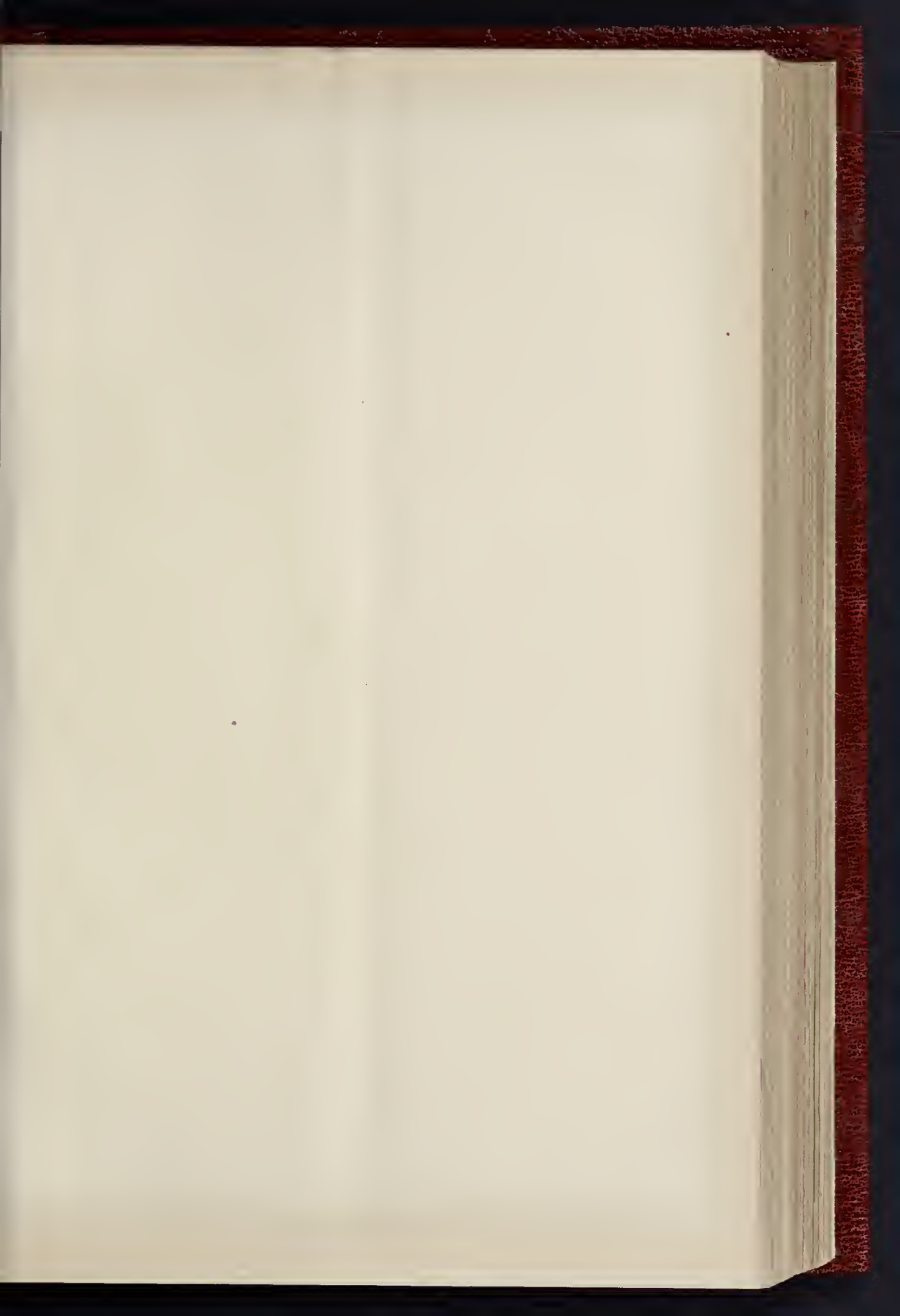




CHURCH OF ST. PAUL, GRANGETOWN, CARDIFF.—M



INK PHOTO. FRAGUE & CO. 22, MARTINS LANE, LONDON, E.C.





*Interior of the Lady Chapel,
New H. C. Church, Folkestone.*



"INK PHOTO" SPRAGUE & CO., 22, MARTINS LANE, CANON ST., LONDON, E. C.



Old Houses in The Market, Warwick -

reading-room (with separate entrances), with librarian and attendants' rooms. Over the tepidarium are the residences of the caretaker and fireman, these having an entrance from the street. With the exception of these residences the building would be entirely heated by steam."

One remark we may make on the plan, that it is a mistake, in planning public baths, to make the men's and women's entrance from the street by the same door and into the same entrance-hall. It is a mistake that has been made in other plans for baths, executed and unexecuted, that have come before us. The women's entrance should always be a separate one from the street.

OLD HOUSES, WARWICK.

This illustration of a picturesque and rather rich example of ancient English half-timbered houses is reproduced from a sketch by Mr. A. A. Perkins. The contrasting effect of the oblique strutting with the rectangular work, in the second story, is unusual and effective.

RECENT DOCK EXTENSIONS AT LIVERPOOL:

THE INSTITUTION OF CIVIL ENGINEERS.

At the seventh ordinary meeting of the session, held on Tuesday evening, Jan. 14, the President, Sir John Coode, K.C.M.G., being in the chair, the paper read was on "Recent Dock Extensions at Liverpool, with a general description of the Mersey Dock Estate, the Port of Liverpool, and the River Mersey," by Mr. George Fosbery Lyster, M. Inst. C.E.

The description of the dock extensions, which were more particularly the subject of this paper, was prefaced by some general remarks on the physical characteristics of the River Mersey and the trade of the Port of Liverpool. The geographical position of Liverpool, its unrivalled water frontage, and its proximity to the great manufacturing districts and to the coal and mineral fields of the North of England and Wales, could not fail to ensure its becoming a

great port; and the result was seen in its continuous advance from the condition of a fishing village to that of one of the foremost seaports of the world. Its revenue at the beginning of this century, 23,380*l.*, on 450,060 tons, had increased, in 1889, to 990,000*l.*, from dues on 9,292,000 tons. The Mersey estuary was of peculiar form, roughly resembling a bottle, the wide upper estuary from Runcorn to Liverpool forming the body, and the six miles of narrows between Liverpool and Birkenhead the neck. The maintenance of the full capacity of the upper estuary was of vital importance to the port, and in this work the incessant changing of the low-water channel of the upper estuary was one of the prime factors. It was computed that on a spring-tide about 710,000,000 cubic yards, and on a neap-tide about 281,000,000 cubic yards, of water passed in and out at the mouth of the river at New Brighton. The ebb and flow of these vast quantities of water maintained channels through the wide sandbanks of Liverpool Bay. The principal channel was an excellent one as regarded width and direction; and as regarded depth, there was twice every twenty-four hours sufficient for the largest vessels, there being 10 ft. of water on the bar at dead low-water of spring-tides, giving 40 ft. at high-water springs, and 30 ft. at high-water neaps. Time was, however, now a most important element of successful trading, and the tendency was to increase the size of ships, so that a greater depth of water in the approaches to the Mersey was highly desirable in order to avoid delay off the port. The attainment of such an end was, however, surrounded with physical and financial difficulties of no ordinary character; but the question was kept prominently in view, and the Mersey Docks and Harbour Board had recently decided to spend a certain amount of money on an experimental dredging of the bar by sand-pumps. The first Liverpool Dock, the "Old Dock," was constructed under powers obtained in the reign of Queen Anne, in 1708. The site was part of the old pool, a tidal creek on the right bank of the Mersey. This dock was the first wet-dock constructed in England, its area was four acres,

and it had within it, on lowest neap-tides, 10 ft. depth of water. Since the construction of the "Old Dock," others had been built from time to time as trade required, the site chosen for them being the river foreshore in front of the town of Liverpool. In the second quarter of this century especially, many new docks were constructed by Mr. Jesse Hartley, dock engineer, to whose ability and practical knowledge Liverpool undoubtedly owed much of its commercial greatness. From 1845, also, Birkenhead, on the Cheshire or left bank of the Mersey, entered into competition with Liverpool. Docks on a very large scale had been laid out there, and already partly constructed, when, in 1858, the Mersey Docks and Harbour Board was incorporated by Act of Parliament to take over and manage as one concern the whole of the Liverpool and Birkenhead Docks, which, since the date named, had formed one estate. In 1871, although the Birkenhead Dock system had been for some time completed according to the Parliamentary plans, the Dock Board was urged to consider the desirability of commencing, without delay, further dock extensions on the Liverpool side of the river, on such a scale as would meet the pressing wants of trade, and provide for the growing requirements of shipping, which was everywhere advancing in size and tonnage. The result of this pressure was an exhaustive inquiry into the question by a Committee of the Board, with the outcome that the author was directed to consider and report as to the alterations and additions which might be requisite to meet the probable requirements of the great and increasing commerce of the port. Reports and plans were duly submitted by the author, showing schemes of dock extension both at the north and the south ends of the Board's Liverpool estate; and in the Session of 1873 Parliamentary powers were obtained for the construction of new dock works, estimated to cost on the whole 4,100,000*l.* The works referred to were designed to meet the wants of the port for some time in advance from the date of the Act. It was, therefore, provided that the expenditure was not to exceed 500,000*l.* per annum, and, accord-

ingly, the works had been spread over many years. The effect had been that, before any of the several new docks were opened, trade in its natural advance had been ready to fill them. The general design of the New North Docks comprised the enlargement of the Canada Basin, and the improvement of its entrance, so as to make it available for vessels of the largest class, and the construction of the following new docks:—The Langton Dock, of 18 acres, serving as a half-tide dock; the Alexandra Dock and branches, 41 acres; and the Hornby Dock, 17 acres. The Canada Basin and Langton entrances had been designed to give as direct a lead from the river as possible, so that vessels could pass quickly through, allowing of a large number docking on one tide. They had been found to work excellently; large steamers of 34,197 tons aggregate burden had been docked and undocked in one tide of two and one-third hours. A most important point in connexion with the Canada Basin and approaches was that of depth. After careful consideration, it was decided to lay the sills of the entrances at the level of 12 ft. below Old Dock Sill, or 2 ft. below low-water of equinoctial spring-tides, and the floor of the basin and approaches at a level 2 ft. lower. In order to ensure the maintenance of the required depth without dredging, special means had to be adopted to clear away the silt deposited every tide; and to this end sluicing-culverts had been constructed in all the walls of the basin, the flow of water from which cleared silt away for a considerable distance in front of the walls. To effect the removal of silt deposited beyond the range of the wall-slucies, sluice-pipes had also been laid under the floor of the basin; and these were fitted at short intervals with vertical branches having outlets through the floor of the basin. The outlets were closed by framed disks of greenheart, which effected the distribution of the sluicing-water over the area to be cleared. The fairway to the basin was also maintained clear by sluices laid in the foundations of the north and south jetties, which, besides serving for this purpose, limited the area within which deep water had to be maintained, and acted as guides against which vessels entering or leaving the basin might bear. The Langton Dock had an area of 18 acres, and served as a vestibule for shipping, while its north and west quays were provided with sheds suitable for the discharge of vessels of the largest class. The graving-docks, situate on the east side of the Langton Dock, were each 950 ft. in length, but had intermediate gates in the centre, so that the inner chambers could be used as "long-time" while the outer were used as "short-time" docks. The graving-docks were built entirely of concrete. A 30-ton hydraulic crane furnished means of handling screws, rudders, &c., and was so arranged as to be capable of being used at any of the four graving-dock chambers. At the entrance to the graving-docks was an engine-house, which was the centre of power for the district; it contained hydraulic main-engines of 350 h.p., besides powerful engines and pumps for draining the graving-docks of such water as could not be run off with the tide. On the south quay of the Langton Branch Dock was a hydraulic crane of 100 tons power, of a novel character, the lift being made by a direct-acting inverted hydraulic cylinder—a mode of working which permitted of nice adjustment of the loads. The Alexandra Dock, designed to accommodate the largest steamers, had a length of 1,600 ft., and its quays were all provided with substantial sheds, 95 ft. wide in one span. The Hornby Dock was partly used as a timber dock, partly for ordinary trade; for the latter purpose a shed, 125 ft. wide, was now in course of erection on its south quay. The principal points of these northern docks were illuminated at night by electric lights, placed on masts 90 ft. high. The total estimated cost of the whole of the works was 2,727,000*l.*, and, since their completion, they had accommodated sea-going ships of the largest class, with an aggregate of 18,000,000 tons. The New Southern Extension comprised a chain of docks from the Herculaneum, which had been constructed by the author in 1868, to the old Brunswick Dock. These new docks had been named the Harrington, Toxteth, and Union, the latter forming the link between the new system and the old. At the same time the Herculaneum had been greatly enlarged, and on its eastern and southern quays special accommodation for petroleum had been provided by the excavation of casemates in the solid rock. The Harrington

and Toxteth Docks were laid out for general trade, and were provided with first-class sheds, those on the western quays being single-story sheds, 150 ft. wide, whilst on the east side double-storey sheds of novel character had been erected, the width of these sheds being 95 ft. The discharge of goods on to the floors of the latter sheds was effected by a number of hydraulic cranes, mounted on the roof, and capable of dealing with any load up to 30 cwt. Through the Union Dock, vessels which could not on neap-tides, by reason of their deep draught, get into the river over the Pluckington Bank and shallow sills of the older docks, were enabled to dock and undock through the chain of new docks into the river, by the Herculaneum entrances, now deepened to 12 ft. below Old Dock Sill. The level of the water in the older docks referred to would be maintained, when necessary, by impounding and pumping. The bulk of the excavation from these docks was a soft sandstone rock, and, no place of deposit being obtainable, it became necessary to send the rubbish to sea, which was done in steam-hopper barges of 500 tons capacity. The estimated cost of the New South Docks was 1,373,000*l.* By the north and south extensions, forming the subject of the paper, the area of the Liverpool Docks had been increased from 252 acres,—the area at the time of the passing of the Act of 1873,—to 363 acres, the present area, and the quayage from 18 miles to 24 miles.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday last at Guildhall, Lord Rosebery in the chair.

Proposed New Council Chamber.—Sir T. H. Farrer moved:—

"That it be an instruction to the Council Chamber and Officers Committee to consider and report as to acquiring a suitable site for a Council Chamber and offices."

In the course of a long speech he advanced the reasons he had for making his motion. Although, he said, the enlarged Council-room at Spring-gardens would, when completed, be large enough for their meetings, the office accommodation there was most inadequate, and was so overcrowded that their work and the health of their clerks were seriously suffering.

Mr. Acworth formally moved the following amendment, which stood in the name of Mr. Rhodes:—

"To omit all words after 'That' in order to insert the words 'having regard to financial and other general considerations, and having regard to the inexpediency of any proceedings in the nature of a possible hindrance to the ultimate fusion of the ancient Municipality of the City of London and the newly-formed Council of the Administrative County of London in one great corporation, it is not desirable at present to press on the seeking for a site for new Council offices.'"

Mr. Acworth said that he agreed with almost every word that Sir Thomas Farrer had said, and there was a good deal in Mr. Rhodes's motion with which he did not agree entirely; but he did not think that the fusion with the City need be seriously considered in reference to this matter. Subsequently Mr. Acworth withdrew this amendment in favour of that which stood in the name of Sir Walter de Souza.

Sir W. De Souza moved:—

"That the Council, whilst recognising that in due course a site will have to be acquired, and municipal buildings erected suitable for all the requirements of the Council, feels that it is not in a position to judge what the future requirements of the Council will be, and for this and other reasons is of opinion that it is at present premature to consider any scheme for the purchase of a site and the erection of municipal buildings."

This amendment was lost, on a division, by fifty votes against thirty-nine votes, and the further discussion of the subject was postponed.

The Architect's Department.—Arising out of some recommendations of the Standing Committee as to the appointment of some temporary draughtsmen and assistants in this department, it was incidentally stated that the Standing Committee would shortly present a report dealing with the whole organisation of the department.

After transacting further business the Council adjourned.

Houses of Parliament, Berlin.—On the 13th inst. the "Controlling Committee" at last (after discussing the subject for nearly two years) sanctioned the erection of a large central cupola, according to the designs of the architect of the building, Herr Wallot.

THE GUINNESS FUND.

SIR,—The princely donation of Sir Edward Guinness being the first step towards the attempt to solve the difficult and embarrassing problem as to the practical way of properly housing the poor will doubtless cause the matter to be taken up in earnest. With this view I venture to repeat a suggestion I made when Mr. George Peabody announced his intention of devoting a large sum of money for a like purpose,—viz., that instead of a body of trustees attempting themselves to erect dwellings, they should offer to lend a considerable portion of the money required at a low rate of interest,—the interest of which and the principal to be repaid in equal quarterly instalments extending over say thirty years or redeemable at pleasure. The advantages would be that the difference between the amount lent and that required would encourage private investment and increase the available fund, which would be further increased by donations, or if necessary by public grants. The low rate of interest would give a margin that would just turn the scale from a loss to a profit. The lenders would have control not only in the planning and construction of the buildings, but also in their ultimate use (at any rate for thirty years), so that their purpose may not be lost. Each year would render the security greater, and by the constant repayment the fund would be practically inexhaustible. If some such plan as this had been adopted by the Peabody trustees I believe the difficult question would by this time have been nearly settled.

J. DOUGLASS MATHEWS.

HAYWARD (DISTRICT SURVEYOR) v. SANDON.

SIR,—In some remarks regarding this matter which you published on the 14th inst., I wish to point out some misleading statements which I beg you to correct.

It is stated that the "summons was dismissed," yet that could scarcely be, as no summons has issued by the one heard on Oct. 4, 1889, when the magistrate decided in favour of the District Surveyor, giving him also costs in the case.

Also it is stated that my "sollicitor" gave me certain advice, which he actually did not give. But why anyone should write to you professing to know and publish what passed between "my solicitor" and myself I am at a loss to conceive, though in justice to Messrs. Sandon's adviser, I should say that I am led to believe this statement did not emanate from him.

What actually happened was this. Messrs. Sandon being dissatisfied with the magistrate's decision, and the order that he made on Oct. 4 that they should pay the District Surveyor the specified fees, endeavoured to get a case stated for the Superior Courts.

Failing to obtain this in their own way, it was discussed in the magistrate's own private room and "dismissed"—if that is the word—and so the matter remained in *status quo*.

As I made no demand for costs, of course, none were given.

Since then the matter has been settled by Messrs. Sandon paying me what I have chosen to accept in satisfaction of my fees. But be it quite understood that the decision of the Bow-street Court confirming that of all other Courts in favour of the District Surveyor's contention is unshaken, and that Clause XXVII. of the Act remains to be read as it always has been, and Messrs. Sandon's contention has only confirmed its meaning to be just what it says in its several rules.

C. F. HAYWARD.

SCHOOL-PLANNING.

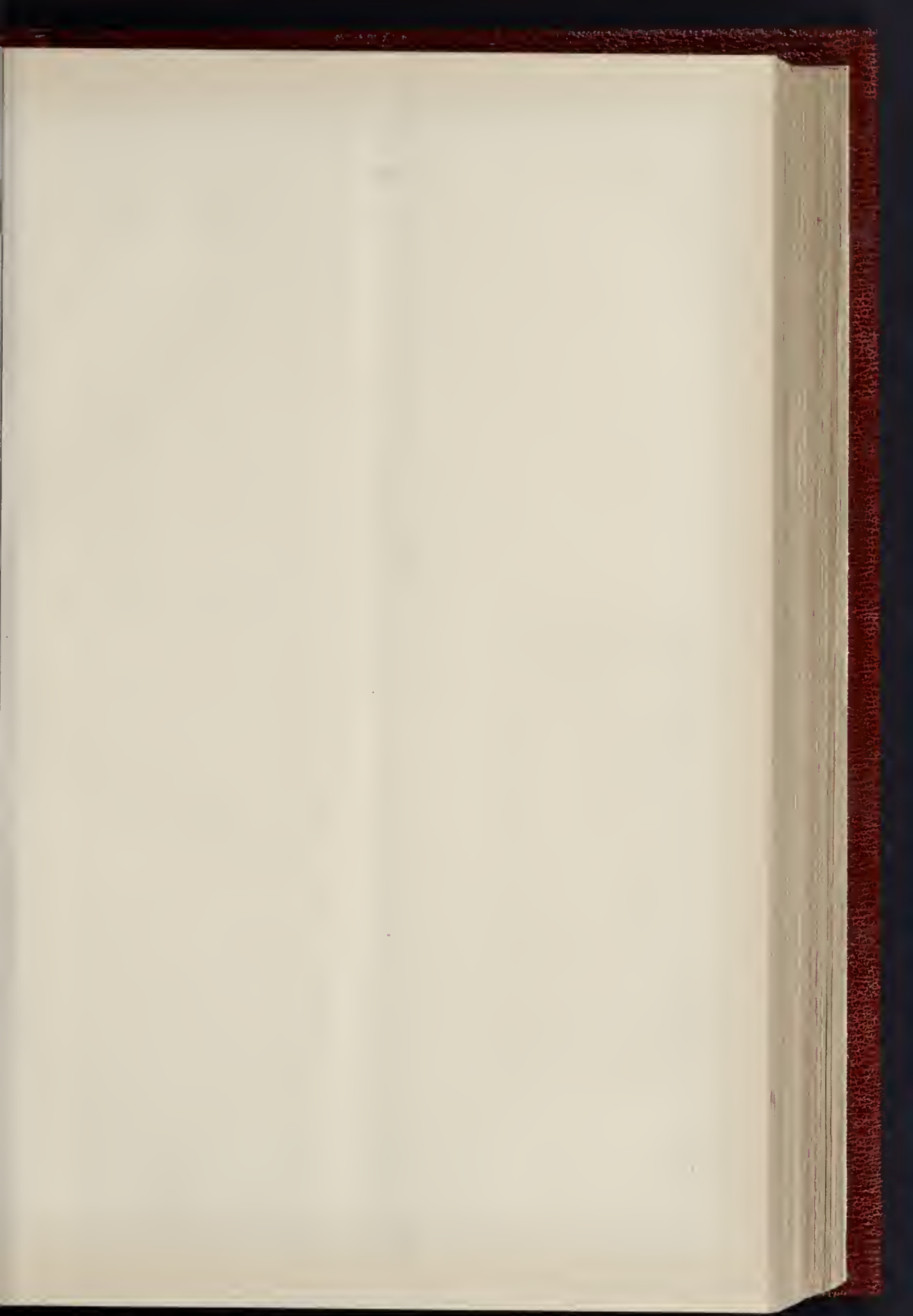
SIR,—The writer of the article on p. 4, *ante*, recommends asphalt for school floors. I have, however, frequently heard complaints from men employed in City warehouses of the asphalt floors upon which they have to stand all day; they attribute to its effects the shortening of the lives of their fellow-workmen. Employers who have to stand continually on linoleum or oilcloth also complain that these floor-coverings "draw their feet." It has been suggested that asphalt and these coverings are good conductors of heat, and are the means of a too rapid loss of heat; another notion is that the interposition of these substances causes an interference with the normal electric condition of the body. What are the electrical conductive conditions of these substances I do not know, but it would be useful to your readers if some of your scientific subscribers would kindly give us some information on the matter.

A. H.

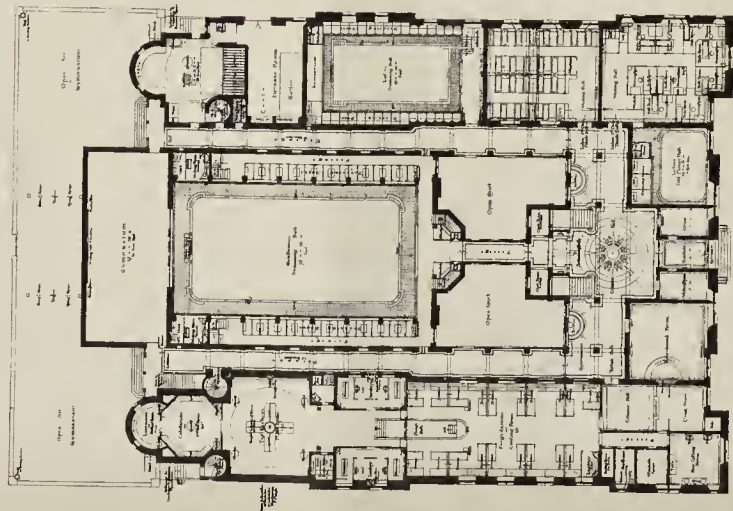
DADLINGTON CHURCH, LEICESTERSHIRE.

SIR,—In Vol. I. of the *Builder*, July 8, 1843, there appears an engraving of this old church with its quaint, square wood belfry, covered with oak shingles.

Archeologists, and everyone who takes a delight



THE BUILDER. JANUARY 25, 1890.

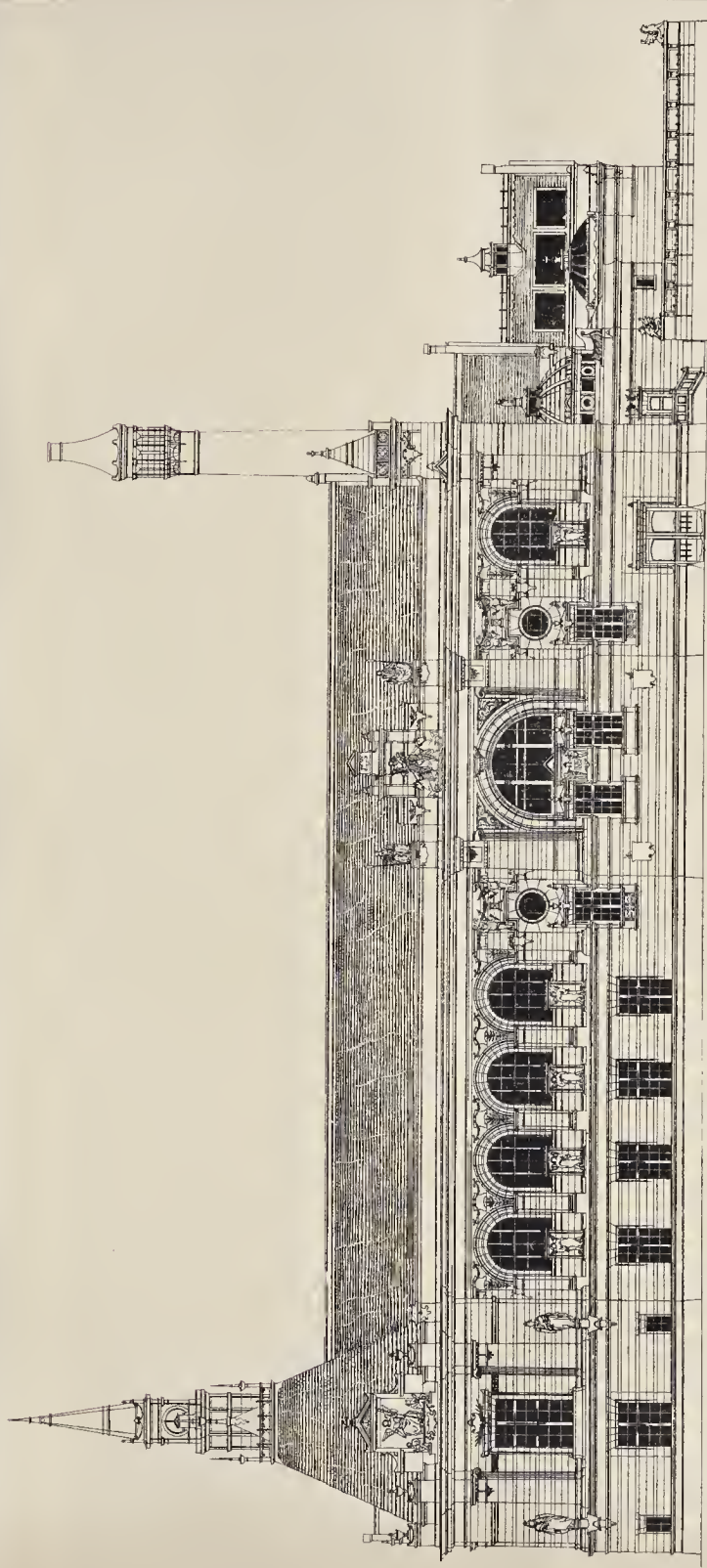


GROUND-FLOOR PLAN



FRONT-ELEVATION

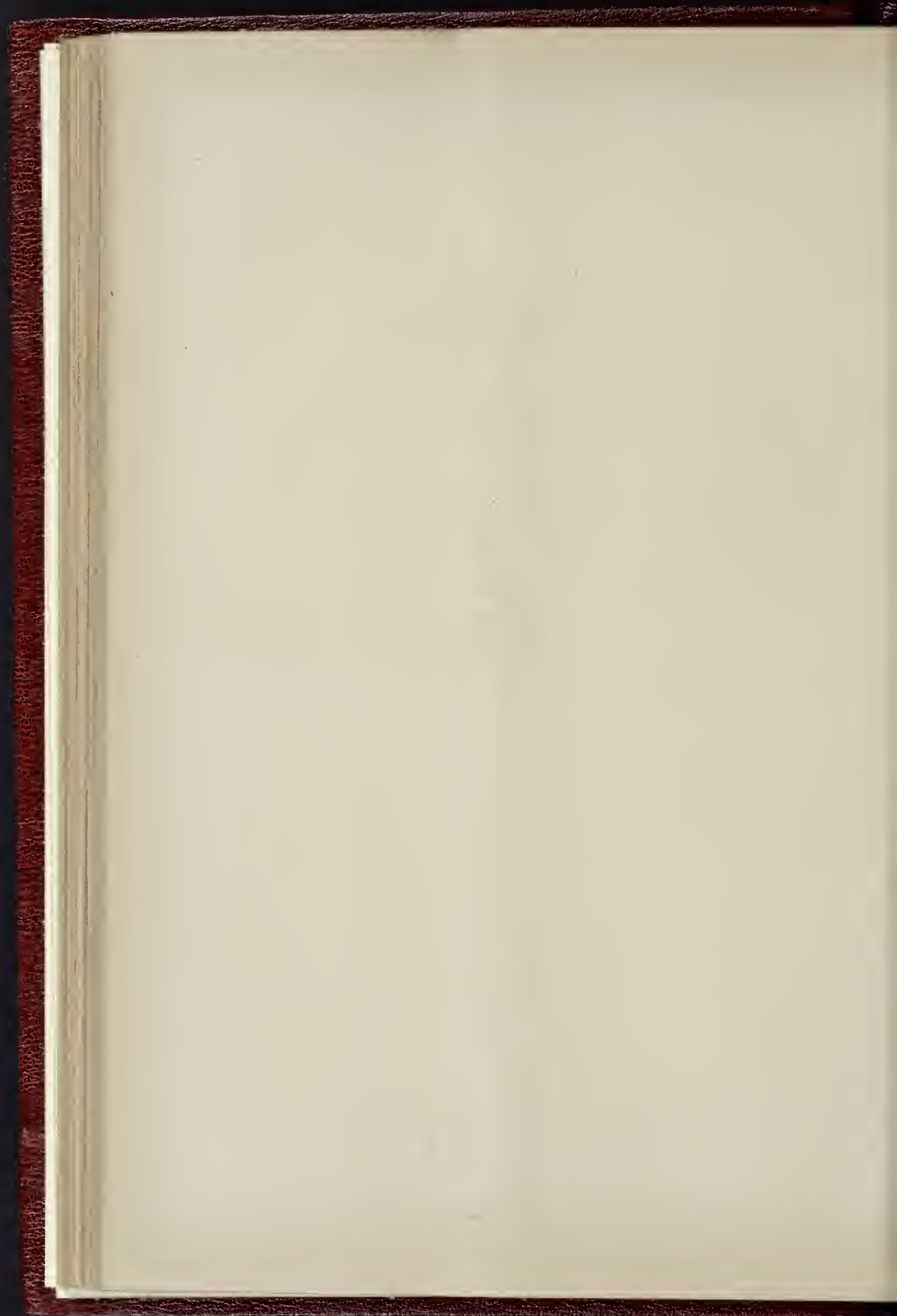
By Mr. PETER ANDERSON.



SIDE ELEVATION



PHOTO LITHO BRUNNELL & CO. 25, MARTIN LANE, LONDON, E.C.



and pride in our village churches, will learn with mingled feelings of disgust, shame, and regret that this unique old belfry has disappeared, and in its place a fourth-rate, fancy-tiled, villa-turret type of thing put up. The curious old windows, which did duty for a clearstory, have been ruthlessly brickied-up with red bricks, and other vagaries are contemplated with the old wood porch and its fine old door, "if the funds hold out." Surely, some steps can be taken to stop the destroyer's hand. I understand no architect has been called in, but, from a personal inspection of this old belfry in August last, I do not hesitate to say that, with judicious repair at a comparatively small outlay, it would have done duty for centuries.

The chancel was faithfully repaired and partly re-built two or three years since under Mr. Ewan Christian, the architect to the Ecclesiastical Commissioners. H.

PROVINCIAL NEWS.

Smetwiche.—A number of residences are about being commenced at Smetwiche, Bloxwich (near Walsall), and near Solihull (Birmingham). These houses will be of a size and character adapted to the requirements of clerks and the higher class of skilled artisans. The total cost of erection is estimated at about 23,000*l.* The architect is Mr. John Statham Davis, Birmingham.

Swansea.—The Alexandra-arcade, Swansea, has now been completed. According to the *Western Mail*, the architect is Mr. E. Bath, of Swansea, and the builder Mr. Henry Billings, Swansea. The arcade contains twenty-seven shops, and is furnished throughout with a complete installation of electric light. Its principal novelty, however (amongst South Wales arcades), is the principle which has been adopted of building a second row of shops above the first, and giving access to the upper row by galleries or balconies, which lead all along the building. The public go up flights of massive stone steps at either end, and pass along a fairly broad pavement in front of all the shops. The arcade is traversed by bridges at either end and at the centre, and the public can thus pass freely to all parts. The arcade leads from High-street to Alexandra-road. The latter thoroughfare is at present showing some signs of advancement, and it is hoped that it will in time become as important a thoroughfare as High-street itself.

Walsall.—A new hall for the Walsall Spiritualistic Society is now in course of erection. The hall will consist of basement and three storeys, the top one being devoted to the caretaker's rooms and the basement to the cooking kitchens and other offices. The principal part of the building will be two halls of 36 ft. by 54 ft. each, with ante-rooms and lavatories, the height of the building being 34 ft. to the wall-plate. The building will be almost entirely of brick, with Corinthian columns and elaborate cornices. Mr. W. E. Jackson, Walsall Wood, is the architect, and Mr. R. Evans, Thorpe-road, is the builder. The contract for the building is 1,000*l.*, and the total cost is expected to be about 1,200*l.*

CHURCH BUILDING NEWS.

Alnwick.—An organ-chamber has been added on the north side of the ancient parish church of St. Michael, at Alnwick, opening out of the chancel under a Perpendicular arch made to correspond with the character of the chancel. The ancient window formerly in the wall, at the point now occupied by this arch, was carefully taken down, marked stone by stone, and erected precisely as before in the north wall of the new chamber. Mr. F. R. Wilson is the architect. A new organ, estimated to cost 630*l.*, is to be placed in it when the necessary funds are gathered together. The Duke of Northumberland has generously contributed upwards of three hundred guineas towards the expenses of the improvements. The ancient fabric here and there shows traces of the munificence of the ancient Percies in features bearing their heraldic insignia. It is, perhaps, still better known among antiquarians as possessing one of the rare reacon turrets, from which intelligence was flashed, by means of a beacon flare, to distant parts.

Liskeard.—The parish church of Liskeard has lately been reopened, after the completion of its restoration. According to the *Western Morning News*, the work of restoring the church has been done, during a long series of years, in a somewhat fragmentary manner, but about ten or eleven years ago an important contribution to this work was made, nearly 4,000*l.* being

then spent in the erection of a new roof, the removal of the organ-gallery, the rebuilding of the north-east angle of the north aisle, and the provision of new mullions and tracery heads to some of the windows. The contract was entrusted to Mr. Thomas Lang, and the church was reopened on March 12, 1879. The committee at that time, although desirous of completing the restoration of the chancel, deemed it advisable to postpone further operations. Ten years having elapsed, an effort was made which has resulted in seeing the desired alterations and improvements carried out. The first stage of the work of the present restoration, which has been carried out from designs by, and under the superintendence of, Mr. John Sansom, architect, of Liskeard, was the demolition of the old and dilapidated vestry, and rebuilding on the same site a structure in the fifteenth century style, to harmonise with the church, the windows, doorways, and other dressings being of granite, interior fittings of oak, and tiled floor. This vestry is a memorial to the late Rev. James F. Todd, a former vicar, and carries out the desire entertained for its erection by his successor, the Rev. Flavel Cook. Mr. T. E. Madams, of Liskeard, was the builder. The old chancel, which measures 40 ft. long and 21 ft. 6 in. wide, and has now undergone restoration, was very badly arranged, and there was no apparent distinction between it and the other portion of the church. The view of the east-end was, moreover, obstructed by the position of the pulpit, which stood on the south side of the nave aisle, near the old high pews of the Corporation, whilst on the north side of the nave aisle was a high reading-desk, the clerk's desk, and churchwarden's pew. These constructions have now been removed, and a passage carried across the east end of the nave. The old oak pulpit, which is a fine specimen of carving, and bears date "Anno Domini, 1636," has been refixed on a moulded granite base much lower than it previously stood, and is approached from the chancel by four granite steps corresponding with its base; it is somewhat further south than formerly. The chancel has been entirely rearranged, the floor raised one step above the nave, and the new choir stalls, erected in teak, are of handsome design and elaborately carved, while the poppy heads are worthy of special mention. The two steps leading from the chancel to the sacristan are of polished red Ogwell marble, and supplied by Messrs. Blackler & Son, Torquay. The altar railing, which is of solid brass, polished and furnished, with moulded top rail of oak, was manufactured by Messrs. Hart, Son, Peard, & Co., London. The floors of the entire chancel are paved with rich encaustic Minton tiles of special design. The east wall of the chancel has been taken down and rebuilt, and a new granite five-light window and tracery lights has been filled with stained glass by Messrs. Clayton & Bell, Regent-street, London, illustrative of the Ascension of our Lord. Underneath this window stands the reredos, in Beer stone. It has three main panels divided by pinnacles and buttresses, the centre panel by a crocketed canopy. The two panels on each side of the reredos are similar in character to the centre. The whole is rich in carving and tracery. The Communion and credence tables, which have been made in Jerusalem of oak from Mount Hebron and olive-wood from Gethsemane, were designed by the architect. The table has an elaborate tracery front, and the sedilia is in teak of similar character and design to the choir stalls. The east window of the north chancel aisle has also had a new granite five-light window; this has been filled with stained glass by Messrs. A. Savill & Co., of London, and is erected to the memory of the late Mr. Christopher Childs by his widow and four sons, Mr. Torlase Childs, Dr. Childs, Mr. Walter Childs, and Mr. John F. Childs, and illustrates the text, "Consider the lilies of the field." In the north and south chancel aisles the seats have been rearranged so as to afford passages behind the choir stalls, and the Corporation pews are placed in front of the nave seats, the bench ends being carved with the borough arms, poppy heads, and tracery panels, the seat for the Mayor being placed in the centre of the first pew. The heating apparatus has been rearranged by Messrs. Longthorpe, of Leeds. The wrought-iron reading-desk placed in the nave is the work of Mr. John Davey, of Liskeard. The work generally has been carried out by Mr. Philip Blowey, contractor, of Plymouth, and has been to the satisfaction of the architect

and committee, whilst the carving, both in wood and stone, has been executed by Mr. Harry Hems, of Exeter. The granite work was supplied by Messrs. Nicholls & Son, Liskeard. The amount expended has been about 1,800*l.*

Perth.—It has been decided to restore the ancient kirk of St. John, Perth.

Wimbish (Essex).—We learn from the *Essex County Chronicle* that it is proposed to complete the restoration of this church by "the rebuilding of the tower," and the carrying out of other works, at an estimated cost of 1,300*l.* Mr. Nelson Jones is named as the architect. The ancient tower, it appears, fell down about 130 years ago. The chancel was rebuilt in 1872.

STAINED GLASS.

Cardiff.—A stained-glass window, for St. John's Church, Cardiff, is on view at Messrs. Belham & Co.'s studio in Buckingham Palace-road. It is in three lights, and illustrates the subject of Christ blessing little children, the figure of Christ occupying the centre compartment, with groups on either side compartment composed in relation to the centre one. The design of the figures is good, and Messrs. Belham's peculiar thick rough glass makes the most of the colour effect. The window has been carried out by Messrs. Belham & Co. from a design by Mr. J. P. Seddon.

Charlestown (Cornwall).—According to the *Western Morning News*, a stained-glass window, from the studio of Messrs. Fournace & Watson, has just been placed in St. Paul's Church, Charlestown, in memory of William Vawdrey, the eldest son of the late Dr. Vawdrey, of St. Anstel. The subject is a figure of Solomon, King of Israel, holding a model of the Temple at Jerusalem in his hand. The inscription states that William Vawdrey died at Shanghai in 1883.

Kenilworth.—In the south transept of St. Nicholas Church, Kenilworth, a memorial window has just been placed. The window is of two openings, which are filled with the subject, carried over both lights, of "Our Lord's Charge to St. Peter," with ornamental canopy. Under the window a brass-plate is fixed with inscription. The work has been designed and executed by Messrs. F. Holt & Co., Warwick.

Little Burstead (Essex).—The east window of the parish church of Little Burstead has lately been filled with stained glass, the gift of Mr. John Ismay French. According to the *Essex County Chronicle*, the window is the work of Messrs. Clayton & Bell, and it consists of three lights, containing the following subjects, under canopies:—In the northern light, the Annunciation; in the southern light, the Presentation; and in the central light, the Crucifixion. In the tracery above are angels with inscribed scrolls. The work is treated in the richest manner, and has been carried out strictly in accordance with the characteristics of the fourteenth-century period.

London.—St. Clement's Church, Eastcheap, has lately received an addition to its stained glass, in its east window, from the studio of Mr. Taylor, of Berners-street, the subject being the "Agnus Dei," carried out in Renaissance style under the direction of Mr. Butterfield, the architect, who has just completed the redecoration of the church.

Surveyorship, West Hartlepool.—At the last meeting of the Town Council, the salary of the Borough Engineer, Mr. J. W. Brown, Assoc. M. Inst. C. E., F. G. S., was, by a large majority, increased from 400*l.* to 500*l.* per annum. Mr. Brown was outvoted on the efficient and able way in which his department is conducted, and on the skillful manner in which he had designed and carried out the engineering work of the Corporation. Many extensive schemes are in hand and in contemplation in this rapidly developing port.

Advance in the Price of Bricks.—A well-attended meeting of brickmasters was held at Cannon-street Hotel on the 13th inst., at which the leading manufacturers of the various districts supplying the London market were present. The following resolutions were proposed, seconded, and unanimously passed:—

- (1) "That in the opinion of this meeting of brickmasters supplying the London market, an advance in the selling price of bricks is imperative to meet the increased cost of fuel and materials, and the advance given in the price of labour.
- (2) "That in the opinion of this meeting it would prove of great advantage to the industry, if brickmasters supplying the London district would cooperate in dealing with the various labour questions as they arise."

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—IV.
CURRENT (continued).

IMPORTANT as are the effects produced within a conductor through which an electric current is flowing, still more important are the phenomena occurring in the medium around it. A suspended magnetic needle brought near a wire, carrying an electric current, tends to set itself at right angles to the conductor, showing that a current produces a magnetic field in the surrounding medium, and thus establishing a connection between electricity in motion and magnetism. An investigation of the magnetic field so produced, by means of iron filings and a needle suspended in such a manner that it can point in any direction, shows that a current is surrounded by a series of circular lines of force, whose planes are perpendicular to the current, and whose centres lie in it. A field of this shape is frequently called a "whirl" of force.

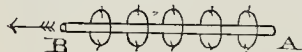


Fig. 6.

Fig. 6 shows the relative directions of the current and of the circular lines of force. The diagram should be committed to memory, but the following rule, known as Ampère's, is also useful.—"Imagine yourself swimming in the current, so that it flows from your feet to your head, then if you face the magnetic needle, its north pole will be turned to your left hand."

It is the strength of the magnetic field produced by a current that is used for determining the strength of the current itself.



Fig. 7.

If a current is sent from A to B (Fig. 7) through a solid conductor, and at B split up into three or more parts, so that from B to C a number of currents are flowing, which, added together, equal the current in A B, it will be found, the distances being in both cases the same, that the field produced by the current in A B at an external point is the same as that produced by the currents in B C. Again, if a given current flows along a straight conductor the number of lines of force produced by it will be proportional to its length. We say straight, because a conductor might be increased in length, but the added portion so shaped that the new lines of force neutralised some of the old ones, in which case the total number of lines would be diminished instead of increased. Before the strength of a current can be determined by measuring the field at a point external to it yet one thing must be known, and that is, how the strength of the magnetic field varies as we recede from the conductor. If we attempted to investigate this question by measuring the strength of field at various distances from a straight conductor, mathematical difficulties would arise in examining the results, firstly, from the fact that different portions of the current would be at different distances from the point in the field under consideration; secondly, because as we recede from the conductor in any direction, the distances from different parts of the current do not increase in the same ratio.

These difficulties can be got over by using conductors bent into circles, and noting the fields produced at their centres, from which, of course, every portion of the current is equidistant, taking into account the increased length of conductor when the distance is increased by the use of larger circles. The following very simple demonstration of the law of the inverse square of the distance is due to Professor Silvanus Thompson.

A circular bobbin B, (Fig. 8), of radius r_1 , is wound with n_1 turns of wire, the total length of which is therefore $2 \pi r_1 n_1$; a second smaller bobbin B, of radius r_2 , is wound with n_2 turns of wire, and placed in the plane of the first bobbin, so as to have its centre O in

common with it. A small magnetic needle is pivoted about one of its poles and placed so that when the plane of the coils faces east and west the second pole is at O. The connexions are made as shown in the figure, the connecting

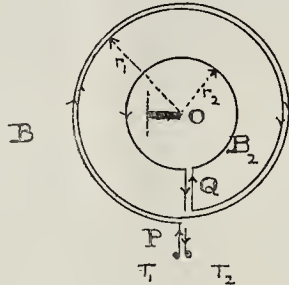


Fig. 8.

wires P and Q, leading the current to and from the terminals T_1 and T_2 and to and from the bobbins, being placed side by side, so that the whirl of force produced by the current in one wire is neutralised by the whirl produced by the same current going in the opposite direction in the other wire. It will be noticed that when a current is sent from T_1 to T_2 , through the apparatus, the fields produced by the bobbins B_1 and B_2 tend to neutralise each other; the turns of wire are so adjusted that no matter how much current is sent through the instrument the needle remains undeflected, that is, the bobbins exactly counteract each other's effects at O. On cutting the turns of wire, it will be found that

$$n_1 : n_2 :: r_1 : r_2 \quad (i)$$

Let $[r]$ be the mathematical expression which gives the variation of strength of field with distance.

Then the strengths of field produced at O by the bobbins, since the same current traverses both, are proportional to $2 \pi r_1 n_1 [r_1]$ and $2 \pi r_2 n_2 [r_2]$, but matters have been so adjusted that these fields are equal, hence

$$2 \pi r_1 n_1 [r_1] = 2 \pi r_2 n_2 [r_2]$$

therefore $\frac{[r_1]}{[r_2]} = \frac{r_2 n_2}{r_1 n_1}$ (ii)

but from (i) $\frac{n_2}{n_1} = \frac{r_1}{r_2}$ substituting this value

$$\text{in (ii)} \quad \frac{[r_1]}{[r_2]} = \frac{r_2^2}{r_1^2} = \frac{1}{\frac{r_1}{r_2}}$$

$$\text{or} \quad [r] \propto \frac{1}{r^2}$$

That is to say, the force varies inversely as the square of the distance. In the figure the radius of the outer bobbin is twice that of the inner one, so that one turn on B_2 balances two turns on B_1 .

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

18,802, Improvements in Water-closets. H. S. Booth.

In order to utilise the inflow of water under pressure to draw or force out the confined air and effluvia, an ejector, with controlling mechanism, is, according to this patentee, fixed so that the operation of flushing the closet automatically purifies the air.

1,578, Paint and Pigments. R. Stone.

The body of the paint which is the subject of this patent is made of China clay, marble, or any earthy substance of a fine, fibrous, silky nature. One or more of these or similar substances are mixed with petroleum oils or spirits, or with nitric or sulphuric acid. The mixture is then burned, which gives it a colour which is permanent and not likely to fade, and the resultant material is also fire and waterproof. Proportions of both pigments and media are varied at will, but the burning of the mass is an essential part of the invention.

2,121, Improved Building Block, Tile, or Slab. G. A. Wright.

According to this invention, a noiseless, non-absorbent tile is made of burnt clay, terra-cotta, concrete, or suitable material, and the face is dipped into india-rubber or such like solution; and while this is liquid, metal, flint, or granite powdered fine is sprinkled on the surface. The blocks are cemented together with bituminous cement.

19,829, Clamp. T. Metham.

The clamp, grip, or vice which is the subject of this patent is particularly adapted for the use of carpenters, joiners, or woodworkers, although it may be also utilised in other trades. It is formed of a combined set of levers or arms, in the shape of a fork or prong, upon the ends of which is fixed the grip or claw for compressing the material. The arms are actuated by means of a screw or screws, so placed that working it to right or left hand will cause the levers to expand or contract as may be required.

14,012, Substitute for Wood. H. B. Bentzen.

According to this invention, material for use in imitating wood-carvings is made by mixing dextrine, glue, and sawdust. For imitation carvings, the mass is mixed with dark sawdust and moulded under pressure, when the ornaments produced are of considerable strength and can be speedily and cheaply produced.

17,032, Portable Scaffold. A. T. Nygren.

This invention, which hails from Sweden, provides a hoist or scaffold which may be substituted for the ordinary stationary scaffold. Elaborate fixing by means of bars, screws, and bolts is provided, and a runner is clamped to the sloping roof and the cornice of the building. From the runner a kind of chair moved by ropes and winches depends, and this may be moved about to any part of the structure. The point of fastening, which looks strangely weak in proportion to the work required of it, is ingenious, but difficult to describe briefly.

NEW APPLICATIONS FOR PATENTS.

- Jan. 6.—205, H. Johnson, Window Fasteners.
- Jan. 7.—256, W. Halladay, Saw Sharpening Machines. 257, L. Halladay, Saw Swages. 258, L. Halladay, Saw Sharpening Machines. 263, J. Soketchazy, Portable Framework for Bridges. 274, A. Waterer, Electric Bells. 276, A. Bout, Sash Balances. 285, W. Kneen, Attaching Door Knobs to Spindles. 301, A. Lewis and J. Donaldson, Door Detainer.
- Jan. 8.—330, J. Dunning and B. Priestley, Sash Fasteners. 353, N. Scott Russell, Combined Door Springs and Checks.
- Jan. 9.—392, R. Brown, Batten Nail. 423, W. Silverlock, Ventilating Sowers, Drains, &c. 428, A. Wright, Weathered Facing Brick.
- Jan. 10.—436, S. Hill and R. Hodges, Door Catches and Door Fasteners. 479, A. Marshall, Sewer Inverts. 481, E. Burtwell, "Rise and Fall" Brackets for Shop Window Fittings. 482, E. Burtwell, Sash Fasteners. 497, J. Gizeux, Closing Doors.
- Jan. 11.—509, W. Reynor, Testing and Flushing House Drains.

PROVISIONAL SPECIFICATIONS ACCEPTED.

- 19,393, W. Davis, Material for covering walls.—19,524, S. Empsall and W. Fish, Syphon Water Flushers for closets.—19,586, C. Smith, Imitation Marble, &c.—19,617, M. Wardie, Self-acting Window Wedge.—20,470, J. Campbell, Drying Machine.—20,591, B. Little, Fresh-air Induction Pipes for Warm Air Buildings, &c.—20,711, S. Danischewsky, Door-fastener.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

- 1,952, J. Merryweather, Paving.—2,780 and 22,731, A. Fenton and others, Artificial Stone.—4,005, J. Hall, Norfolk Latches.—4,965, W. Davidson, Fastenings for Rain-water Pipes, &c.—7,020, H. Kimpton, Tip over Flushing Tank.—10,759, E. Massey, Fireplaces.—16,774, H. Maddean, Carpenter's Ploughs and Fillisters.—17,918, P. Knight and G. Hoyes, Door Knobs.—18,076, H. Lake, White Lead.—19,258, W. Wheatley, Roofs.—19,852, F. Prosser and W. Carter, Staining and Mottling Wood.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

- JAN. 13.—By RUSSELL, CROWE, & Co. Bernwood.—The lease of 13, Artillery-st., and the goodwill and plant of business premises, term 19 yrs. 500
- JAN. 14.—By E. & H. LUMLEY. St. James's-pk., the lease of No. 33, term 16 yrs., r. £390, and 68, Jermyn-st., ut. 29 yrs., r. £250 1,000
- By LOCKHURST & LLOYD. Brixton—184 and 186, Acre-lane, l. r. £64 p.a. 840
- Clapham—E.g.t. of £26 p.a., with reversion in 35 yrs. 700
- Wandsworth-rd.—No. 440, ut. 43 yrs., r. £25 430
- r. £42 p.a. 350
- JAN. 15.—By D. YOUNG. Newington—64 and 66, Albert-st., ut. 60 yrs., r. £25 535
- Stratford—101 and 103, Major-st., ut. 77 yrs., g.t. £6 6s., r. £40 16s. 240
- By F. ELDARD. Kilburn, Dunster-gardens—A plot of 2 land 165
- JAN. 16.—By NEWSON & HARDING. Barnsbury—63, Ellington-st., l. r. £45 700
- Islington, Pied Bull-yd.—Stabling, &c., ut. 25 yrs., g.t. £19, r. £55 p.a. 350
- Clerkenwell-rd.—No. 42, ut. 20 yrs., g.t. £15, r. £22 ss. p.a. 110
- l.g.t. of £140 p.a., term 26 yrs. 1,200
- Stoke Newington—5 and 7, St. Matthis-rd., ut. 53 yrs., g.t. £1, r. £25 425

Kingsland—66, Downham rd., n.t. 28 yrs, g.r. 44. 10s. r. £30 p.a. 2270
 Hoxton—61, Croyley-st., n.t. 15 yrs, g.r. £3. r. 130
 £28. 4s. p.a.
 37, Cavendish-st., n.t. 15 yrs, g.r. £3. 10s. r. 105
 £30 p.a.
 Midway-pk.—1, St. Jude-st., n.t. 42 yrs, g.r. £4. 245
 r. £32 p.a.
 By F. J. Russell.

Rotherhithe—29 and 31 Paradise-st., f. r. £41. 12s. 855
(Contracts used in these lists.—E.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; n.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.)

MEETINGS.

MONDAY, JANUARY 27.
 Royal Academy.—Professor Aitchison, A.R.A., on "Roman Architecture." Preliminary. 8 p.m.
 Surveyors' Institution.—Mr. H. H. Smith, on "Landed Incomes." 8 p.m.
 Society of Arts (Cantor Lectures).—Mr. Silvanus P. Thompson, D.Sc., on "The Electromagnet." II. 8 p.m.

TUESDAY, JANUARY 28.
 Institution of Civil Engineers.—(1) Further discussion on Mr. G. F. Lyster's paper on "Recent Dock Extensions at Liverpool." (3. Time permitting) Mr. W. H. Wheeler, on "Bars at the Mouths of Tidal Estuaries." 8 p.m.
 Society of Arts (Applied Art Section).—Mr. E. C. Hoehn, F.R.S.A., on "The Relation of the Fine Arts to the Applied Arts." Mr. Walter Crane will preside. 8 p.m.

WEDNESDAY, JANUARY 29.
 Society of Arts.—Mr. Gilbert Redgrave on "The Utilisation of Blast-furnace Slag." Prof. W. C. Roberts-Austen, F.R.S., will preside.

THURSDAY, JANUARY 30.
 Royal Academy.—Professor Aitchison, A.R.A., on "The Laurentine Villa of Pliny the Younger." 8 p.m.
 Royal Institution.—Mr. E. Roscoe Mullins on "Sculpture in Relation to the Age." II. 3 p.m.
 Institution of Civil Engineers.—Students' visits to (1) the Deptford Station of the London Electric Supply Corporation. 11 a.m. (2) The New Chiml-rooms at the Foreign Cattle Market, Deptford. 2 p.m.

FRIDAY, JANUARY 31.
 Architectural Association.—Mr. E. W. Mountford, on "Free Libraries." 7.30 p.m.

SATURDAY, FEBRUARY 1.
 Association of Public Sanitary Inspectors.—Sixth Annual Dinner.

Miscellaneous.

Lectures under the Auspices of the Worshipful Company of Carpenters.—The following course of free lectures on matters connected with building will be delivered at Carpenters' Hall, London Wall, on the Wednesday evenings named, each lecture to commence at 8 o'clock p.m.:—Feb. 5, Mr. Banister Fletcher, on "Architecture in all Ages," illustrated by large drawings, expressly prepared, and photographs; the Rt. Hon. Sir John Lubbock, Bart., in the chair. Feb. 12, Prof. T. Roger Smith, F.R.I.B.A., on "Drawing—Geometrical and Perspective," Sir J. C. Lawrence, Bart., in the chair. Feb. 19, Prof. W. H. Corfield, M.A., M.D., on "Modern Sanitation"; Mr. H. J. Kennard, in the chair. Feb. 26, Professor Armstrong, Ph.D., F.R.S., on "The Domestic Fireplace"; Mr. Charles Barry, F.S.A., F.R.I.B.A., in the chair. March 5, Prof. A. B. W. Kennedy, F.R.S., on "The Forth Bridge"; Mr. Alfred Preston, in the chair. March 12, Prof. Marshall Ward, M.A., on "The Tree, from the Sapling to the Bench"; Mr. Wyatt Papworth, F.R.I.B.A., Master of the Clothworkers' Company, in the chair. March 19, Prof. W. C. Unwin, F.R.S., on "The Construction of Walls"; Mr. Banister Fletcher, J.P., Master of the Carpenters' Company, in the chair.

The New Law Courts, Rome.—The concrete foundation-plate of the New Law Courts has been completed. The layer of *biton* has a thickness varying from 2'00 to 2'80 m., and has been spread over the whole of the building site at a depth of about 7'50 m. below street-level. It took two parties of men, each 700 strong, working day and night, in three shifts of eight hours' duration, to get the work done in thirteen weeks. The 56,000 cb. metres of material used were mixed by hand, the proportion being three parts broken stone to two parts pozzolano and one part lime-paste.

New Imperial Palace at Frankfort.—A new palace is to be built for the Emperor at Frankfort-on-the-Main, at a cost of 100,000*l.* It will, it is said, be one of the finest palaces around that city, although the town is so rich in these from the Hesse, Nassau, and Grand-Ducal Homburg times. There is to be a banqueting hall capable of seating 120, and twenty-eight minor halls and saloons.

The Growth of Hong-Kong.—The *Times* says that at the opening of the session of the Hong-Kong Legislative Council on November 20, Governor Des-Vaux laid on the table a copy of an elaborate dispatch which he had just addressed to Lord Knutsford on the growth and prosperity of the colony. The document refers at length to everything connected with the recent growth of Hong-Kong. A striking evidence of the increase of wealth will be found in the prices of land. Since 1881 the price of marine lots has risen 50 per cent., and of those inland from 10 to 20 per cent. Land in Victoria in the best sites is worth about 180,000*l.* an acre, and lots have exchanged hands at such prices as 70,000*l.*, 95,000*l.*, 90,000*l.* an acre, and so on. In the Chinese business quarters it is not to be obtained at less than 97,000*l.* to 130,000*l.* per acre, while hill lots have increased in even greater proportion. Government lands which could not have been sold at 5 per cent. per square foot within the present decade have lately been sold at public auction for more than ten times that amount. The sums derived from land premiums, or the sums received from leases, are not included in the ordinary revenue, but are kept separate as matter of account, and are applied to defences and other permanent works. Next to the defences works, the greatest public work of recent years is the Tytam reservoir, which confines 350 million gallons of water behind a dam composed of granite and concrete, at a distance of five miles from the city of Victoria, and the conveyance of the supply by means of a tunnel 2,450 yards in length, and a cut granite aqueduct for the remaining distance. In concluding his long and interesting report, Sir William Des-Vaux says:—"There must be some still living who saw the island before the British occupation. If one of them, having been absent during the whole interval, were now to return, even the extremely salient and beautiful features of the natural landscape would scarcely enable him to identify with the Hong-Kong of to-day what he would remember as a bare rock, with a fisherman's hut here and there as the only sign of habitation, and a great sea-basin only very rarely disturbed by a passing keel. For now he would see a city of closely-built houses stretching for some four miles along the island shore, and rising, tier over tier, up the slopes of the mountain,—those on the upper levels interspersed with abundant foliage, while on the opposite peninsula of Kowloon, which was (until very recently) an uninhabited waste of undulating red rock, he would now see,—in the distance prevalent verdure,—in the foreground and along the whole sea-board numerous houses, together with docks, great warehouses, and other evidence of a large and thriving population. . . . "Going ashore our visitor would see long lines of quays and wharves, large warehouses teeming with merchandise, shops stocked with all the luxuries as well as the needs of two civilisations; in the European quarter a fine town-hall, stately banks, and other large buildings of stone; in the Chinese quarters houses, constructed after a pattern peculiar to China, of almost equally solid materials, but packed so closely together, and thronged so densely, as to be in this respect probably without parallel in the world."

The English Iron Trade.—The English iron market is quieter; but, although lower prices have been accepted during the week, it has lost nothing in its steadiness. Pig-iron has been further depressed in price, owing to the decline in warrants. Scotch warrants have been flat, and there has been some excitement in the market. Scotch makers' iron is still pretty strong, however, notwithstanding the adverse influence of warrants upon prices. Cleveland iron is 1s. 6d. per ton lower with makers, while merchants quote 3s. per ton less. There is less firmness in Lancashire and Midland brands generally; but Staffordshire pigs remain stiff. Bessemer iron in the North-west has lost 6d. a ton on the week, with makers firm at their quotations. Old materials are steady at a rise of 10s. per ton. The business doing in finished iron is moderate, and prices are easier in the North of England, but in Lancashire and Staffordshire they are strong, though common crown bars and sheets being 5s. per ton dearer. Steel continues in good demand, and is steady. Although billets and slabs are 2s. 6d. a ton lower in the North-west, blooms have gone up 2s. 6d. Shipbuilders continue busy, but not many new orders are hooked. The condition of the engineering trades remains the same as reported last week.—*Iron.*

Liverpool Engineering Society.—The seventh meeting of the present session was held on Wednesday, the 15th inst., at the Royal Institution, Colquitt-street, Mr. Henry H. West, M.Inst.C.E., President, in the chair. After the usual routine business had been transacted, a paper entitled "Mechanical Refrigeration and the Manufacture of Ice" was read by Mr. M. C. Bannister. Having pointed out that artificially-produced cold had now become an absolute necessity, not only for the maintenance of our food supplies, but also for the economical prosecution of many chemical processes, the author gave a brief summary of the laws regulating the transmission of heat or cold from one medium to another. He then reviewed the various chemical and mechanical methods which have been used for the artificial production of cold, after which he proceeded to treat thermodynamically the various systems of refrigeration now in use, namely, those known as the cold air, sulphuric ether, sulphurous anhydride, carbonic anhydride, ammonia compression, and ammonia absorption. Each of these systems he dealt with separately, resolving all to a common thermal basis, viz., the heat units in one pound of coal consumed to raise steam to be used in a fairly high-class modern steam-engine. The general results obtained were demonstrated by graphic thermal diagrams, showing the various losses and ultimate useful effect of each system, and tables giving the vapour tensions and latent heat units of various temperatures. The author then briefly sketched the mechanical details of ice-manufacture, explaining his own recent improvements for the more economical manufacture of crystal ice in large blocks. The paper, which throughout was of a very interesting and exhaustive character, was concluded by some sketches of the floral crystalline formation of ice. The discussion upon the paper was adjourned until February 12.—The annual dinner of the Society took place on the 17th inst. at the Adelphi Hotel. The chair was taken by the President, Mr. Henry H. West, M.Inst.C.E., and there were about ninety members of the Society and other gentlemen present. The tables having been cleared, and the patriotic toast honoured, the Mayor (Mr. Thos. Hughes) proposed "The Engineering Profession," and referred to the triumphs of English engineering throughout the world, particularly pointing out as instances the Mersey Tunnel, the bridge across the Dee, and the docks at Liverpool, in regard to which no one could recognise more than he did the science that had been developed in this direction by his friend Mr. George Fosbery Lyster. None could doubt but that it was owing to the skill, perseverance, and energy of English engineers that this country had practically become the carrying power of the world. Sir John Coode, M.I.C.E., K.C.M.G., responded. The President then referred to the humble beginnings of their Society, and stated that some fifteen years ago it was held alternately in the homes of the members, but in course of time it had grown to be one of the most important auxiliaries of the parent Society. A move, he might mention, was being made to bring the whole into one common fold. He thought this was a step in the right direction. While not destroying the individuality of each Society, they would, by coming into communication with each other, tend to promote a higher standard of skill. Sir Charles Darbishire then proposed the toast of "Kindred Societies." Mr. T. Mellard Reade, F.G.S., responded, and expressed the opinion, as regards the two professions, that whilst emulation might be encouraged, there was no fear of competition.

The Corinth Canal.—The work on the Corinth Canal is again being actively prosecuted. Of the 12,000,000 cubic metres of earth to be removed, two-thirds have already been excavated. It may be remembered that the Canal Company was in financial difficulties a little while ago, but these are now said to have been overcome. The Governments of Greece, Italy, and Austria having promised an interest guarantee of 10,000,000 francs. It is however expected that the canal cannot be finished in less than three years. It may be mentioned that this undertaking was in reality begun in the reign of Emperor Nero, over 1,700 years ago, but has been abandoned from time to time.

Oundle Sewerage.—Mr. W. H. Radford C.E., Nottingham, has been instructed to prepare plans for intercepting sewers and sewage precipitation-tanks at Oundle.

British Archaeological Association.—At the meeting of this Association on Wednesday, the 15th inst., Mr. C. H. Compton in the chair, a communication was read from the owner of Eggeston Abbey, near Barnard Castle, denying that any of the ancient ruins had been purposely removed. A portion had been blown down, but the remainder would be carefully preserved. Mr. Loftus Brock, F.S.A., exhibited an old German book of sermons printed in 1516,—a fine specimen of monastic binding, in stamped leather, with brass bosses, of contemporary date. Mr. A. G. Langdon exhibited designs of a series of bench-ends which have been destroyed with the church of Levenhock, Cornwall, recently burnt. Mr. Earle Way exhibited a series of examples of fictile ware found on the site of the old Marshalsea prison, Southwark. These remains are of Roman date, one being a curious imitation of a thin Samian ware bowl, in black Upchurch pottery. The chairman announced his recent correspondence with the Historical Manuscripts Commission relative to the records of Creakle Abbey, preserved at Cambridge. A paper was then read by the Rev. Denny Gedge, on the brass of Sir Adam de Clifton, who died 1367, formerly existing in the Church of Methwold. It was sold by the sexton in 1680, to a travelling tinker, who broke it to pieces and melted a portion. The remainder was recovered and preserved in the parish church in a fragmentary condition, but in more recent years they again left the church. The pieces have now been put together and the brass fixed to the wall of the church. The brass is one of very considerable beauty, and the face appears to be a portrait. The second paper was on the Ancient Charters and the Boundaries of Crowland Abbey, by Mr. A. S. Canham. These documents are remarkable for being so full of inaccuracies, and it is well known that doubt has been thrown upon their value. The author contended that these were occasioned by the error of transcription either from memory or from poor copies, after the burning of the originals in Norman times. The matter was correct, although names and dates were often misleading. The boundaries were then discussed and all the names recorded in the old documents identified by the modern designations and the six boundary crosses which still remain. A seventh was ploughed up in 1848.

Installation of Mechanical Engineers.—The annual general meeting of this Institution will be held on Wednesday, Thursday, and Friday, Jan. 29, 30, and 31 respectively, in the hall of the Institution of Civil Engineers, Great George-street, Westminster. The following papers will be read, viz., "On the Compounding of Locomotives burning Petroleum Refuse in Russia," by Mr. Thomas Druhart, Locomotive Superintendent, Graz and Teasritz Railway, South-East Russia; "On the Burning of Colonial Coal in the Locomotives of the Cape Government Railways," by Mr. Michael Stephens, Chief Locomotive Superintendent; "On the Mechanical Appliances employed in the Manufacture and Storage of Oxygen," by Mr. Kenneth S. Murray, of London. Communicated through Mr. Henry Chapman.

The Royal Arcade, Melbourne, Australia.—A short time ago Mr. Howard Spensley invited competitive designs for enlarging the Royal Arcade, Bonrke-street, by adding an annex to run from Elizabeth-street and join the present arcade about the centre. A number of designs were submitted from the Colonies, and also from London, and after careful consideration the choice fell upon the design bearing the motto "Arcadia," which was awarded first premium, and was prepared by Mr. J. W. Lockwood, architect, Melbourne. The second premium fell to the lot of "Orient," Mr. John E. Still, architect, of London. It is intended to proceed with the erection of the building immediately. — *Melbourne Argus*, Dec. 6, 1889.

The New Government Buildings at Christiana.—In consequence of the unsatisfactory nature of the designs sent in for the new Government buildings at Christiana, the committee of adjudicators will, most likely, it is said, invite another competition. The two architects gaining the first and second premiums were Messrs. Lenschow and First, the former's grouping of the details of the facade being commended, whilst the design of the latter is considered suitable for acceptance in the main; but neither of them satisfies the requirements set forth in the programme in its entirety.

Pavements and Horses.—It would be a step in advance if, failing the best of all pavements,—yet to be invented,—London, and for that matter other towns and cities as well, could be paved in some uniform pattern. In that case horse-owners could, at least, try to cope with whatever slipperiness might be inseparable from the use of some particular material, by adopting a modified shoe, or by using some sort of appliance adapted to counteract the tendency to slip. We have no desire, in connexion with this subject, to re-open the horseshoe question. It is sufficient to say that, notwithstanding all arguments and inventions, the great majority of our working horses are shod in the ordinary manner,—a manner which, whatever advantages may be claimed for it, is but ill suited for use upon wood or asphalt. Still, were London to be paved throughout its length and breadth upon some uniform plan, there need be little doubt that some kind of modification of the present style of shoe would be indispensable; but an present it is probably an impossibility to find a system which shall succeed equally well with all horses on all roads. It need to be an old coachman's maxim that accidents usually occurred at starting or pulling up; and the saying holds good now, not only in its original sense, but also in the matter of passing from one kind of pavement to another; for every practical coachman knows that, putting aside gradients, sharp stops, or exceptionally slippery portions of roadway, his horses nearly always either fall, or threaten to do so, when they come suddenly on to one substance after travelling on another. It is, however, worthy of note that some of the teams working in and out of London wear indiarubber pads, and the coachmen, amateur and professional, are unanimous in declaring that they prevent slipping, and enable the horses to travel at the requisite speed without any great amount of inconvenience.—*The Field*.

Plumbing Examinations at Bristol.—An examination of candidates for certificates of registration, under the auspices of the local district council, took place on Saturday last, at the Merchant Venturers' School, Bristol. The Worshipful Company of Plumbers were represented by Mr. W. C. Timms, master plumber, and Mr. L. F. Gilbert, representative of the Operative Plumbers' Society of Great Britain, and the local examiners were Dr. D. S. Davies, Medical Officer of Health; Mr. T. S. Pope, architect; Mr. George Bracher, master plumber; Messrs. W. H. Hobbs and T. J. Edmonds, representing the local operatives' society, and Mr. Walter H. Perry, assistant honorary secretary. Candidates attended from Bristol, Bath, Crewkerne, Gloucester, and other places, and were examined in the theory and practice of plumbing, the theoretical questions being such (according to the *Western Daily Press*) as to test their knowledge of sanitary matters, besides other branches of the craft. The work done in both sections was of such a character that only 20 per cent. passed.

Cologne Cathedral.—The Society of Private Architects has published a circular-letter containing certain proposals for the opening-up of better views of the Cologne Cathedral, especially from the south-west corner. This new scheme has, however, come rather late, as alterations in the neighbourhood of the Dom are at present being carried out in accordance with the plans set up some time ago by Mr. Stnebbens. Both ideas might, however, yet be combined, and a very great improvement he then made, which would, however, require some 20,000, more than has been granted as yet for the project.

The Archer Patent Water-tight Drain-pipe.—We hear that the drains at the Royal Barracks, Windsor, are being taken up and relaid with the Archer patent water-tight pipes, as it was found that many of the ordinary pipes had become broken through settlement of the ground. The Walthamstow Local Board have just adopted the Archer stoneware pipes for a main sewer through the marshy, water-logged ground near the river Lea. The Archer joint has been fully described and illustrated in the *Builder*.

The North Sea-Cattegat Canal.—A Bill empowering the construction of a canal between the North Sea and the Cattegat, *via* the Simfjord, in Jutland,—a scheme to which we referred last year,—has been introduced into the Danish Parliament. The *concessionnaires* demand a State interest guarantee of 3 per cent. for fifteen years, the guarantee to commence a year after the completion of the canal.

Norwegian Wooden Villas.—Apropos of the Norwegian and Swedish wooden villas, of which specimens have been seen at various continental exhibitions in recent years, and which are finding much favour in other countries, a discussion has been started between certain Norwegian architects in their organ, the *Teknisk Ugeblad*, as to the merits of the architectural style adopted in the same. On one side it is argued that the style is not pure Norwegian at all, but a modern concoction, the true Norwegian style being that of the so-called Stabur, the peculiar style of architecture seen in some very old churches, and the building termed Staburs on old farms. It reminds one somewhat of the Chinese pagoda. On the other side it is argued that the "villa" style is preferred to the Stabur style abroad. The two styles might have been contrasted at the last Paris Exhibition, where the villa (now standing at the foot of the Eiffel Tower) obtained two gold medals, but it should be pointed out that the Stabur was unfortunately not raised till after the jury's award. The latter is now shown in the Museum Van Kunstinvertreed at Harlem. This style has been adopted, with certain necessary modifications, for nearly all rural railway stations in Norway. Finally, Herr Karl Norma, a well-known architect, whose speciality in the Stabur or Old Norse style of architecture, maintains that this style cannot be called Norse at all, but is a conglomeration of Roman, Gothic, and Renaissance, the treatment of which generally indicates a primitive and low intellectual standpoint of the builder. He considers, however, that the style is highly suitable as groundwork for picturesque villas.

PRICES CURRENT OF MATERIALS.

	£.	s.	d.	£.	s.	d.	
TIMBER.							
Greenheart, B.G.	ton	7	0	7	15	0	
Teak, E.I.	load	12	0	14	0	0	
Sequoia, U.S.	foot cube	6	3	0	3	0	
Ash, Baltic, 1st yellow ..	100	0	10	0	0	0	
Birch " ..	3	0	4	15	0	0	
Elm " ..	3	10	0	4	15	0	
Fir, Danstic, &c.	2	0	3	10	0	0	
Soft Pine, 1st yellow ..	3	0	5	5	0	0	
Canada " ..	5	10	0	7	0	0	
Pine, Canada red ..	2	10	0	3	10	0	
Soft Pine, yellow ..	3	0	5	5	0	0	
Lath, Danstic, 1st yellow	10	0	10	0	0	0	
St. Petersburg, &c.	5	0	6	10	0	0	
Wainscot, Elga, &c.	log	0	0	0	0	0	
Dowls, Finland, 2nd and 3rd ..	100	8	10	11	0	0	
" " 4th and 3rd ..	7	0	8	0	0	0	
Dowls—Riga ..	7	0	9	0	0	0	
St. Petersburg, 1st yellow ..	12	0	10	0	0	0	
" " 2nd " ..	9	0	10	0	0	0	
" " white ..	6	10	10	0	0	0	
Swedish " ..	7	10	16	0	0	0	
White Spruce ..	3	0	17	0	0	0	
Canada, Pine, 1st ..	16	0	26	0	0	0	
" " 2nd ..	11	0	17	10	0	0	
" " Spruce, 1st ..	9	0	11	0	0	0	
" " 3rd and 2nd ..	7	0	9	0	0	0	
New Brunswick, &c.	6	0	8	10	0	0	
Baltians, all kinds ..	6	0	17	0	0	0	
Flooring Boards, sq., 1 in, prepared, First ..	0	11	0	14	0	0	
Second ..	0	8	0	10	6	0	
Other qualities ..	3	0	17	0	0	0	
Cedar, Cuba ..	0	4	0	5	0	0	
Honolulu, &c.	0	4	0	4	0	0	
Mahoeva, Cuba ..	0	5	0	10	0	0	
St. Domingo, cargo average ..	0	5	0	0	6	0	
Mexican, cargo average ..	0	4	0	5	0	0	
Tobacco " ..	0	5	0	6	0	0	
Honduras, 2nd and 3rd ..	0	5	0	0	6	0	
Box, Turkey ..	4	0	13	0	0	0	
Rose, Rio ..	15	0	20	0	0	0	
Bahia ..	14	0	18	0	0	0	
Satin, St. Domingo, 1st ..	0	9	8	1	3	0	
Porto Rico ..	0	10	0	1	6	0	
Walnut, Italian ..	0	4	0	0	6	0	
METALS.							
Iron—							
Bar, Welsh, in London ..	ton	7	15	0	8	5	0
" " at works in Wales ..	7	5	0	7	15	0	
" Staffordshire, in London ..	8	10	0	9	10	0	
Cast, British, cake and ingot ..	57	0	58	0	0	0	
Best selected ..	59	0	60	0	0	0	
Sheets, strong ..	66	0	0	0	0	0	
CHIL, bars ..	49	0	0	0	0	0	
YELLOW METALS ..							
LEAD—Pig, Spanish ..	ton	13	17	6	0	0	
English, com. brands ..	13	17	6	14	0	0	
Sheet, English ..	15	0	0	0	0	0	
Pipe ..	16	10	0	0	0	0	
TIN—Straits ..	04	0	0	0	0	0	
Australian ..	04	10	0	0	0	0	
English Ingots ..	03	0	0	0	0	0	
OILS.							
Unseed ..	ton	20	10	0	20	17	0
Cocoonut, Cochin ..	26	0	0	26	10	0	
Ceylon ..	23	15	0	0	0	0	
Palm, Lagos ..	25	10	0	0	0	0	
Rapeseed, English, pure ..	22	10	0	0	0	0	
" " brown ..	31	0	0	31	5	0	
Cottonseed, refined ..	22	0	0	0	0	0	
Tallow and Oiling ..	21	0	0	40	0	0	
Lubricating, U.S. ..	10	10	0	10	0	0	
" " refined ..	7	0	12	0	0	0	
TAN—Stockholm ..	barrel	1	6	6	0	0	
Archange ..	0	17	6	0	0	0	

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

COMPETITION.

Table with 5 columns: Nature of Work, By whom Required, Premium, Designs to be delivered, Page. Includes Market House and Public Offices.

CONTRACTS.

Table with 5 columns: Nature of Work or Materials, By whom Required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page. Includes alterations, etc., to Offices, Board Room, etc.

PUBLIC APPOINTMENTS.

Table with 5 columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Includes Surveyor, Road Surveyors, etc.

TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

Table of tenders for BRISTOL, including Eastbrook & Sons, Church, Wm., Bathery, E. T., etc.

Table of tenders for BRISTOL, including Stephens & Bastow, Eastbrook & Sons, W. Church, etc.

Table of tenders for BRISTOL, including William Lindsay & Co., Westminister (accepted).

Table of tenders for BROMLEY (Kent), including Vaughan & Brown, Warner & Sons, etc.

Table of tenders for CANTERBURY, including low-pressure system the Sidney Cooper School of Art Gallery, etc.

Table of tenders for CHESTER, including alterations and additions to premises at the corner of Foregate-street and Soller-street, etc.

Table of tenders for CHISWICK, including for making up roads, etc., at Chiswick for the Chiswick Local Board.

Table of tenders for BARROWGATE-ROAD, including Scrif, Hoole, & Co., Adams, etc.

COLCHESTER.—For the erection of stables, and alterations, at William's Walk, for Mr. G. W. Mallinson. Mr. J. W. Starr, architect, Gups Chambers, Colchester:—

Table of tenders for COLCHESTER, including T. J. Ward, A. Doss, F. Dupont, etc.

HOLMWOOD (Surrey).—For repairs to 'Redland's Bank,' Holmwood, for Mrs. Ann Gammon. Messrs. H. M. & W. Grellier, architects:—

Table of tenders for HOLMWOOD, including Colls & Sons, W. J. Chivington, William Edger, etc.

ILLOGAN (Cornwall).—For the erection and completion of new school buildings at Illogan, near Redruth, together with enclosures, and providing for complete water supply. Mr. Sampson Hill, Redruth, architect:—

Table of tenders for ILLOGAN, including J. Odgers, Redruth, J. Julian, Truro, etc.

LONDON.—For rebuilding the Divisional Police-station, Leman-street, Whitechapel, for the Receiver for the Metropolitan Police District. Mr. John Butler, F.R.I.B.A., architect. Quantities by Mr. W. H. Thurgood:—

Table of tenders for LONDON, including W. Scrivener & Co., Kirk & Randall, Birge & Hill, etc.

LONDON.—For alterations and additions to the 'Duke of York,' Victoria-street, Westminster, for Mr. S. Stopp. Messrs. Saville & Martin, architects, 36 and 37, Strand, W.C.:—

Table of tenders for LONDON, including Putnam & Fotheringham, Ward & Lambie, Ansell, etc.

LONDON.—For the erection of three shops and dwelling-houses, Roslyn-hill, Hampstead, for Mr. James Grimbridge. Mr. Albert E. Fridmore, architect, 2, Broad Street-buildings, E.C. Quantities by Mr. Alfred Griggs:—

Table of tenders for LONDON, including G. Lyford, Poley & Son, Garnar, A. & W., Taylor & Son, etc.

LONDON.—For alterations at 5, Carter-lane, E.C., for Miss Heald. Messrs. Hudson and Booth, architects:—

Table of tenders for LONDON, including Hall, Biddall, & Co., Spencer & Co., J. Greenwood.

LONDON.—For paving, kerbing, &c., for the Camberwell Vestry. Mr. J. C. Reynolds, Surveyor:—

Table of tenders for LONDON, including Mrs. Gatty, Camberwell, Jas. Stowell, Camberwell, etc.

LONDON.—For alterations and sundry works to premises, Heath-street, Hampstead, for Mr. I. T. Richardson. Mr. Albert E. Fridmore, architect, 2, Broad-street-buildings, E.C.:—

Table of tenders for LONDON, including H. & W. Grey, Taylor & Son, W. Birch, E. E. Annan.

LONDON.—For the erection of a shop and dwelling house, Rosslyn-hill, Hampstead, for Miss Emma Day, Mr. Albert E. Pridmore, architect, 3, Broad-street Buildings, E.C. Quantities by Mr. Alfred Griggs:—
 Lyford, G. £2,142 0 0
 Taylor & Son 1,377 0 0
 Gurnar, A. & W. 1,309 0 0
 Tombs, E. 1,339 0 0
 McCormick & Sons 1,293 0 0
 Grover & Son 1,261 0 0
 Kilby & Gayford 1,234 0 0
 *H. King & Co., Hampstead. 1,146 0 0
 Potter & Son 1,140 0 0
 *Accepted. (No shop-front in this contract.)

LONDON.—For alterations at No. 2, Little Howland-street, W., for the West-end Glass and China Burning Company. Mr. John James Downes, architect, 11, The Parade, Lewisham High-road, S.E.:—
 Catechpo £204 0 0
 John Grover & Son 174 10 0
 Sydney Best (accepted) 163 0 0

LONDON.—For alterations and additions to the "King's Arms" Tavern, Fulham-road, for Mr. W. Hancock, Mr. H. J. Newton, architect, No. 5, St. Margaret's Chambers, 49, Victoria-street, Westminster.
 Kellaway £2,440 0 0
 Lambie 2,240 0 0
 Godden 2,273 0 0
 Burman 2,230 0 0
 J. Beale 2,030 0 0

LONDON.—For alterations and additions to the Morning Advertiser office, 127, Fleet-street, for the Incorporated Society of Licensed Victuallers, Messrs. Treacher & Fisher, architects, 30, Coleman-street, E.C.:—
 Walker £212 0 0
 Burman 439 0 0
 Few 440 0 0
 Spencer & Co. 440 0 0
 J. Beale 391 0 0

LONDON.—For alterations and general repairs to the "Malmore Arms," Peckham Park-road, for Mr. P. O'Callaghan.
 J. Beale £293 0 0
 [No competition.]

SCAWBY (Lincolnshire).—For building mansion, Seaby Grove (exclusive of stabling and lodge), for Mr. Joseph Cliff, J.P. Mr. E. W. Farebrother, architect, Grimsby:—
 Holmes & Co., Wainfleet £3,275 0 0
 Enoch Hind, Nottingham 8,247 0 0
 C. Baines, Newark 8,100 0 0
 H. S. and W. Close, Lincoln 7,783 0 0
 J. Guy & Co., Grimsby (accepted). 7,690 0 0

WOOLWICH.—For alterations and additions to the "King's Arms," Woolwich Common, for Mr. T. W. Earle. Mr. R. A. Lewcock, architect, 83, Bishopsgate Within:—
 Todd £1,034 0 0
 Allen & Son 986 0 0
 Spencer & Co. 990 0 0
 J. Beale 845 0 0

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The Builder.

Vol. LVIII. No. 242.

SATURDAY, FEBRUARY 1, 1890.

ILLUSTRATIONS.

Bronze Doors recently fixed at Cologne Cathedral.—Designed by Herr Schneider, Architect; Executed by Herr Mengeberg.	Double-Page Typo-Gravure.
House, Edgell-road, Ealing.—Mr. L. A. Shuffrey, Architect.	Single-Page Photo-Litho.
South Aisle, Gaddesby Church, Leicestershire.—Drawn by Mr. Arthur H. Hall.	Single-Page Photo-Litho.
Parish Rooms, St. Giles's, Northampton.—Mr. S. J. Newman, Architect.	Single-Page Ink-Photo.
Houses, Knighton, near Leicester.—Mr. Isaac Barradale, Architect.	Single-Page Ink-Photo.
Hospital for Sick Children, Great Ormond-street: Jubilee Wing.—Mr. Charles Barry, Architect.	Double-Page Photo-Litho.

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Aid-Book to Engineering Enterprise.



THE comprehensive work published under this title* forms a modern encyclopedia of civil engineering, judging from the wide range of subjects enumerated in the table of contents.

In the chapters which follow, the author gives great prominence to the financial aspect of engineering. The book is remarkable for the practical hints it contains, while avoiding all mathematical investigation of the dimensions and strengths of structures,—a striking contrast to most other aid books, which usually supply various rules, tables, &c. The present volume is divided into two parts, which, with forty-four pages of a copious index, arranged in double columns, forms a book of 865 pages. These parts, prior to revision, were sold in separate volumes. Upon the publication of the first edition of Part I, we said that "its study might save much time and much money," and when the first edition of Part II appeared, we characterised it "as common sense made available to the enquirer in a systematic form." We also prophesied in our notice of the first edition that a new edition could only be a question of time, and so it has proved.

The first part is intended to serve as a guide to projectors of engineering undertakings in our colonies and abroad, the experience gained in this country being stated as an aid to colonial and foreign practice. The amount of capital expended upon railways already equals, or exceeds, that invested in all other modern works of construction put together; yet, even in this country, many loop and junction lines are continually being projected. The construction of telegraphs is also dealt with, for which the author truly states it is always economy to employ the best materials for any except temporary lines. Referring to submarine work, the first submerged cable in salt water was successfully laid from Dover to Calais in 1851. The line between Spezzia and Corsica, laid in 1854, was found in 1876 to be in good working order, thus proving that a cable, properly made and laid, has a life long enough to amply

repay prime cost. Other chapters in this useful book describe the formation of harbours, the building of breakwaters, piers, and jetties as subsidiary to the greater work of harbours; the design, exigencies of site, erection and classification of various iron bridges, a subject upon which the author is fully qualified to advise. He particularly emphasizes the importance of securing complete information as to foundations and conditions of site when a bridge is ordered to be designed and constructed for export. "Ten pounds (he remarks) have, perhaps, been saved by omitting to examine the river-bed, and five hundred pounds wasted in unnecessary screw piles." The comparison he furnishes of eighteen examples of bridges, of similar span, but each fulfilling very different requirements, is very valuable, and he includes an allusion to the ingenious design he proposed for a bridge over the River Thames at the Tower, consisting of a single span, in which the upper member formed a continuous arch, and the lower member supporting the platform could be divided in the centre for the convenience of ships passing up and down the river. Irrigation schemes and reclamations of land are justly classed by the author as among the most important of public works; while the supply of water stands first among municipal works. He ably deals with various systems and sources of water supply, and argues that the increase in the number of waterworks passing into the control of municipal hands is advantageous, as a stoppage in the supply of water to a district would be disastrous; but he does not recommend the management of manufacturing enterprises by public bodies. In treating of town drainage, he asserts "it is the misuse of the water systems which alone renders them open to condemnation." Sewage irrigation, as well as its treatment with chemicals, are alluded to, but no mention is made of the International Water and Sewage Purification system, which first met with favour at Acton. Gas and electric lighting are contrasted, both as regards cost and results attained. In large cities illuminating gas can be sold, with profit, at prices much below what is possible in small towns. The cost of the gas itself, the author states, depends principally upon the cost of the fuel and the sale of by-products; but "as the cheapest kind of gas for use as fuel in steel-making and other metallurgical operations is made by private persons at as low as from 1d. to 4d. per 1,000 feet, though such gas is cheap because a high degree of purity and illuminating power is not required, the

experience so gained (in the author's opinion) points the way to further economy in gas for lighting." With regard to the adoption of electrical energy, upon "the extent and kind of lighting and the distances apart will depend whether the whole will be best served from one central station or whether the area should be divided into several circuits or districts."

To Part I, a chapter on mining enterprise in coal, copper, gold, iron, lead, silver, and tin, has been added to the second edition. The chapter, also, which compares English and foreign legislation gives valuable hints upon guarantees for foreign concessions. The facilities for acquiring land for the site of engineering projects in foreign countries have greatly encouraged English enterprise abroad. It is shown that the gauge of a new railway, whether for light or heavy traffic, should from the commencement accord with that of the neighbouring railway, as the new rolling-stock may have to travel over the old lines, and the saving in land by the use of narrow gauges is inconsiderable. In American cities where the streets are generally badly paved, and unfenced railroads cross public streets, iron tramways were adopted at an earlier date than elsewhere. The working of horse and steam-tramways in town and country is fully described in this book.

The volume also contains chapters upon the important subjects of contract and purchase in the engineering trades; the establishment of factories; the purchase of steam, portable, and gas engines; air, water, oil, and electric motors; railway equipment; locomotives; rolling stock; pumping and fire engines; tanks; pipes; tubes; machine tools; smithy tools and steam hammers; derrick, jib, and travelling cranes; steam cranes; excavating machines; boring tools; rock-drills; dredgers; pile-drivers; diving apparatus; Portland cement: its manufacture, uses, and advantages. Among market buildings, the author includes the covered market building at Carlisle, opened so recently as October, 1889, and expresses the opinion that, "as fit projects for official management, markets should take precedence of such undertakings as water or gas supply, which may with more propriety be left to private enterprise." He deals in a masterly manner with the subject of iron buildings, roofs, and lighthouses. The notes upon the manufacture and modern uses of steel for ships, girders, stanchions, and boilers have been re-written and extended in the second edition. In his remarks upon iron and steel manufacture, Farnley and Lowmoor iron are mentioned four times in the volume

* Aid Book to Engineering Enterprise, by Ewing Matheson, M. Inst. C. E. Second edition. London: E. & F. N. Spon, 1889.

† See *The Builder*, April 27, 1878.

‡ See *The Builder*, July 2, 1881.

as the highest quality of malleable iron. The author's present intimate acquaintance with the Farnley Iron Works entitles us to draw attention to this recommendation. Indeed, throughout the book, those paragraphs which relate to iron and steel deserve the highest encomiums and the gratitude of the profession. He explains the Bessemer, the basic, and other processes of steel manufacture, but does not recommend the use of a complete steel roof as economical for spans of less than 100 feet. The author remarks that special tools and processes in manufacture are continually being introduced; but that almost invariably the manufacturer, who by these means does his work best, also executes it at the cheapest rate. The apparatus for electric welding is likely to take the place of the ordinary process, where the pieces are of moderate size, and where the repetition is sufficient to repay the cost of special plant. The accessories consist of an electric "transformer," worked by a steam engine or other motor, for producing by induction a current of the necessary strength to heat the iron or steel. The heating is rapid and clean, and the parts to be welded are pressed together when white hot. Its application to the welding of dissimilar metals is remarkable. Reference is also made to other modern applications of electricity. The transmission of power has not, the author states, received so much attention as the application of power. Steam, it is asserted, can, under special conditions, be conducted 2,000 ft. with a loss of only 5 lb. pressure. If the power required, as in a crane or hoist, is for direct action, then hydraulic transmission is probably the best. There is practically no limit to the distance through which power can be transmitted by water, but for rotary motion the author recommends compressed-air or wire rope when electricity cannot be applied. The latter he considers the best alternative for any system. Transmission of gross power by belts he states to be more general in America than in this country, where toothed wheels are usually employed as gear. Even for such a purpose as imparting motion to har-iron rolling mills, belting has, he informs us, been applied with success.

The headings in the margin to each page assist in rendering the remarkable compilation of facts contained in this volume easy to be referred to; and at the end of each of the thirty chapters the reader is referred to other chapters in the book which bear upon the subject of an individual chapter. This method is excellent, because it aids in rendering each special chapter complete, without repeating matter in the volume.

THE MAINTENANCE OF COUNTY ROADS.

BY MAJOR-GENERAL LUARD, R.E.

THE condition of the roads in the counties surrounding the Metropolis is a matter of no small moment to the inhabitants of the great City. Though they have nothing to do with paying for them, their furniture-movers, travellers, tourists, cyclists, and many others make free use of them, and criticise them freely too, in case they are not satisfied. This criticism is not without its beneficial effect, and certainly does no harm, even if it produces pain in the minds of Highway Authorities.

After a deliberation of a year, and sending the County Surveyor on a tour of personal investigation, the Committee for Roads and Bridges in Kent laid before the Council of that county, at the quarterly meeting at Maidstone on the 15th ult., the scheme which they had evolved for the future management of the main roads of the county. As this scheme differs very much (so far as I am aware) from that which has been recommended for any other county in England, and as it has been adopted by the Council, it is a matter of general interest to examine it a

little, weigh its merits, and attempt to forecast its probable success or failure.

Kent is to be tried for a year in two ways: one, which practically embraces the geographical district of East Kent, is that of contract with Highway Authorities, and the other, for the remainder of Kent, is that of contract with private firms. The first is one with which we are all familiar, having been suggested in clause 11 (4) of the Local Government Act of 1888, and very generally acted on throughout the country as a trial scheme for the first year of the existence of County Councils. How it has worked no one quite knows yet, but no sign of improvement in the main roads of Kent is yet visible. However, the Kent Roads and Bridges Committee say that they intend in future to tie down the Highway Boards of East Kent with specifications, schedules of quantities of materials, and the superintendence of assistants to the County Surveyor, and we may presume, therefore, that the local Highway Surveyors will still be in charge of the execution of the work for their respective Boards, but under constant supervision by the County Surveyors, two assistants having been allotted to East Kent for about 250 miles of main road, with a proposed salary of £300 each (including all expenses). Now as regards such contracts, there is, in the first place, no competition, and the Highway Boards are not at all likely to accept contracts which are not quite certain to leave a satisfactory margin for themselves, and a consequent loss to the other party to the contract,—the county. In the second place, if the terms offered are not financially agreeable to the Highway Boards, no alternative scheme has been approved by the Council for carrying out the work. The County Surveyor of Kent had with much pains drawn up a scheme, which was practically and admittedly in accordance with the suggestions of Mr. Codrington of the Local Government Board, in the pamphlet he has recently issued, placing the whole of the execution of, and payment for, the work on main roads in the hands of the County Surveyors; and, although there are some manifest objections to such a scheme, there is much to be said in favour of it. But the Kent Roads Committee have, anyhow, seen fit, and perhaps wisely, to reject the adoption of their Surveyor's proposals, and have preferred to try contracts. But when the contractors have been made with the Highway Boards, they will naturally save as much as they can on those contracts for the benefit of the remainder of the roads in their districts and for the pockets of their ratepayers. How will this benefit the condition of the main roads?

But we are told this is to be tried for one year only. Turning now to the other part of the scheme, it appears that the main roads of West Kent are to be let by tender to private firms,—let by dribblets of a few miles here and a few miles there, with again the specifications and schedules of quantities of materials, and superintendence of Assistant County Surveyors. In this case the Highway Surveyors of the Boards will be snuffed out *in toto*, for the contractors will, of course, decline to submit to be supervised by two sets of Surveyors, whose ideas of road management might not correspond.

Will the condition of the main roads be thus benefited? The contractors must make their profit, specifications and so on notwithstanding; and they can have no security, however well they may perform their contracts, that the system will be continued. There can be no guarantee, however small a profit they may content themselves with, that they will be able to obtain further contracts. The system, if continued, must be one embracing a large area, and not confined, after the lapse of a year, to those portions in which the contracts have been well done, reverting to a different system for those portions of main road which have been unsatisfactorily maintained. Will not the contractors generally observe the adage that the "one bird in the hand is worth two in the bush"? And what about the local Highway Surveyors? It

has been somewhat the fashion to abuse this class, overlooking the very difficult position in which they have been placed; and now, without the chance of their assenting or dissenting, a very important share of the work of the Highway Boards in West Kent is to be wrested from them, whether their Surveyors have proved themselves intelligent or the reverse.

Whoever may have been the authors of these remarkable proposals, we cannot look forward with any confidence either to one part or the other of this contract system holding out a promise of any measure of success. It smacks of the cry of "save, save, save!" so often sounded at meetings of certain local bodies, whether the "save" is a real economy or not; and we might reasonably have expected a somewhat broader and more comprehensive scheme to have emanated from the collective wisdom of the Roads Committee of so large and important a county as Kent. The present writer did make a distinct protest at the recent County Council meeting at Maidstone against these proposals in the form of the following resolution:—

"That the Highway Boards of Kent be invited to form a Roads Union under the auspices of the County Council."

That the principles on which such Union be founded be as follows:—

- Finance to be under the chief control of the County Council, assisted by the Highway Boards.
- Work to be under a professional staff, entitled the "Kent Roads Staff," consisting of road-gangers, highway surveyors, inspectors, and chief inspector, under the Roads Committee.
- Waywardens to assist in local supervision.
- The whole to work together for mutual assistance and the public benefit."

I prefaced these motions with a further one, to the effect that the report of the Roads Committee be not adopted; but as the agenda of business to be despatched was a very long one, and as these propositions were brought forward at the last moment without its having been practicable to discuss them previously with others, they were (I think very naturally) discarded in favour of the plans recommended by the Roads and Bridges Committee. But I brought forward these motions with the conviction that the suggestions of the Roads Committee were not good ones, and also that it was not fitting to find fault with other people's plans unless you can suggest something better. Prevention is also better than cure, and it is better to try and upset bad plans before they are acted on than to have to substitute better ones subsequently. This want of prevision is the cause of endless trouble and a great waste of money.

If we come to look thoroughly into the subject of what are called main roads, we shall see that their position relatively to that of the other roads in a county has been very much changed. The State does not endow the main roads with portions of the State revenues for similar reasons to those which obtain on the Continent, viz., military transport, but to relieve local rural taxation. If this has been the case ever since the system has been in force of contributing to the maintenance of main roads, it has been still further accentuated by the Local Government Act of 1888, the principle being that the towns should help the country in this large item of expense. But the time must arrive when it can be shown that justice has been done, that the contributions from town and country respectively towards the whole cost of maintenance of all the roads in the county has been equitably adjusted, and it is evident that when that time arrives and that agreement has been arrived at, the necessity for the legislative distinction between main roads and ordinary roads will no longer exist,—a distinction which gives rise to much friction between the county and the local authorities, and is a distinction which no one has yet been able to distinctly define.

It would be a decided convenience to every one if this legislative distinction could be abolished, leaving it to the counties to ex-

pend appropriate sums on their roads in accordance with their relative use. This was pointedly recognised by the Committee of the House of Lords on the working of the Highway Acts in 1881, who, in their report, see page xxi., considered that this distinction might be abolished if the proceeds of some local tax could be contributed by the county in aid of highway rates.

It is quite possible that with a slight addition to the taxes allotted for local purposes, it would be found that this is now the case; but it is a matter of calculation, and it is only by treating it generally,—i.e., by taking the whole area of the rural portions of the county, and not its districts separately,—that we can arrive at any conclusion on the point of equitability. If in each district we had a similar proportional mileage of main road, it might be taken on such a basis; but that is not the case. The proportion of mileage varies very much; and even if it did not, the cost per mile must necessarily vary very much from a great variety of causes,—soil, skill, railways, harbours, &c., &c. If it can be arrived at, and I think it can, it would seem best from every point of view that the amount of the rate in the £ paid by every person in the rural districts of the counties for the maintenance of the roads in their respective counties should be equalised. This is perfectly practicable if a general confidence can be established, that the same beneficial and really economical principles of road management shall be extended throughout the length and breadth of each county, and that the question of whether the roads are kept in proper or improper order shall no longer be entirely dependent on the accidental circumstance of one road-surveyor being more capable or honest than another, or one set of highway guardians being more capable of taking broader views than other sets. The economical maintenance of the ordinary roads is just as important a matter relatively as the economical management of the main roads, and now that the latter are to be entirely paid, of still greater local importance. The principles of management which apply in one case apply equally in the other; but, according to the plans of the Roads Committee for Kent, the ordinary roads of West Kent are to be left to the management of the discarded highway surveyors and the perforated Highway Boards.

In Kent we have been fortunate enough, or sufficiently clear-sighted, to have (with a few trifling exceptions) adopted the plan throughout the county of grouping the parishes into districts for highway purposes under the Act of 1862. The advantage of having done so is very generally admitted; and it seems probable that the time has now arrived for an extension of the system of grouping,—viz., by uniting the highway districts, even as the parishes have been united. If so, it is manifest that each Board should be directly represented on the County Roads Committee, or Board, which, in such a case, would be composed partly of County Councillors and partly of *ex-officio* delegates, in some cases the chosen representative of the Board being the Councillor for the district. All Councillors should also be *ex-officio* members of the Highway Boards in their respective districts. By this means the interest would be generalised, and as a rate, though a smaller rate than that now usually levied, would still have to be charged, the Boards would still have a direct interest in keeping a good watch over all their roads, but not merely in the future for their own immediate good, but for the benefit of the county at large, a lesson in unselfishness and mutual regard which would bear good fruit throughout the county. A further safeguard and increased local interest would be obtained by polishing up the office of Waywarden, an office the duties of which have, perhaps, scarcely been attended to with as much zeal or intelligence as could be desired, but which might be made far more useful if the waywardens were better instructed in the true principles of road management, and received copies of the various returns and reports relating

to the roads of their respective parishes, districts, and the county. If this union of Highway Districts were effected, the working staff of professional men should be a county body, and not a number of disjointed sets of men without connexion or organization of any kind. Starting from the road-ganger, in many cases of an improved description possibly, he should have the chance of obtaining promotion when vacancies occur amongst highway surveyors; the highway surveyor should have a chance of becoming an inspector, and an inspector a chance of becoming chief inspector. In Essex they have appointed an Inspector of Roads and Bridges independent of the County Surveyor, who has plenty of work on his hands without having the roads as well. In Kent the same argument holds good, and probably in all large counties, and possibly in most small counties also, more especially if all the roads were under the Roads Committee of the Council.

The Inspectors should be the best men obtainable,—men who would sooner put their hands in the fire than soil them by receiving commissions or indirect remunerations extra to their salaries,—and their salaries should be clear of all necessary expenses, or large enough to enable them to travel freely and constantly through their districts. In Kent there should be five Inspectors in charge of the highway districts, in North, East, South, West, and Mid Kent respectively, and supervisors of the main road contracts with boroughs and urban districts. Over four thousand miles would be divided between them, the cost of which would be about 130,000*l.* per annum. The Chief Inspector would have his office in the county town, and be the chief professional adviser on all highway matters to the County Council.

In Kent the salaries of such Inspectors should not be less than 300*l.*, and of the Chief Inspector 500*l.*, in each case free of all expenses, and if the ratepayers are considered in the light of shareholders in this business, and the Roads Committee the Directors, such salaries cannot be looked on as extravagant for a general manager and his assistants. The Highway Surveyors' salaries should also, in many cases, be raised as soon as their merit had been recognised, so as to place them more above temptation, and vacancies should be filled by public advertisement. It is ill muzzling the ox that treads out the corn. The road-gangers should be paid a fixed weekly wage whatever the weather, and raised or lowered according to their merit and zeal, and (as previously stated) have some prospect of advancement open to those who show themselves worthy of it. Local clerks and treasurers should also be included.

In Kent, and in many other counties also, one of the most pressing necessities in the way of economising road maintenance is the subsoil drainage of our roads; but it would be almost impracticable to undertake this satisfactorily under the present disjointed system. Many of the roads lie below the level of the fields and woods through which they run, and in stiff soils may be said never to have a dry subsoil. This makes muddy roads, muddy roads cost much in scraping, besides being a nuisance, the limestone (Kentish Rag), which is so plentifully used in Kent, becomes disintegrated far more quickly, and has to be renewed far more frequently than is necessary, and general waste of money is going on everywhere. But the cost of drainage should be spread over a considerable number of years, and the appropriate method and extent of drainage requires to be most carefully gone into in every single instance where it is required; that which is right for one description of soil or gradient or width of road being wrong for another. If not so dealt with, much waste of money would ensue.

It is very much open to question whether the large sums which the Councils are obliged by the Act of 1888 to pay to the Unions for the salaries of Poor Law Officers would not be better appropriated towards meeting the cost of the roads. We do not want to en-

courage unnecessary expense in connexion with the paupers, for whom the cost of establishment seems to be something very remarkable, but we do want to save the payment of rates for a distinct branch of county work which is of increasing benefit to the rateable value of the county. The Council has no authority over the Unions, nor a voice in the salaries of the officials, and yet has to pay those salaries, whatever they may be. In Kent this amounts to 42,000*l.*, which, if allotted to the roads, would reduce the rates by 2*½*d. in the pound, after transferring to Urban Authorities their appropriate share, and leaving the poor rate no higher than before. This would be a point very easily recognised by every ratepayer.

From returns which have been most kindly prepared and forwarded to me from the majority of the Highway Boards and Town Councils in Kent on a form supplied by me, I have been able to obtain very important statistical data relating to the highways of all kinds. I will not enter on them now further than to remark that in the towns and urban districts the rateable value increases 2*½* per cent. per annum, and that in the country districts it decreases 1*½* per cent. per annum, or a total difference between them of 4 per cent. The mileage or amount of main road that should be maintained by the county should, therefore, in fairness have been increased at a similar rate, viz., 4 per cent. per annum, whilst it has hardly been increased at all. But if all the roads were in the hands of the County Council (through the Roads Committee) the increasing value of the towns would bring corresponding increases in the licence and probate dues (and van and wheel tax), and the finances would be self-adjusting.

The position of the Local Government Board would be precisely the same as at present, except that it would receive its returns of local road expenditure through the county, in place of directly from the Highway Boards. If it so desired, it could have periodical inspections made of main roads to see that they were properly kept up, and the expense of such inspections, if any, might be paid out of county funds.

Very little legislation would be necessary beyond the arrangements necessary for the appointment of the various classes of the paid staff, and omission of clauses in Highway Acts relating to main roads.

I have now pointed out most of the reforms which appear to be necessary, and which will have to be effected before we can be satisfied that this matter is being properly treated. Success in any business depends on a combination of three things,—knowledge, skill, and means,—and road business is no exception to this rule. The Scotch have had no difficulty in satisfying themselves for many years past that it is better to manage all their roads by large areas in place of dividing the maintenance of one set from the maintenance of the other, and there is no superhuman difficulty about adopting a similar sensible plan in England, which involves everything which is best. Knowing that roads cannot be economically maintained unless they are scientifically managed, I urge that more science should be brought to bear on this very important item of local expense, and I am not disposed to be deterred from publishing my views because they are not yet, using a very hackneyed expression, "within the present range of practical politics"; but the sooner they are so, the better will it be for every one.

C. E. LUARD.

The Wimbledon Common Estate of the National Rifle Association.—It was generally understood last summer that the meeting then held by this Association was the last that would take place at Wimbledon. This is confirmed by a notification in our advertising columns. The Association is about to remove its depot to Bisley, in connexion with the rifle butts which are now being formed there, and the freehold site of the depot, abutting upon Wimbledon Common, is to be sold by Messrs. Debenham, Tewson, Farmer, & Bridgewater.

NOTES.

THE "Lion of Tegea" has been known to and frequently described by archaeologists, ever since Ross visited Tegea in 1834, but somehow,—it is hard to say why,—it has always, up to the present time, escaped publication. Possibly its interest has been thrown into the shade by the Tegean pediment sculptures, which have the double claim of their certain link with Scopas and their mythological interest. We are glad that M. Gustave Fougères has at last given to the public a reproduction of a photograph taken by him in the local museum of Piali, where the lion bas-relief still lies,—unless, indeed, it has, as is quite possible, been transplanted with the other Tegean sculptures to the Central Museum at Athens,—a point on which we are uncertain. From the crouching pose of the lion, M. Fougères (*Bulletin de Correspondance Hellénique*, pl. vi., p. 477) concludes that another slab existed on which the opponent of the lion was sculptured. He also makes the interesting conjecture that the slabs may have formed part of a frieze decorating the cella wall of the Great Temple of Athene Alea, to which the pedimental sculptures by Scopas are known to have belonged. The bas-relief lion is, indeed, a piece of work not unworthy to decorate such a temple. That a frieze of animals alone was not considered inappropriate is sufficiently shown by the archaic frieze from Assos, now in the Louvre. In the same number of the *Bulletin* are also published some interesting archaic statuettes found at Cyme. They represent Cybele seated in a small shrine (*naiskos*). Their great importance consists in the fact that they are early instances of a type popular in Athens in the fifth century, and that hence they form a link connecting the well-known Oriental Cybele, of Babylon (*Diod. Sic.*, ii., 9-5), with the statue of Cybele, by Pheidias, in the Metron at Athens. The famous rock Niobe of Sipylus is—it is now universally recognised—a Thrygian example of this type.

RAILWAY chairmen are, not unnaturally, somewhat elated at the improved position in which they find themselves this year, and the ubiquitous Sir Edward Watkin,—who is presiding over meetings in various parts of the country in quick succession,—is certainly no exception. Indeed, at the South-Eastern meeting, the loquacious baronet fairly surpassed himself, indulging in a string of superlatives irresistibly suggestive of "The Greatest Show on Earth." After commenting upon the really remarkable fact that not a single passenger has been killed on the South-Eastern during the last twenty-five years, and explaining that unpunctuality is often caused by excessive desire for safety, he said that there was not a better staff than theirs in the world, that their line was the safest in existence, and that there was no property anywhere in which a trustee might invest his money with greater safety and profit! Is this "after" Barnum?

IN the course of his speech delivered on November 16 last at Cavendish College, Cambridge, Lord Hartington referred to the just aspirations of those who hope to see our Universities exert a powerful and beneficent influence upon the national life of England. Our own generation has seen those great centres of intellectual life awaken to the fact that the country at large is entitled to share in the heritage and increment of their learning. Side by side with the University Extension movement, there is "ample room and verge enough" for a kindred advance in connexion with our national collections. Mr. Louis Fagan, of the British Museum, may legitimately claim precedence as the pioneer in this direction. Stimulated by the success that attended his delivery last year of a course of lectures in some of our principal seats of commercial industry, he has undertaken to give a further course in London, on the

evenings of the 13th, 20th, and 25th inst., at the Steinway Hall. Mr. Fagan's lectures will deal with certain of the more interesting and most valuable objects preserved in the British Museum, whose history, and existence even, are less commonly known than they should be. His subject-matter will be illustrated with a large number of photographic reproductions, prepared under his own care, and illuminated by oxy-hydrogen light. The concluding lecture is to be mainly devoted to the MSS. and Prints, of which latter Mr. Fagan's official position, combined with his well-known attainments, renders him a trustworthy and skilled expositor.

AT SALZBURG, in consideration of the enormous success of the Bayreuth plays, and the genuine interest which the model representation of Mozart's "Don Juan" at Salzburg excited some two years ago, steps have been taken to ensure the erection of a "Mozart Festspielhaus" in the town. This enterprise, which is to be carried out on the same lines as Wagner's at Bayreuth, will require 400,000fl. for the building, and the sum of 150,000fl. annually for a series of twenty representations to be given in the summer. This amount will be raised by a committee, at the head of which is the architect, Karl Domel, and the profits which are expected will fall to the benefit of the music school of the "Mozarteum." The building, which is to be erected on the beautifully-situated "Mönchsberg," will hold an audience of from 1,500 to 1,800 persons, and its stage will have the most modern technical and scenic apparatus. The first performance in the new house is expected to be held in 1891, and, considering that the town has a yearly average of visitors numbering 60,000, besides being within easy reach from Reichenhall, Gastein, Ischl, Gmünd, &c., there need be no fear of seeing empty benches.

AT the general meeting of the shareholders of the Zürich "Theater-Aktiengesellschaft," it has been decided to rebuild the old theatre burnt down last New Year's night. A different site is to be chosen for the new house, in which performances are proposed to be given during the winter season 1891-92, and which will hold an audience numbering at least 1,200 persons. The building will not be characterised either by over-decoration of the façades nor by any special glitter in its interior; but the shareholders wish the theatre to be a model one in regard to safety, practicability, and acoustic properties, and no expense will be spared to obtain these qualities.

THERE is a movement on foot to have the Abbey Church of Haddington restored, and a report has been made by Messrs. Hay & Henderson, of Edinburgh, who were the architects employed in the restoration of St. Giles' Cathedral there. In 1811, the nave, which was in use as the parish church, was fitted up under the supervision of Mr. Elliot, of Edinburgh, who designed St. Paul's Church, York-place, and other public buildings in the city, at a cost of 6,000l. The nave consists of five bays, and, according to the taste of the period, galleries were placed in the aisles as well as across the west and east ends, the central bay of the south aisle being left free for the pulpit. Accommodation was provided for a congregation of 1,230 persons. Messrs. Hay & Henderson report that the church is not now in a fitting state for public worship. In restoring the nave, it was suggested that the galleries should be dispensed with, and the cost of restoration was estimated at 4,450l. The choir and transepts are in a ruinous condition, and should the galleries in the nave be dispensed with, it was proposed by the architects to restore the transepts, and thus provide the requisite number of sittings. This would cost an additional sum of 6,500l. Should it be resolved to restore the chancel also, this could be done at a cost of 12,000l. The total cost of restoration would thus be 22,950l. An account of the history of the church and site,

with some sketches, was published in the *Builder* for June 15, 1889.

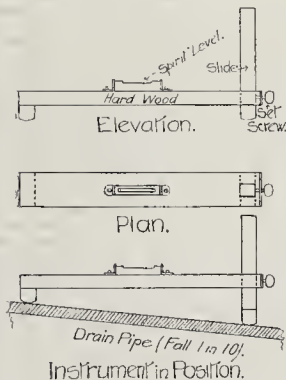
IN a paragraph directing attention to the present condition of Hogarth's house at Chiswick, the *Athenæum* says that it "is in a sad state of dilapidation, showing, among other injuries, a hole in the roof, and many more signs of ruinous neglect." The house abuts against the left-hand side of Hogarth-lane, leading from the main street to the Duke of Devonshire's villa, Chiswick House. Hogarth bought it shortly after his unlucky visit to Calais; he occupied it as a summer residence until his death, on Oct. 26, 1764, in Leicester-fields. In this same house died, in 1844, Cary, the translator of Dante; who, as also Hogarth and his wife, was buried in Chiswick churchyard. The Hogarth tomb, bearing Garrick's epitaph as amended by Dr. Johnson, was restored *à curis* a Scotsman, namesake of him—"whose pictured morals charm the mind," in 1850. Tom Taylor, writing thirty years ago, mentions the mulberry-tree as still standing in the front garden, but he found that the three mural tablets on which Hogarth commemorated his pet animals had disappeared, and his painting-room had been dismantled. At Chiswick Hogarth passed the last few months of his life, in directing the touching up of some of his plates. Nichols, in his "Biographical Anecdotes" (1782), tells us that upon the day preceding that of his death, the day he returned to town, Hogarth worked upon the second state of "The Bench,"—a view, with portraits of the four judges, of the Court of Common Pleas. The plates of Hell Gate, Satan, Sin, and Death, originally painted, but not completed on the canvas, for Garrick; and of Finis, or the Bathos, are also ascribed to the year 1764, and are said to have been engraved in this house. A view of it, with the workshop, will be found in Faulkner's "Brentford, Ealing, and Chiswick" (1845). The parish church has lately been almost entirely rebuilt, after the Early English style, by Mr. J. L. Pearson, R.A.

SOME extensive alterations are about to be made, says the *City Press*, at Grocers' Hall, Prince's-street, in the shape of new reception rooms over the adjoining square, together with other apartments on the garden plot. The present hall, being virtually the third to occupy this site, was built in 1798-1802, after the designs of Thomas Leverton, architect. It was thoroughly repaired twenty-five years later. The first hall was erected (1428) in Coneyshop, or Coneyhope, lane—since Grocers' Hall-lane—the old name being derived from a sign of three rabbits over a poultry-stall therein. The ground, included within Chepe Ward and lying near to the Wall brook, had been occupied by the Lord Fitzwalter's town mansion or inn, whose tower was incorporated in the new building. Thither, in 1641, the Grand Committee of Safety removed their sittings from Guildhall. Its walls survived the Great Fire. In 1668-9 Sir John Cutler rebuilt the parlour and dinner-room. During the interval, 1681-1735, Grocers' Hall served as the Lord Mayor's official residence; from 1694 to 1735 it was used for business purposes by the Bank of England directors. The company of Peppercorers and Spicers, for awhile united with the Apothecaries, and whose coat-of-arms bears a charge of nine cloves, and carries for crest a loaded camel, originated in a club of spice-sellers that used to meet in Soper-lane, Queen-street, Cheap-side. On June 12, 1345, this fraternity formed themselves into a trading company by style of the Grocers, and received a charter of incorporation that same year. They first met together in the inn of the Abbots of Bury (Hevis Marks), and, subsequently, after many migrations meanwhile—to Garlickhythe; to Cornettes Tower, Bucklersbury, King Edward III.'s Exchequer and Exchange, &c.; bought Lord Fitz-Walters' Chapel of the Fratres du Sac, Old Jewry, whence they removed to his house hard by. The Weigh House Chapel,—the new buildings for which we illustrated in our columns

on January 18,—derives its name from the King's beam, at the Woolwharf, near to East Chepe, which had formerly been placed in the Grocers' custody. For the making of Princes-street the Company had to surrender a portion of their garden, but they sold the land at a prodigious profit, receiving more than 20,000*l.* for what, in 1433, cost them but 3*l.* 16*s.* 8*d.*

FROM the report in the local prints of a prosecution at the Watford police-court in respect of a nuisance at Rickmansworth, it would appear that the sanitary state of that town is by no means satisfactory. "Wherever it was possible," the prosecuting solicitor informed the bench, "dry earth-closets had been established." In the present case, however, the house was drained into a cesspool which overflowed into the road. Of course the bench made an order to abate the nuisance, directing that small catch-pits should be constructed from which the sewage could be emptied at frequent intervals; but it is perfectly clear from this report that the sanitary system of Rickmansworth is of a very happy-go-lucky kind. Some houses have earth-closets and some cesspools. But it is equally certain that no town, even a small one, can be in a thoroughly healthy condition where the cess-pool system exists, more especially in a low-lying spot in the valley of the Colne, where the soil is gravel and much permeated by spring water. This matter is of some importance, because, owing to the extension of the Metropolitan Railway, land is being laid out for building, and Rickmansworth itself has now become a practicable residence for workers in the Metropolis. It is well also to bear in mind that during the present winter, Uxbridge, also in the valley of the Colne, has been troubled by an outbreak of diphtheria. It is therefore high time that the people of Rickmansworth set to work to establish an efficient sanitary system before any considerable number of new houses are built.

IN reference to a small instrument for testing the gradients of pipes which we noticed and illustrated, page 41 *ante*, Mr. J. Leslie Anderson, of Newcastle-on-Tyne, sends us a sketch of a simple instrument which he has used for the same purpose, of which an illustration is subjoined. Mr. Anderson says: "By



simply laying it on its side over a detail of the required gradient the instrument can be at once adjusted, there being no need to mark a scale of gradients on the slide, although that could be done if desired."

SIR EDWARD WATKIN'S speech at the recent half-yearly meeting of the Metropolitan Railway has at length clearly disclosed his policy in regard to the Northern extensions. The Manchester and Sheffield and the South-Eastern are to become the partners of the Metropolitan in a new trunk line. It is clear from this that the original Metropoli-

tan Railway will be swamped in a much larger undertaking, and it is probable that sooner or later the present ordinary shareholders of the Metropolitan Railway will obtain some kind of preferential dividend, low in amount, but also a fixed charge; for it is perfectly evident that a large amount of capital will have to be created before the London end of the northern extensions will be fit for through and long-distance traffic. The development of Sir Edward Watkin's policy will be watched with interest by the public at large,—by the shareholders of the Metropolitan, probably, with some perturbation.

THE collection of water-colour drawings of Cambridge, by Mr. Fulleylove, now on view at the Fine Art Society's Gallery in New Bond-street, may almost be said to be a collection of gems, both as regards subject and execution. No artist has more precisely the gift for treating subjects consisting of old Renaissance architecture combined with lawns, gardens, and foliage, than Mr. Fulleylove; and nowhere could he find subjects more suited to his pencil than at Cambridge. The series seems to us to be artistically superior to that from Oxford which was formerly exhibited in the same galleries: the drawings are more delicate and refined in execution and in their effects of light and colour, and more equable in style. Among those which are especially successful are "Trinity Avenue" (8); a very small, clear, and sparkling view of the "Great Court of Trinity" (5); "Fountain Court, King's" (15); "Clare from King's Bridge" (24) "Wren's Bridge, John's" (25); "King's Parade" (34), a very small drawing with the houses along the street beautifully touched, and not less so the figures crossing the lawn in the foreground; "Cloister-court, Queen's" (55), with its quaint tumble-down canted bay window; we could have wished to see a little more of the characteristic brick cloister arcade of Queen's. All who know and are interested in Cambridge should see this collection; and those who are unacquainted with Cambridge will gain from these drawings a new idea of the beautiful combinations of stately architecture with lawns and trees, which characterise the scenery of the University town.

Plumbers in the Manchester District.—A large public meeting was held in the Manchester Town Hall on the evening of the 22*nd* ult., under the presidency of the Mayor (Mr. Alderman Mark), for the distribution of certificates granted by the Plumbers' Company to plumbers in the Manchester district. The Mayor said that no body of workmen engaged in the construction of dwelling-houses could, through ignorance or carelessness, inflict so much danger on the public health, or cause so much inconvenience to one's family or pocket, as the plumbers. The length of time a man had been in the trade was no guarantee of his efficiency, and a careful technical examination was the only test which would satisfy the requirements of public comfort, and avert the existing dangers to the public health. He urged that even those plumbers of many years' experience in the trade should avail themselves of the facilities provided at the technical school to learn something of the modern science connected with the plumber's art. Mr. John Holden, Chairman of the Manchester Council, moved that,—

"The Registration System, properly carried out, will afford great protection to the public against the effects of defective plumbing, particularly in respect of sanitary arrangements; and, inasmuch as the system must tend to raise the status of the plumbers' craft, it deserves the support of the trade."

Mr. Councillor Corbett (Salford) supported the motion, which was unanimously carried.

The Institute of Builders.—At a meeting of this Institute to be held on Thursday, February 13, a paper will be read by Mr. Thomas M. Rickman, F.S.A., entitled "An Edinburgh Contract."

Letter from Paris.—Owing to the space occupied by the Royal Academy lecture and the discussion on Architectural Examinations, we are compelled to hold over our usual monthly Paris letter till next week.

ROMAN ARCHITECTURE.*

BY PROFESSOR AITCHISON, A.R.A.

THE magnificent public buildings of Ancient Rome attracted the attention and excited the admiration of mankind from the time of their erection, and nearly all the Roman writers have mentioned them with affection or pride, from Plautus (254 to 184 B.C.) to Ammianus Marcellinus (370 to 390 A.D.), who was the last of the Roman writers, and he tells us of the admiration excited in Constantine the Great by the sight of the following buildings in Rome:—The Temple of the Tarpeian Jove, the Baths as high as provinces, the mass of the Colosseum, the shape and doming of the Pantheon, the Temple of the City, the Forum of Peace, the Theatre of Pompey, the Odeum, and the Stadium, and the astonishment he showed at the sight of Trajan's Forum.

On the irruption of the Barbarians, most, if not all, of the public buildings were plundered and partly destroyed. The Popes were, however, enabled to save some by consecrating them as churches, for the Barbarians seemed to have had some respect for places of worship in use, though the Scythians burnt the Temple of Diana at Ephesus in the third century (A.D. 260).

The Pantheon was dedicated to the Virgin and Martyrs in the early part of the seventh century by Boniface IV. (608-615), and it has thus been preserved to the present day.

The Gothic King, Theodoric, as early as the fifth century (455-526), repaired some of the buildings that had fallen into decay, notably the Baths. But the successive irruptions of hordes of savages, whose only delight was slaughter and destruction, converted whole tracts of the Roman territory into wildernesses, thus almost annihilating industry and commerce, and so cutting off the resources from which the public buildings were supported and repaired. The change, too, of faith, of circumstances, of habits, and modes of thought, caused the abandonment of many of them, and those so abandoned were used as quarries; the burnt bricks, and the stonework, the columns, and the costly marbles were used in the construction or in the adornment of new buildings; the absence of commerce made the very iron cramps so valuable that it was found worth while to cut through solid stonework to obtain them; but what was even more destructive was the conversion of the stone and marble into lime, which is generally wanted where human life exists. We know that the mausoleum was made into lime by the Knights of Rhodes, even so late as the fifteenth century.

Roman architecture has claims upon our attention, not only for its intrinsic merits, but as a continuation of Greek architecture, though with the addition of the arch, the vault, and the dome, and was, in fact, mainly designed by Greek architects who were slaves or freedmen; but it has an even greater interest as being the mother of the Byzantine, the Romanesque, the Saracenic, and we may almost say of the Gothic.

The grand ruins themselves attracted attention as soon as the Barbarians had settled down to peaceful avocations. Scholars, too, sought to identify the ruins of the ancient buildings with those described by the Latin authors. Taste and patriotism both combined to make men antiquarians; they grieved over the daily destruction of beautiful things, and they saw that each beautiful thing destroyed, each column burnt into lime, each building ruined for its brick facing, was lessening the evidence of Rome's former greatness.

Cola di Rienzi, the tribune of the people (1313-1354), was one of the most prominent of the early antiquaries. As soon as new buildings of grandeur and importance were required amongst the settled towns of Italy, architects were attracted to the Roman ruins, and endeavoured to extort from them their secrets. All architects have read in Vasari of the time spent by Brunelleschi in measuring and studying the Roman ruins, when he was solving the problem of how to dome the Cathedral of

* Being the first Royal Academy lecture on Architecture this season. Delivered on Monday evening last, Jan. 27.

† Piro Ligorio says that even large marble cornices and an infinite number of statues found in the Temple of Mars were broken up and burnt into lime. Prof. Middleton, "MSS. notes by Piro Ligorio," Society of Antiquaries, 1830. Pope Pius II. (Eneas Sylvius Piccolomini), 1458-1464 A.D., also wrote the following lines on the subject:—

"sed tuus hic populus muris defossa vetustis
caedis in obsequium marmoris dura coquit."

Florence, and Donato was his companion in

Brunelleschi was born in 1377, and died in 1441. In 1453 Constantinople fell, and a fresh impetus was given to the Renaissance by the influx of books, MSS., and works of art, as well as by the scholars, artists, and skilled workmen who had escaped from it.

In the high tide of the Renaissance, architects flocked to Rome from every part of the Christian world to measure and study the remains of Roman architecture, while a new light was thrown on the remains by the treatise of Vitruvius, as new lights were thrown on Vitruvius by their study.

Vitruvius's book probably held its place as the teacher of architecture throughout the Middle Ages. Gallani, in the preface to his Vitruvius of 1758, tells us from Panormita, that Alfonso the Magnanimous, King of Arragon, wishing to restore the new Castle of Naples, had no recourse to others, but to Vitruvius; and because Panormita gave him his Vitruvius, which was without ornament or boards, the King reprehended him, saying that so important a book did not deserve to remain uncovered, from which we learn so well how to cover ourselves,* and at once ordered him to have it nicely bound.

Professor Cockerell, in his pamphlet "On the Architectural Works of William of Wykeham" (Svo. London, 1846. Note, page 33), erroneously supposes that this was Alfonso III. (whom he calls the philosopher, who lived about 1281. It was Alfonso V., who reigned from 1416 to 1458, and whose sayings Beccadelli (called Paormita, from his being born at Palermo) recorded, and which were published in 1485. In this same note, Professor Cockerell says—"The evidence of the estimation in which Vitruvius was held in the Middle Ages abound. The citation of his name in the earliest and most authentic documents of the Freemasons is seldom wanting. The church in the Castle of Nuremberg, built by Barbarossa, in 1158, and the Frauenkirk, in the centre of that great city, probably of later date, are exact illustrations of the 'Temple in Antis' of Vitruvius, as given by Cosarino (Lib. III., fol. 52) . . . In fact, it appears that in the Middle Ages, scarcely less than now, it was the intention and aim of the architects, on all occasions, to establish their rules upon Vitruvian authority; and the illustrations given in the plates of Caesarians may be adduced as sufficient evidences of this traditional respect for the father of architectural legislation."

Vitruvius's book was first printed in Rome in 1486, edited by Sulpicius, and was re-edited and illustrated with woodcuts by Fra Giocondo in 1511, who tells us in one of his books that he shed tears over the destruction of the buildings and works of ancient art that took place in his day.

Amongst the Italian architects we have a succession of those who published drawings of some of the ruins of Roman buildings: L. B. Alberti, Sebastian Serlio, who is supposed to have published in his book the drawings of Baldassare Peruzzi, Palladio, Antonio Labacco, Vignola, V. Scamozzi, and others, up to the present century, in which Contini published his "Edifices of Ancient Rome," in six volumes (1848-56), and doubtless there is a great mass of unpublished drawings. Thirty folio volumes of Piero Ligorio's "L'Antichità di Roma," are amongst the Royal Archives at Turin. In the 17th century, France took up the task, and we have the edifices of ancient Rome by A. Desgodetz (1682).

England at last followed, and Taylor and Cressy's book on the architectural antiquities of Rome was published in 1821-22. I have not mentioned the monographs on Roman buildings, which are numberless.

We all know that every book on architecture, and most of those on any of the building trades up to the middle of the last century, had illustrations of the Roman orders, and had illustrations of them by the eminent Italian architects; and many books on architecture even to this day contain them.

Looking at the effluence of information we

* Cum inchoata illam arceem Neapolitanam instaurare institisset, Vitruvii librum qui de Architectura in scribitur, afferri ad se iussit. Altem est, quando quidem in promptu erat Vitruvius necesse fuit, quidem sine ornatu alio, sine asseribus: quem rex simul atque in promptu, non decere hunc potissimum librum uti nos quoniamdo condecorare, tam belle doceret, detectum incedere, eumque inibi perquam polite ac subito cooperiri mandavit. Lib. I., Par. 44, Antoull Panormite, dictis et factis Alphonsi regis Arragonum.

possess on the architecture of the public buildings of Rome, it seemed to me to be more useful to speak of the private houses. Under the head of private houses I include those in town and country, as well as those in the capital. I shall try and touch on some of the palaces, as they are but glorified houses.

Roughly speaking, the Roman house must necessarily have been the model from which most of the houses of the Western world have been derived, not to speak of the cloisters of cathedrals and abbey churches, which, with their gardens, are supposed to have been copied from the atrium of the Roman house. In England the Roman villa was different to that in Italy,—the atrium became the forecourt, the rooms at the end and part of the two sides sometimes having a verandah next the court; the open space was the compluvium, or impluvium, on an extended scale: but in Spain the general arrangement of the Roman house is still adhered to.

It is interesting to know something of the type from which most subsequent civilised house-building took its rise, more especially when that wonderful people, the Roman had, within a short time after its death-struggle with Carthage, virtually conquered the whole of those countries which surround the Mediterranean, and had thus become acquainted with the houses and palaces of Greece, Illyria, Epirus, Macedonia, Thrace, Asia Minor, Syria, Palestine, Egypt, and Numidia.

The Romans were, of all people, the readiest to adopt all they considered excellent, and we cannot suppose that they did not seize on each particular form or arrangement that recommended itself to them in the houses and palaces of those countries. We know from Plutarch that Pompey copied his theatre from the one at Mitylene, in the island of Lesbos.

In reading the descriptions of the villas of Cicero, of Trimalchio, and of Pliny the Younger, we see the care that was taken to secure proper aspects and delightful views, silence in bedrooms, quietness and pleasant prospects in studies, and to provide libraries, picture-galleries, baths, and tennis courts; we learn, too, how the houses were kept warm; if we were without any express statements of their being warmed, we could see the provisions for warming them in the ruins of the Roman villas in our own country.

We have, again, the precise instructions of Vitruvius for proportioning the separate parts of houses. This subject is greatly neglected in the present day, although it is vitally important if we wish to make our rooms captivating to the eye. I recollect hearing Professor Cockerell praise the Library of University College, London, which Professor Donaldson had just built, and say it was elegantly proportioned, and showed the ripe study that had been bestowed on it. He added that young men were often excellent in ornament but rarely attained excellence in proportion, as they had not as yet been duly impressed by its importance.

We in England too greatly neglect that training which is got by the restoration on paper of ancient buildings.

Although the Younger Pliny's descriptions of his villas are said to be the most favourite exercises for architects I only recollect a single published restoration by an Englishman, that of R. Castell in his "Villas of the Ancients." For though the Roman house in the learned Newton's Vitruvius has evidently been inspired by Pliny's Laurentine villa, it is not a restoration of it. The restoration of one or both of these villas has exercised the ingenuity and displayed the knowledge of Italians and Frenchmen. Why were the Italians of the Renaissance the best architects, and why are the French now? Mainly because the former were, and the latter are, better trained than the architects of the rest of the Christian world. Let us take an analogous case, the invincibility of the Roman legions. We are apt to take for granted that the Roman legions were invincible because the Romans were a fighting, determined, and well-disciplined people; but Polybius, who was a Greek, and a hostage, and had, therefore, no particular reason to love the Romans, explains to us that the Roman legions were largely composed of other nationalities, and that their invincibility arose from the discipline, and not from the men; and that great master of the art of war, Marshal Saxe, makes a similar remark about the men of his day. We are too apt to omit the complete training obtained by the restoration of ancient buildings, until the problems of actual practice come before us, so

that we only get, perfectly trained after being engaged in a large practice, whereas we ought to come to our first building in a well-trained state.

We saw in the Paris Exhibition of last year a series of magnificent restorations of Greek and Roman buildings: the Acropolis of Athens, the Parthenon, the Theseum, the Temple of Demeter at Eleusis, the Temple at Olympia, the Palace of the Cæsars at Rome, Diocletian's Baths, a portion of Hadrian's Villa at Tivoli, the Pantheon, the Temple of Concord, and the Arch of Titus. Many of the sets comprise the plans and elevations of the ruins as they now exist, as well as the restorations, and some of the drawings must be at least 15 ft. long, with every detail of the construction drawn and the colour decorations restored, and this not by very young students, but by men who would here be in practice.

M. Paulin's restoration of Diocletian's Baths was admirable, and has an artistic grace that was probably wanting in the original, while some of the mosaic has that dignity of colour that befits a grand public building. This is especially notable in that with the white ground.

This practice of restoration has often been as much objected to by the French public as it has been neglected here. But what does M. Chas. Garnier reply to the objectors who say,—"What is the use of it?" "Why, unjust and childish souls, it is useful for the history and palpitating life of the arts, it serves to compare the past with the present, and it serves, above all (for that is its end), the artist who has worked! Do you think the time he has passed in measuring those fragments, in interrogating those ruins, in assigning them their place, and in their employment, do you believe that this time has been lost to the artist? He has familiarised himself with the first notions of art and construction; he has lived the life of other times; he has brought together the history of men and of stones; he has learned to study, to compare, to reason, which he must do later when he builds for you; he has, in short, the alphabet of architecture. Whatever may be his ideas in the future, he will know how to express them. If his colleagues have already done similar work, is that a reason why he should not do them? If my neighbour at college has translated Virgil or Cicero, is that a reason why I should not in my turn? Does the education of one man give education to another? Do not laugh at these ignorant attacks; it is noble self-denial to study one's art in youth, in the hope of becoming later a master in one's turn."

To plan well is an important part of the architect's duties, though not the most important, and it means grouping rooms of the requisite size and shape in a convenient manner, and with the least loss of space.

The Roman architects were excellent planners, and we learn something of this by restoration; besides, the exercise of adapting plans to other requirements than those of the present day gives additional breadth to the architect's mind; and we have, too, in some Roman buildings, vast rooms that are unusual in England.

Hitherto I have been speaking about fulfilling the programme in planning, but there is another object we have to attain in important buildings; for want of a better word I may call it noble planning, when the rooms have to be elegantly or majestically proportioned, to be diversified in shape and size, and so contrasted as to set one another off to the best advantage; this sort of planning is mostly required in buildings of state, where beauty, dignity, and magnificence are chiefly aimed at; and what applies to planning is equally true of other parts of the tremendous and complex profession that we follow.

We must have deeply studied noble planning as well as that which is merely suitable, if we are to be successful in making noble plans; so must we study dignified proportion, and exercise ourselves in producing it on paper, if we want our buildings or our rooms to be dignified.

No one was a more diligent student of the antique, nor restored more ancient buildings than Palladio, and he was one of the few who succeeded in attaining the dignity and fine proportions of Roman architecture.

To compose well pre-supposes a study of the art of composition, practice in that art, as well as natural genius; and the same study, and the same genius are required for all the different æsthetic branches of our art. Nothing can be a better study for grace and refinement than

* M. C. Garnier, "A Travers les Arts." Svo. Paris, 1869.

Greek mouldings, only they are not suited to our climate. We, in England, therefore, also want to study Gothic mouldings for their effects of light and shade, so that our mouldings may have the grace and refinement of the former, and the effects of light and shade that are obtained by the latter.

I have always been struck in London by the variety and originality of the buildings, but in too many instances the architecture lacks knowledge, taste, and care.

In the introductory lecture of a course, some digression may, I think, be allowed; as it has to point out the general objects we should all have in view, and how some of these may be obtained by the studies recommended, while the subsequent lectures keep more closely to the subject of those studies.

M. César Daly published a pamphlet on "High Studies in Architecture," which has been largely circulated among architects. He accuses all the various French schools of not devoting any serious attention to this subject. As the French schools are very like our own, I may give his enumeration of them. The Paris School of Fine Arts, the Architectural Schools of Paris and the Provinces, the School of Rome and of the diplomaed, the Diocesan, *i.e.*, Gothic, which he says, knows most about the history of the styles that it cries up, the Independents and the "Don't care a— school." I do not think this is the time to discuss all his propositions, but there are two or three which will, I think, be both interesting and instructive, namely, the programmes for the Bordin and Duc prizes. That for the first is—

"To seek if there be a common æsthetic law, applicable to the monuments of the great epochs of art, and from this point of view to study the monuments of the Egyptians, Greeks, Romans, and those of the Middle Ages, of the Renaissance, and of modern times, to the end of the eighteenth century."

This study is not without its use. A clever and indefatigable student might possibly discover laws that have hitherto been overlooked, but one can scarcely hope that one law can be discovered that would ensure success in every building, no matter what was its style. We should then have discovered the philosopher's stone of architecture. M. C. Daly says:—"Englishmen are practical." So I think without going so far afield. Those who aim high may be recommended to take the best of each of the different sorts of buildings in the style which each one affects, obtain their size, and then carefully calculate the general proportions for the general effect and the particular proportions for the particular parts.

I have mentioned here before that Sir C. Barry's Reform Club was designed,—as far as general proportions go,—on an average of those found in the principal Italian palaces, and it is certainly one of the finest proportioned buildings in England, if not in Europe. There can, I think, be little doubt that the Greeks, Romans, Byzantines, Saracens, and Mediaevals had some rules for the due proportioning of their buildings.

M. César Daly ventures to say that "architecture is a social expression." I say "ventures," because, as far as we can see, different nations at different epochs had but one chance,—*i.e.*, the style in vogue. Though there must have been some passion in each nation, or in the architects as a body, to produce those modifications whose ultimate development we call styles, and those peculiarities we call schools, at each epoch there must have been a taste for some particular characteristic, *i.e.*, for massiveness, exquisiteness, or magnificence, for height, or for width, for complexity, or for simplicity, as well as a marked liking for particular features, such as the pediment or gable, the arch, the vault, the dome, or the tower; though the arch was an economic invention, and the vault was a preservative from fire. Cicero thought there must be pediments in Elysium. Procopius is never weary of praising the dome of Sta. Sophia, "pendent by subtle magic." But who can say now that there is a predominant admiration for any particular form of architecture?

The programme of Joseph Louis Duc's prize is as follows:—"To determine by special studies the style of modern architecture."

In the ordinary sense, one would say that it is every style and no style, but there can be no doubt that every modern building which is not a copy, and few are copies, has a nineteenth-century air about it. We cannot imagine Ictinus or Mnesicles saying of one of our Grecian buildings, "this is Greek." Cossutius or Vitruvius

would not say of our Roman buildings, "these are Roman"; nor would Villard de Honnecourt, or William of Wykeham, say of our modern churches or cathedrals, "these are Gothic"; they would all probably say, "these are not in our style"; but I cannot admit that this flavour amounts to a style, it is only fish, flesh, and fowl, with nineteenth-century sauce. For the architecture of to-day to claim the designation of a new style, it must have adopted new forms by reason of new wants or new materials, or it must have embodied in its buildings the aspiration of the people, so that each building is so presented by it as to give them all a family likeness, but alas! the people have no aspiration to embody. Eclecticism itself would constitute a new style, if all pillaged the same things, and arranged them more or less in the same manner.

I gather from M. César Daly that Duc expected that the competitors should attempt to show the new style in their designs. No man can create a new style, though if he be a great genius with a strong personality, he may considerably modify the existing ones.

As far as we can now see, styles gradually grew up, certain things or certain new forms were wanted, and in striving to get these, some part had to be modified. We see in the Roman baths how the entablatures were cut through by the large arches, and were thus obliged to be mitred round each column, the long entablature perished and with it the prevalence of horizontal lines connecting the columns, and in its place are isolated columns with a scrap of entablature over each, so that the prevailing principle was vertically.

In Diocletian's Palace (probably built about A.D. 305) we see that the architects had got tired of sham imitations, and where they could, used round arches in their place. The architects found, too, that mitred entablatures on isolated columns were in the way where arching was used; so, when it could be managed, the arches were made to spring either directly from the caps of the columns, or from blocks on them. Small colonnades or arcades, when used as decoration only, were carried on corbels, while the traditional ornament was still carried out to the best of their ability.

In 532 A.D., some 200 years later, Justinian had Sta. Sophia built; then all traces of entablature over the columns had gone, and it had taken its place over the arcades; the capitals take a new form and are enriched with a new scheme of ornament; and the dome rests on pendentives. Anthemius of Tralles, who built Sta. Sophia, was doubtless the great architect of his day, and the possessor of the traditions and practices of his day, and had doubtless used pendentives before on a small scale.

The Koptic architect who built the brick mosque for Touloun in the ninth century (876 A.D.) at Cairo, was merely possessed of the Byzantine traditions as carried on in Egypt, and possibly was the introducer of the small arches that take the place of pendentives in the dome. His successors gradually worked out those arches into the form of stalactites that were so much affected by the Arabs and Moors, until at last we get the Alhambra and the Alcazar, which scarcely bear any resemblance to Byzantine work.

The Romanesque architects, who eventually developed Gothic, went to the Crusades, saw the principal buildings in Rome, Constantinople, Asia Minor, Syria, and Palestine, and either from being prisoners themselves or from intercourse with Saracen architects who had been taken prisoners, became possessed of the geometry so much cultivated by the Saracens, and also adopted their methods of design, particularly in producing effect by the constant repetition of parts. So I think we may say that new styles are developed in the course of ages, from the introduction of new methods of construction, new ideals, and to some extent through the love of new forms of ornament.

In the present day, iron, in the form of cast-iron, wrought-iron, and steel, is insensibly affecting architecture,—I mean stone and brick architecture, for scarcely any large building solves all its problems without the use of iron. As far as buildings of cast-iron go, there have been no great achievements yet within the pale of architecture, and as far as wrought-iron and steel go, none. I do not say that nothing has been attempted, but no success has as yet been achieved, and for these reasons, that it has hitherto been too costly to mould wrought iron and steel, and buildings have not been big

enough to use the ready-made forms as units of enrichment, nor have artistic gifts been vouchsafed to the engineers; when good effects have been attained, they have been attained by chance. I do not complain of this, because in most engineering structures the main difficulty has been to do them at all.

I think we cannot help noticing that there has been an effort at the Paris Exhibition to try what can be done with these materials, so as to bring them within the pale of architecture. A witty English architect described the Eiffel Tower as "a factory chimney in lace," but this is an engineering work, its claim to our admiration is rather founded on the solution of a problem in construction that was looked on as insoluble, than as the solution of one in beauty; this was, at most, considered to be of slight importance.

The treatment of cast-iron at the Exhibition buildings at Paris in the shape of columns has been so successfully achieved as to make the columns perfectly harmonise with the decorated wall they carry; for we have now become so well acquainted with the strength of cast-iron as to tolerate its bulk being small in proportion to the weight it has to carry, and in this case the contrast is agreeable.

I cannot too much praise those flanks of the Exhibition buildings, where cast-iron has been used for supports in association with mouldings, sculpture, mosaic, and colour; but when it was wanted to bring wrought-iron within the pale, it defied solution. All honour to the attempt. The wrought-iron stanchions filled with terracotta only suggest that the terra-cotta has been thus packed in iron crates for travelling by rail. In the domes the ribs are unobjectionable by reason of their slowness: they are mere cobwebs.

M. Dienlafay's spoils of Darius's Palace have taken root and blossomed, for the external domes of the Exhibition in coloured and enamelled bricks are a lovely invention—I think it may be called an invention in spite of its traditional use in Persia. The adoption of coloured and enamelled bricks for the roofs of vaulted and domed structures, possibly even of ordinary-pitched roofs, would add much to the beauty of modern cities.

I think I am not singular in looking on the Royal Academy as being desirous of encouraging the higher studies.

It does not so much profess to teach that alone by which the student may get an honourable living, as to try to fit him for the highest employment—*i.e.*, the designing of grand public and private monuments,—monuments that by their durability and beauty may give a notion of the magnificence and taste of this day to succeeding generations,—may, whose very ruins may speak of the greatness of our time, and give lessons in taste, planning, and construction to future architects, when even our language has become the province of a few scholars.

No architect should forget that some ruins still excite our admiration, though the written language of their builders is incomprehensible. I may instance the Pelagiac and the Etruscan.

I think I may here interpolate a maxim,—Never allow your indignation or despondency to prevent you from still doing your best when you have been thwarted in your favourite schemes. Always think of Wren. Your indignation and despair will end with your life, even if they last so long, while your building may last for centuries. Let not the future cultivated student of your building say, the architect of this was not steadfast to the end.

I will now give you a slight sketch of what we know about the Roman houses and palaces, and of what we may gain by the study of them. Most of the private houses of the Romans have been utterly destroyed, except those in Herculaneum and Pompeii, and we may at present exclude the former from our consideration, as so few have been excavated.

It was only after the publication of Sir W. Gell's "Pompeiana," at the end of the first quarter of the present century, that much was known about the houses of the Romans, except to those had seen the excavations. Since his day many splendid monographs have appeared on the subject; the works of Zahn, Müller, Mann, and Niccolini, have become text-books. The plan of Hadrian's Villa, near Tivoli, taken by Pirro Ligorio, was published in 1751, by Contini, and Contini himself published another in 1768.

Robert Adam, in 1764, published his restoration of the Emperor Diocletian's Palace at

Illustrations.

THE BRONZE DOORS FOR COLOGNE CATHEDRAL.

THE illustration shows the first of the modern bronze doors which are to be added to Cologne Cathedral; this door having been very recently fixed. There are to be not less than twelve of these doors to the several entrances of the cathedral, the general design and certain ornaments and enriched mouldings being in all cases the same, but the subjects in the panels varying in each door. The designs were prepared by the Gothic architect, Herr Schneider, of Cassel, under the general superintendence of the architect to the Chapter, Baurath Voigtel, and the execution was intrusted to the sculptor Mengesche, a native of Aachen. The bronze plates are five-sixteenths of an inch thick, exclusive of the raised portions, and are screwed to massive and strongly-braced oak skeleton frames, each door being 11 ft. 5½ in. high by 7 ft. 2½ in. wide. The repetitions are in cast bronze, and have come out so sharp that they could be left without further work upon them, a circumstance which materially affected the price, which is 750*l.* for each door, or 9,000*l.* for the twelve. At present only one of them is hung (in one of the openings in the west front), and it is this first sample which we publish to-day from a photograph sent to us by the Court Photographer, Mr. Anselm Schmitz, of Cologne. The three crowns, of course, allude to the three Magi, whose bones are supposed to rest in the Cathedral.

HOUSE, EDGE HILL-ROAD, EALING.

THIS house has been built from the designs of Mr. L. A. Shuffrey, for his own occupation, on Castlebar Hill, Ealing.

The walls are of Acton red bricks, with Box-ground Bath stone dressings, the window-cills and thin copings being of Portland stone. For the roofs Reading tiles are used, with sanded face. The dormer window shown in the sketch lights a sitting-room, and commands an extensive view over Harrow and neighbourhood. The left hand of the two gables contains the main staircase, which is continued up to the top floor.

The building contractor was Mr. Jas. Chapman, of Hackney, and the plumbing work was executed by Mr. John Smeaton, of London.

DRAWING OF SOUTH AISLE, GADDESBY, LEICESTERSHIRE.

THE Church of St. Luke, Gaddesby, is situated about six miles from Melton Mowbray, and is of the Early English period. The south aisle, the subject of the sketch, was added in the fourteenth century.

The oak benches, in their original position, may be seen in the nave, and a portion of mural decoration on the chancel wall.

The church is unrestored.

ARTHUR H. HIND.

PARISH ROOMS, ST. GILES'S, NORTHAMPTON.

THIS building is situated in a leading thoroughfare of the town. The hall, or parish-room, occupies the whole of the first floor. On the ground floor are four good rooms for various church purposes. In the basement are lavatories, cloak-room, kitchen, storeroom, and two other rooms. A lift for use at tea-meetings runs from the kitchen to the upper rooms.

The architect is Mr. Samuel J. Newman, of Northampton, whose design was selected in a limited competition on the recommendation of Prof. Roger Smith, who was called in by the committee to adjudicate.

In execution, the exterior especially has been somewhat reduced in cost. This illustration is the original design. The builder is Mr. J. Buswell Clarke, of Northampton, the contract being 1,888*l.*; but more than 100*l.* additional has been spent in obtaining a good foundation, it being found that the site was an old stone-pit excavated to very irregular depths, varying from 25 ft. to 8 ft. below the basement, and at some time since filled with loose material. This necessitated great care with the foundations. The system of concrete piers adopted has, however, successfully met the difficulty, no settlement whatever having occurred.

The building is heated throughout by hot water, executed by Mr. W. Stainton, of London, at a cost of 103*l.* 10*s.*

TWO SEMI-DETACHED HOUSES, KNIGHTON, NEAR LEICESTER.

THESE houses have been built from designs by Mr. Isaac Barradale, of Leicester, the contractor being Mr. Peter Lowery. Besides the accommodation shown on the ground floor plan, the upper floor contains large drawing-room, five bedrooms, dressing-room, linen store, bath-room, w.c., &c.

Local red bricks have been used for the exterior, red Broseley tiles for the roof, and the timber work has been coated with Stockholm tar.

THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND-STREET.

NEW "JUBILEE" WING.

THE arrangements of the plans for the new Jubilee Wing of this hospital have been founded on instructions to the architect by the Committee, the result of anxious and detailed consideration of the various suggestions and advice tendered to them by the medical staff and the nursing staff of the hospital, and derived from their long experience.

The basement floor, which is on the same level as that of the present building, will contain an additional large out-patients' receiving room, approached from Powis-place, with a room attached for such slight surgical operations as can be effected at once; a special waiting-room for whooping-cough cases, and another for infectious cases, each carefully separated from the above large room; while to each of these three receiving rooms separate lavatories and closets are attached.

On this floor is a large Housekeeper's Room, sewing and mending room, a receiving-room for linen, and also linen stores. There is also a room denominated the Samaritan Room. A passage from the present kitchen (which is to be enlarged), kept separate from all the above, leads to a lobby, whence lifts for food, and also for coals, rise to the upper floors of the new wing.

The ground-floor contains an in-patients' receiving-room (the want of which has been seriously felt in the present building), fitted with bath-rooms, available for immediate use at any time. A small accident-room is also provided for urgent cases. On one side of the hall of entrance from Great Ormond-street there is a suitable committee-room, with Secretary's room and clerks' office adjacent; and on the other side of the entrance-hall is a waiting-room, the lady superintendent's room, medical officers' room, a common-room for the nursing sisters, and another for the use of lady pupils. The centre of the wing is occupied by the principal staircase, which is carried the whole height of the building, and lighted both laterally and from above.

The mezzanine floor contains a large dining-room for the nurses, with service-room attached fitted with lifts from the kitchen; also a common-room for the use of the nurses; bed-rooms for the lady superintendent, the lady pupils, and the sisters, bath-room, and other necessities.

The first and second floors are similarly planned, and contain two new wards on each floor, rather more lofty than the present ones, with a room for the sister in charge. On each floor is a ward-kitchen fitted with lift from the kitchen in basement; a vestuary, bath-room, and other necessities. These wards contain sixty-two beds, each bed having allowed to it 1,000 cubic feet of air in the ward. The new wards are so planned as to be lighted on each side, thus ensuring cheerful appearance and thorough natural ventilation.

The third floor contains accommodation for which the medical staff have long been anxious, viz., a large separate ward, containing thirteen beds, and specially devoted to whooping-cough. A small separate ward, containing three beds, is adjacent, intended for very special cases. As with the wards below, a sister's room, as well as a ward kitchen, vestuary, bath-room, &c., is provided.

In all, there will be an addition to the accommodation, including the rearrangement of the north end of the second floor of the present hospital, of eighty-nine beds, including those in small special wards, making a total of 214 beds.

The attic floor contains the sleeping accommodation for the nurses and the female servants of the Hospital. These have, of course, separate approach, and in each case good-sized and well-lighted cubicles are arranged for one occu-

pant each. On this floor is also the housekeeper's bedroom. Bathrooms, &c., are also provided.

It should be mentioned that all floors, staircases, and passages are constructed of fireproof material; that the walls of the several wards will be faced internally with glazed bricks of suitable colour; and that the warming will be by open-fire Galton stoves, so arranged and fitted as to assist largely in the ventilation of the wards.

Several improvements in the present building are also provided, including the enlargement of the Diphtheria ward on the second floor, enlargement of the kitchen and heating apparatus room, providing three additional bedrooms for the use of the porters, and also a second consulting-room attached to each of the present patients' waiting-halls, which last have been found greatly needed from the large attendance of out-patients, and to avoid unnecessary delay in attending to them by the attendance daily of two medical men instead of one as at present.

The design externally has necessarily been varied from that of the present building, as the levels of all floors, except the basement, are different. The wards are more lofty, and the windows are larger.

Tenders for the erection of the carcass of the building have been received, and that by Mr. W. T. Mitchell, of Dulwich, has been accepted at 14,493*l.* It is intended to commence the work forthwith, but until further money can be raised the completion of the building, with all internal finishings, estimated at about 6,000*l.*, must necessarily be deferred. It is, however, hoped that before the completion of the work now to be undertaken the necessary funds for the completion will be forthcoming.

EXAMINATION IN ARCHITECTURE:

THE ARCHITECTURAL ASSOCIATION.

THE seventh meeting of this Association for the present session was held on Friday, the 17th ult., in the meeting-room of the Royal Institute of British Architects, Conduit-street, Mr. Leonard Stokes (President) in the chair.

Messrs. F. W. Cowley and S. Dawe were elected members.

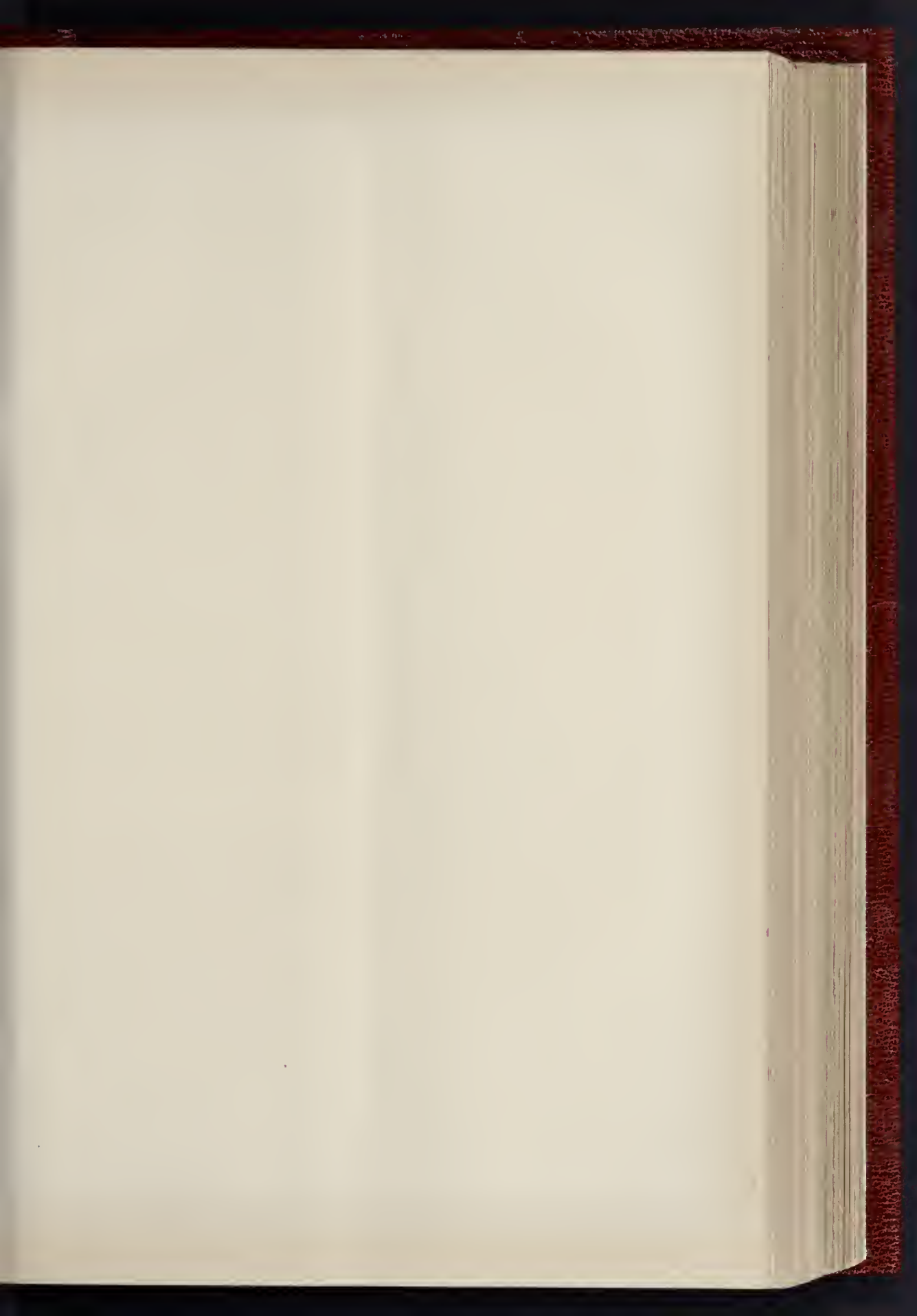
Mr. Farrow, hon. secretary, called attention to the Painter-Stainers' Company's Travelling Studentship, for which the Association had the privilege of nominating two competitors.

Mr. E. S. Gale, hon. sec., announced that arrangements had been made for the first seasonal visit, which would be to Mr. D'Oyly Carte's new theatre in Shaftesbury-avenue, on Saturday afternoon, February 8.

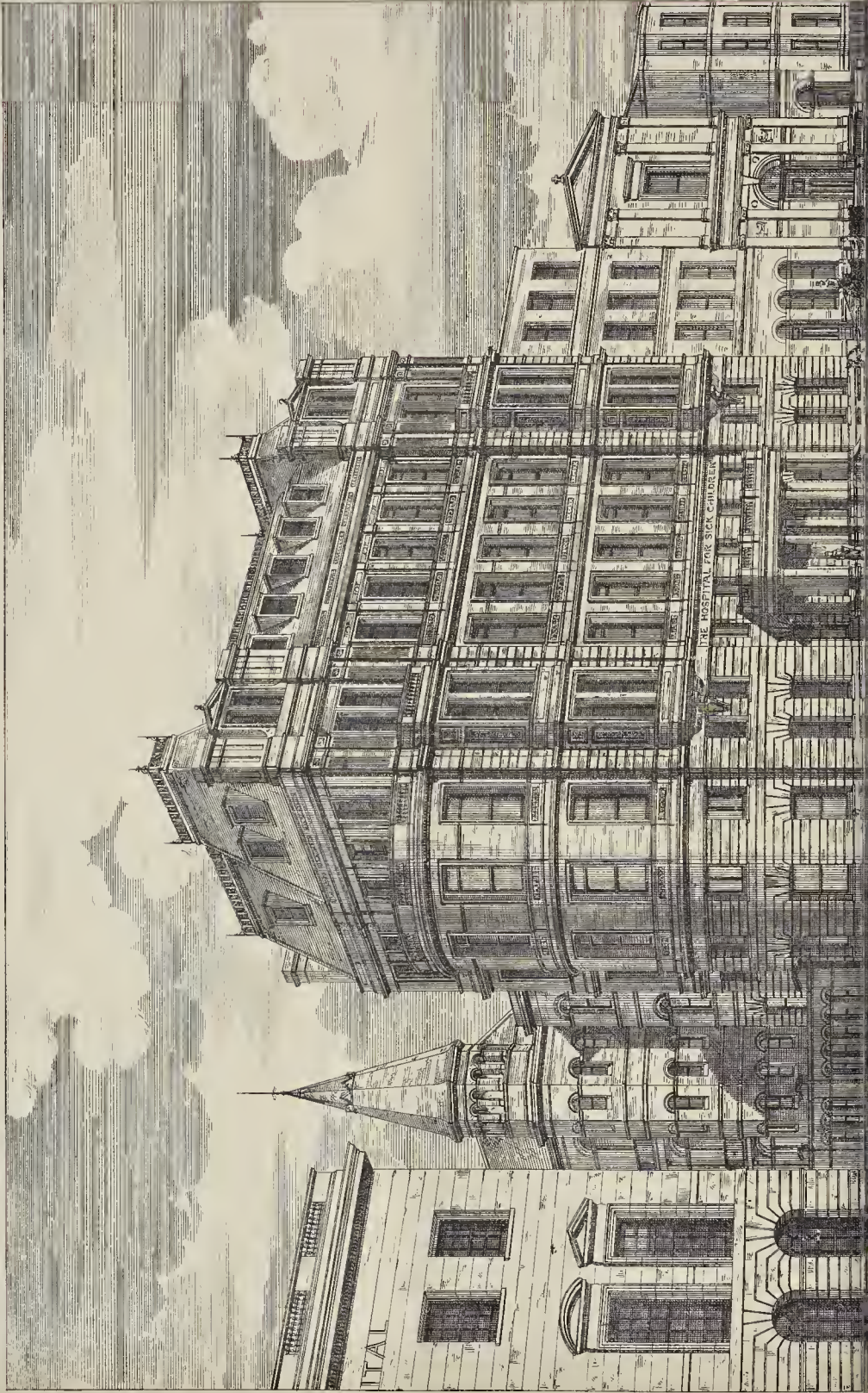
The Chairman then called upon Mr. Arthur Cates to open a discussion on the Progressive Examinations of the Royal Institute of British Architects, and in doing so said that he thought he ought to mention that Mr. Cates had come down to them that evening in defiance of his doctors. It was extremely kind of him to do so, and he (the Chairman) hoped that Mr. Cates would not be any the worse for having come out. As most of them knew, Mr. Cates had not been at all well lately, and his presence under the circumstances showed what great interest he took in them and in the cause of the Examinations.

Mr. Arthur Cates then read his paper, which was entitled "Examination in Architecture: In the Past, the Present, and the Future." We printed it *in extenso* last week. In the discussion which followed,—

Mr. J. A. Gotch said he had great pleasure in proposing a vote of thanks to Mr. Cates for attending and giving them his paper, which he thought was a very valuable one, for two reasons. In the first place, it was an historical account of the Examinations, and therefore of much interest; and in the second place it would be a guide and a great help to those who had pupils, as well as to the pupils themselves and the younger members of the profession. He thought that no better service could be rendered to a young man beginning his architectural training than to put into his hands a copy of Mr. Cates's paper. As Mr. Cates was reading the memorial which was prepared by the Architectural Association for presentation to the Institute in 1855, it struck him that, as Mr. Cates had said, the terms of it applied very much to the present day, for, even now, "the students of Architecture are without sufficient guidance." The examinations which had been instituted by the Institute were a very good sign-post, but they wanted

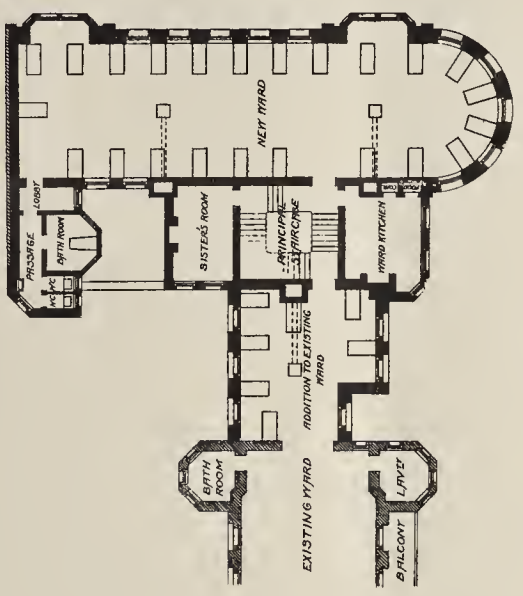


THE BUILDER. FEBRUARY 1, 1890.





POWYS PLACE
 PLAN OF GROUND FLOOR



PLAN OF FIRST & SECOND FLOORS.



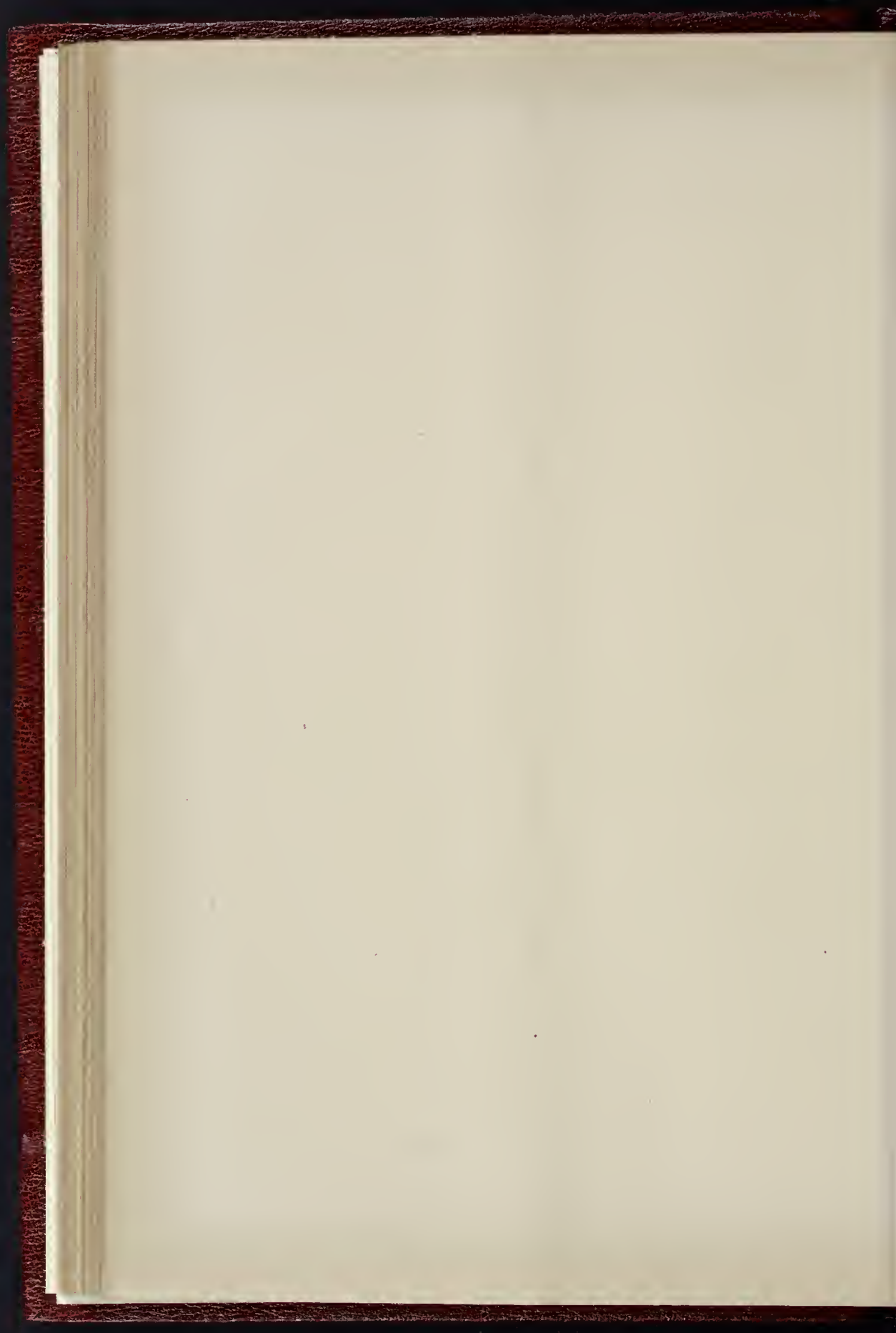
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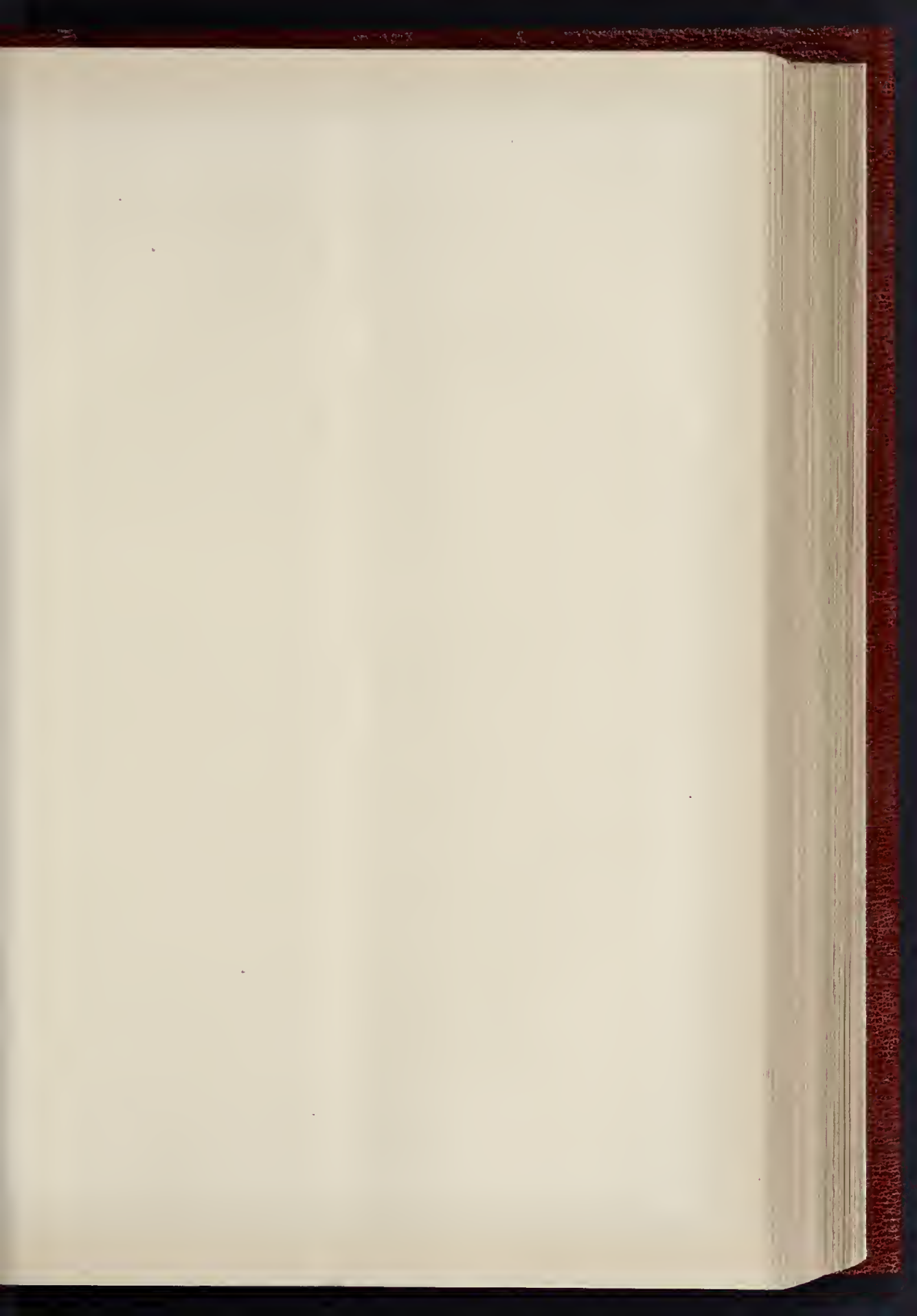
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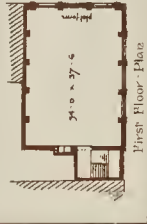
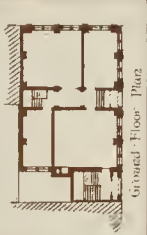
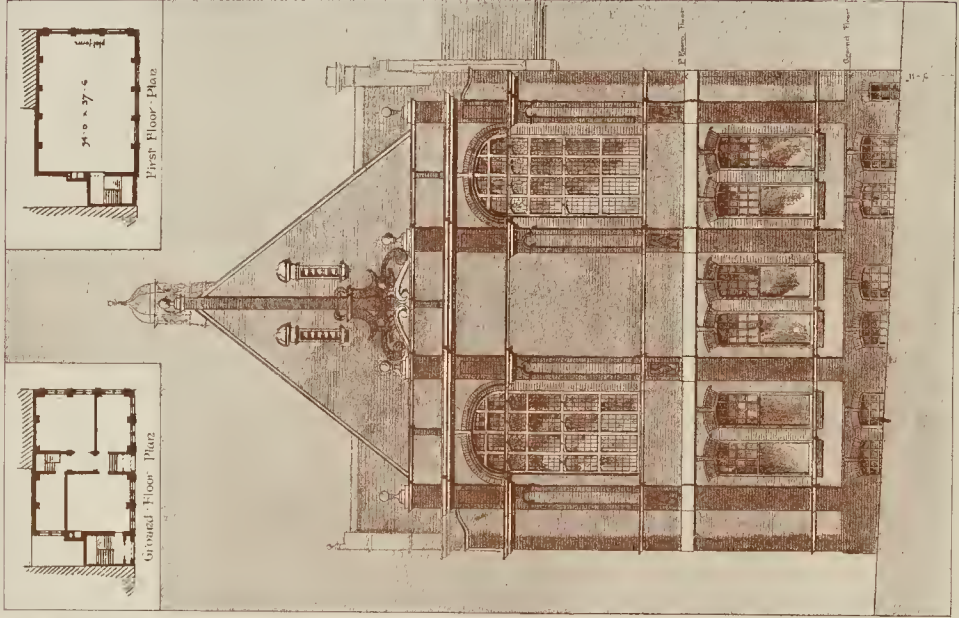
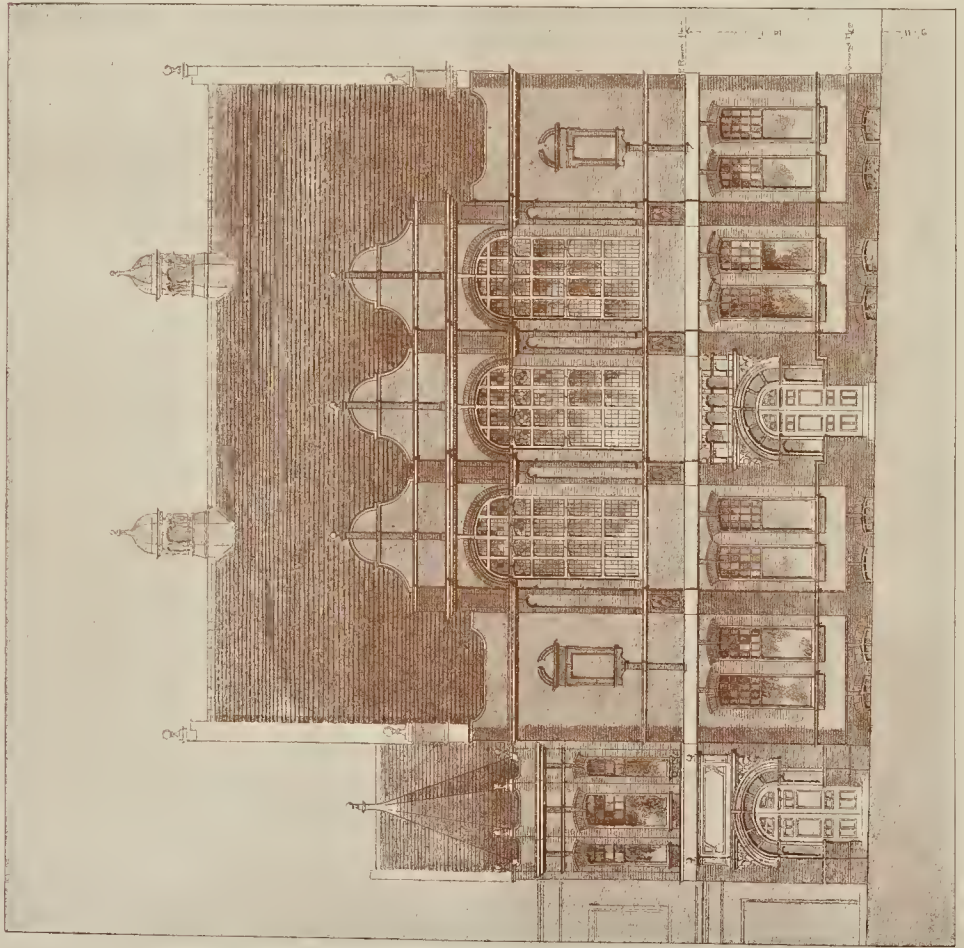
PHOTO LITHO. SPAGNOLI & CO., 22, AVENUE DE LA CANNIÈRE, PARIS.

THE HOSPITAL FOR SICK CHILDREN, GT. ORMOND STREET, NEW JUBILEE WING NOW IN COURSE OF ERECTION.

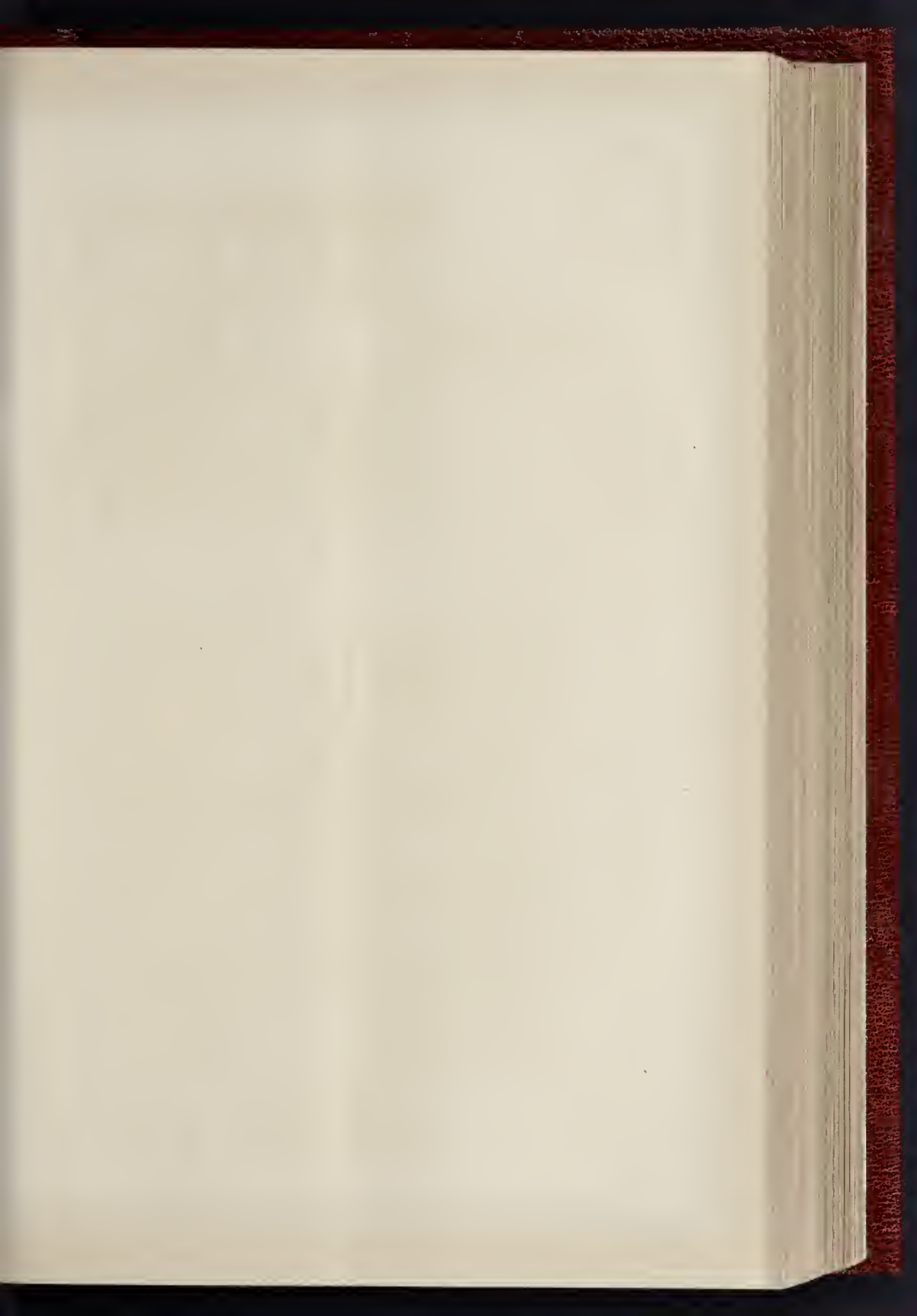
MR. CHARLES BARRY, F.R.I.B.A., ARCHITECT.







FOR PHOTO. SERVICE SEE PAGE 22. MUST BE SENT BY POST TO "THE BUILDER," LONDON, E.

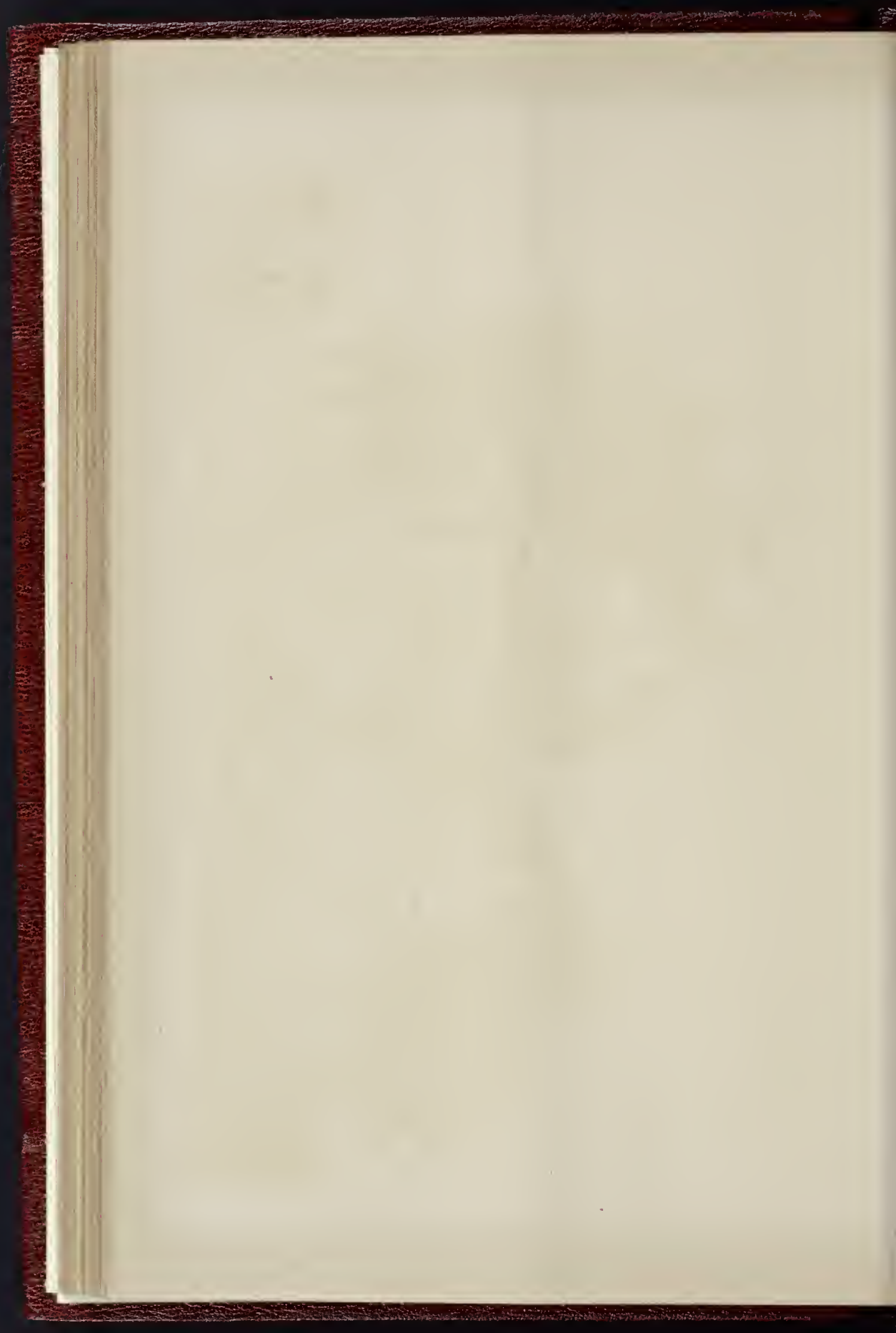


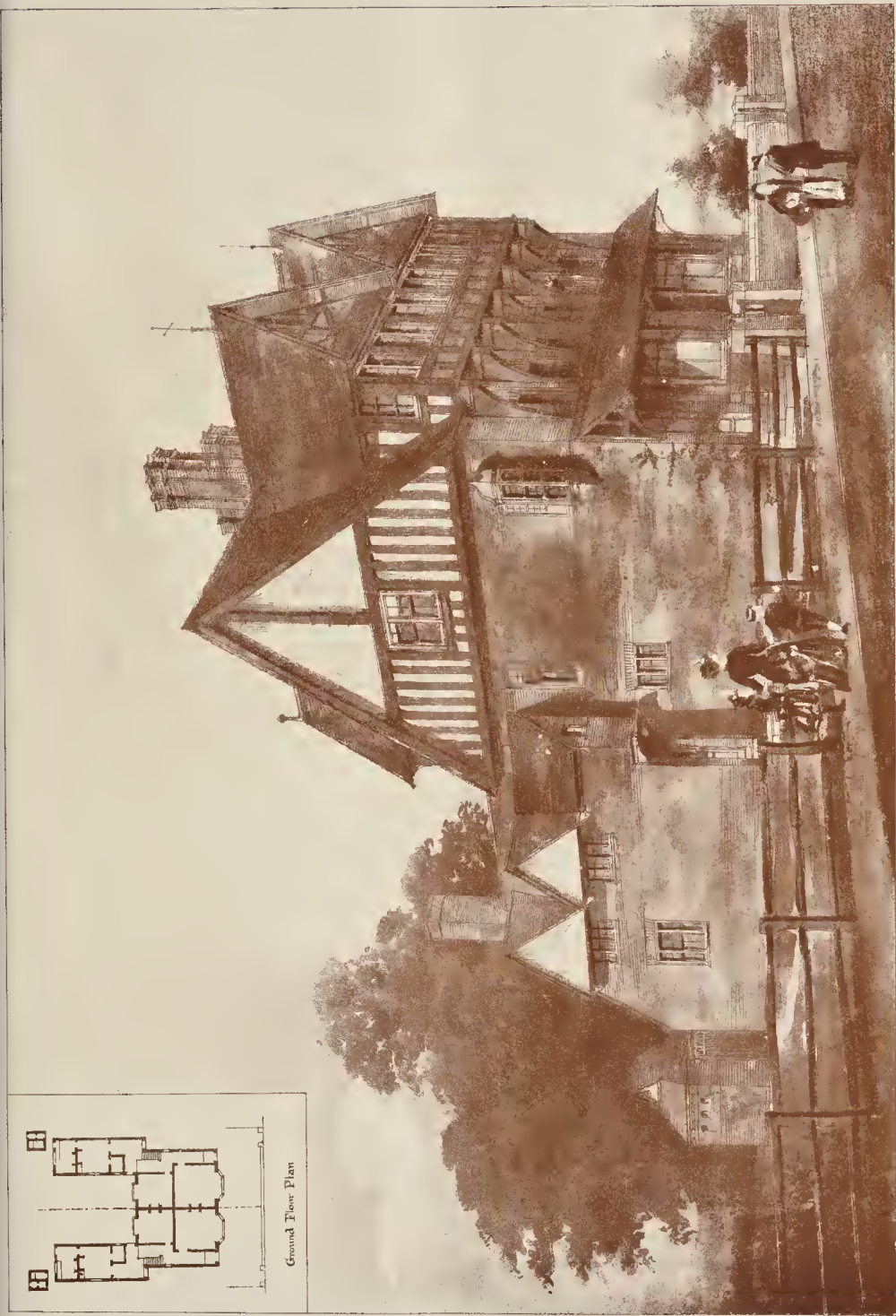
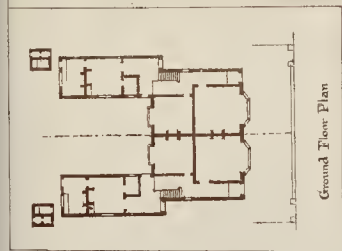
THE BUILDER, FEBRUARY 1, 1890.

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W. L. A. Sheffield, 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



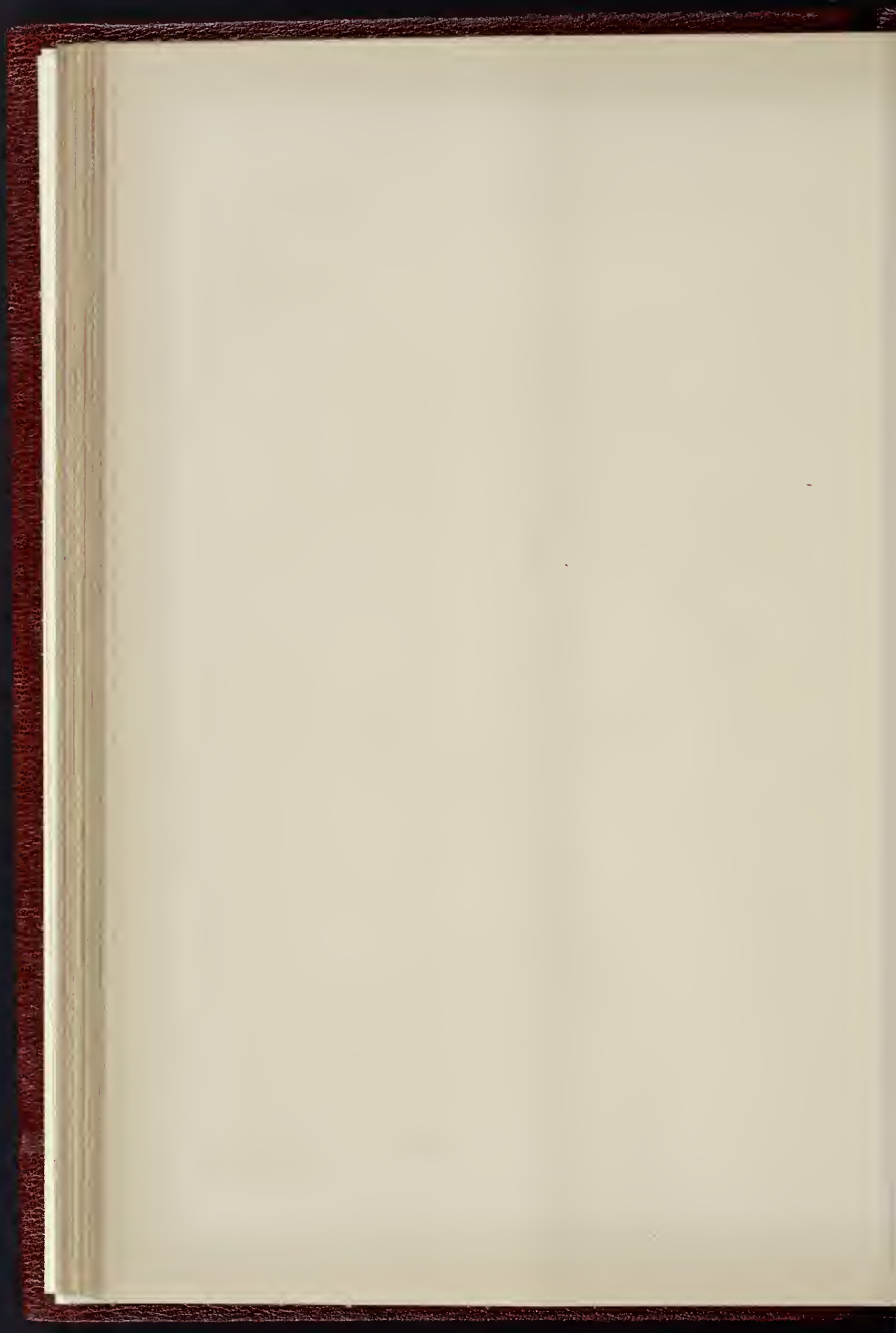


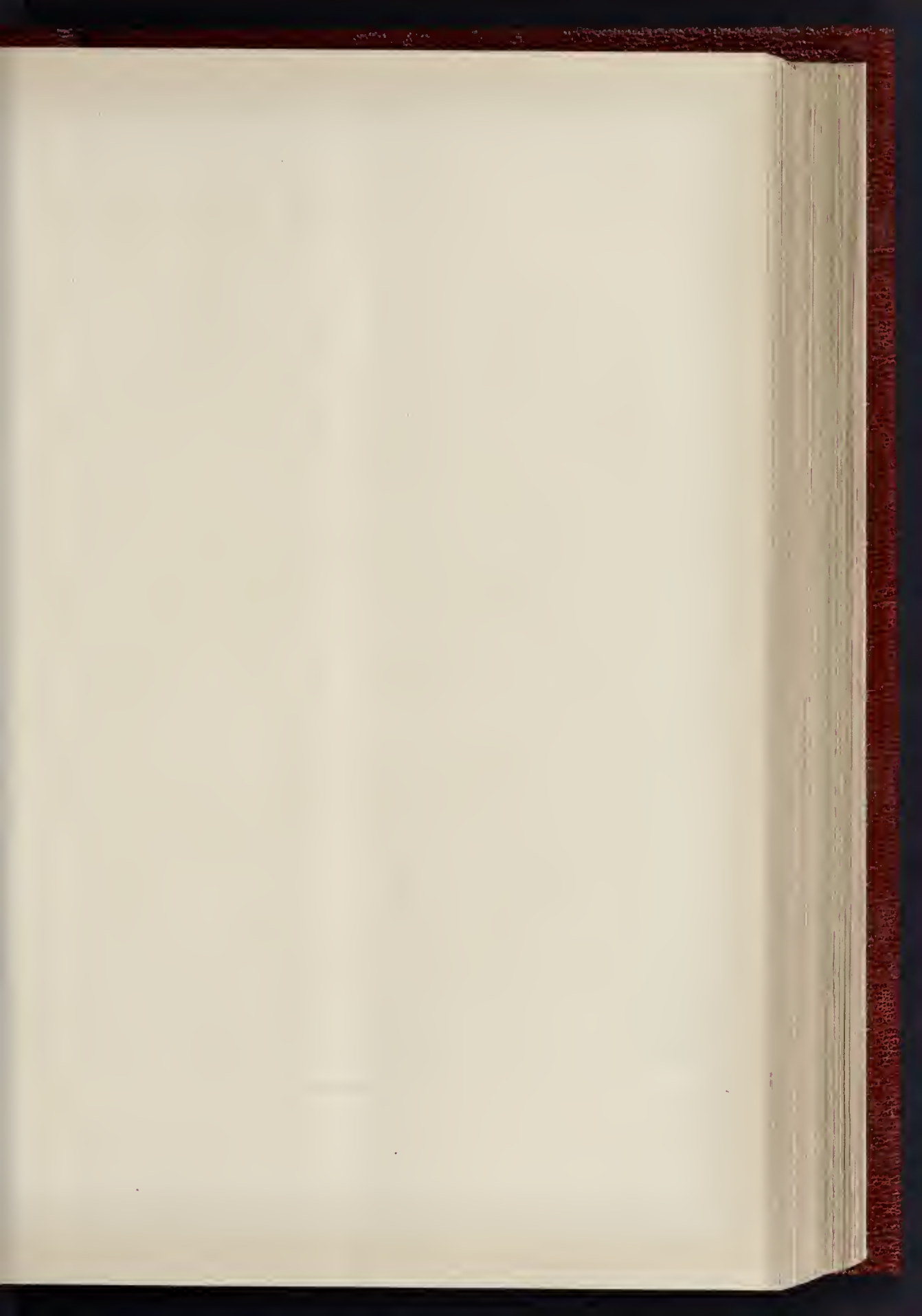




THE ARCHT. DRAWING BY J. H. STUBBS, R.S.A. & J. H. STUBBS, R.S.A. DRAWN BY J. H. STUBBS, R.S.A.

HOUSES, KNIGHTON, NEAR LEICESTER.—MR. ISAC BARRADALE, F.R.I.B.A., ARCHITECT





THE BUILDER, FEBRUARY 1, 1890.

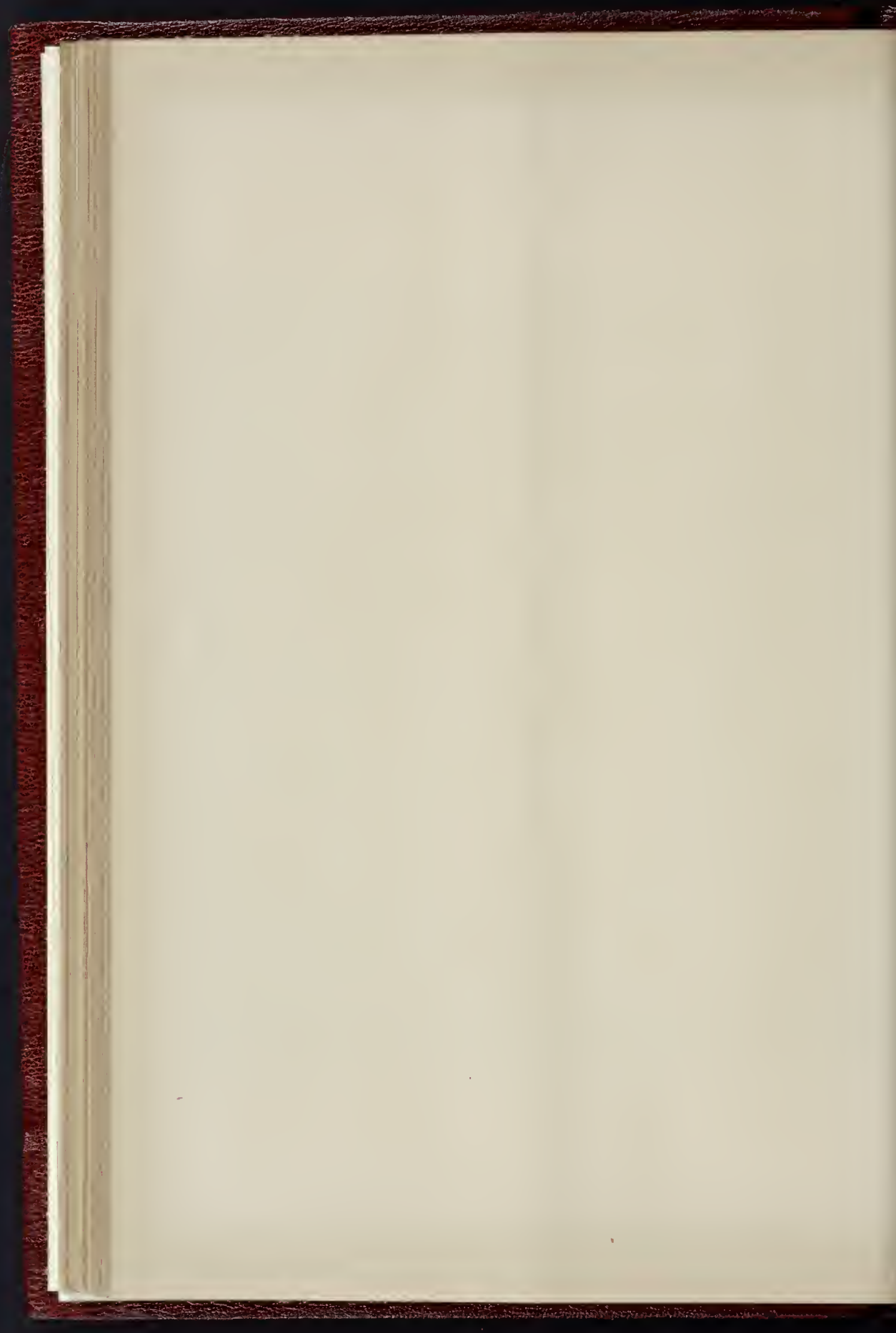




The Phototype Co., 53, Strand, London.

BRONZE DOORS RECENTLY FIXED AT COLOGNE CATHEDRAL. DESIGNED BY HERR SCHNEIDER, ARCHITECT; EXECUTED BY HERR MENGEBERG.

From a Photograph by Anselm Schmitz, Cologne.



something more than that; they wanted not only to have the task set them, but some better means of enabling them to grapple with that task, and he trusted that before long they would evolve, not only a better system of architectural examination, but a better system for enabling them to acquire the necessary knowledge to pass the examinations. He thoroughly and heartily endorsed what Mr. Cates had said about principals insisting upon their pupils preparing for and passing these examinations. In the office in which he was a partner, when a pupil was articled to them they made it a stipulation that he should go in for these examinations, and they also made it a part of the articles that they should offer him facilities for acquiring suitable knowledge apart from what might be going on in the office. That seemed to him to be the most essential, and if all architects would take a similar course, and if they could induce their assistants to pass the Examinations as well, it would be for the benefit of the profession. As regarded architects' assistants, he found that they were generally very willing to go in for the examinations; men who did not come in touch with the Association, or with London at all, except through what they saw in the papers, welcomed these examinations; and he thought it would take very little trouble, and very little persuasion on the part of the principals, to get their assistants to enter for them. One advantage that the progressive system had was that from the very outset of his career a young architect was more or less in touch with the Institute. The very fact of their becoming probationers was a help to them, as well as a help to the Institute; he was thoroughly satisfied that it was to the Institute that they must look for maintaining the prestige of the profession, and the more they could get the young men to be in touch with the Institute, the better it would be for the profession. It must be remembered that those who passed the preliminary examination became probationers of the Institute, and thus obtained a certain standing in the profession which they would not otherwise have.

Mr. H. D. Appleton, in seconding the vote of thanks to Mr. Cates, referred to the action of the Association with regard to the affiliation of local societies, which Mr. Cates had alluded to. He (Mr. Appleton) had taken some little interest in that matter, and wished to make one or two remarks on the subject. In endeavouring to promote the formation of local associations in country towns, the first difficulty which they were always met with was the fact that architects engaged in practice in those towns were extremely jealous of their pupils and assistants coming together; and he was afraid that that was the great difficulty with which they would have to contend. Provincial architects seemed to think that if the assistants were to meet together in classes in that way, they would get talking about office-work in general, and thus rival practitioners would learn what business was going on in each others' offices. He had always endeavoured to point out that no harm of that kind had ever occurred in connexion with the Architectural Association; and that, moreover, architects' pupils and assistants were possessed of sufficient *esprit de corps* to render it well-nigh impossible that they should talk about office secrets. Another difficulty which they had experienced was the fact that the Institute having a federation scheme on hand, the student societies which they had approached had in one or two instances said that they would prefer to become connected with the Institute instead of with the Association; but he thought it was not the intention of the Institute to federate with the student societies. The question of the way in which isolated students in the country could derive benefit from the work of the Architectural Association had long been one of great difficulty; but they last year instituted the first of what they had hoped would be a series of correspondence classes for those students, but they only had twelve members, he thought, in the class which was started, and it was not kept up with very much vigour. But he sincerely trusted that the Association would still endeavour to assist those students who unfortunately were not living in places where they could derive benefit from attending classes. It seemed to him that there was wanted some sort of organised system to take the country students' work and to bring it before the classes in London, for they did not seem to derive sufficient benefit from the present system. Of course, the members of the affiliated societies had the benefit of seeing the work submitted

in the London classes, which was sent down to them; but it would not be possible for it to be sent round for isolated students to see, for it would be worn out before it got back. There was one point in the preliminary examination scheme about which there was some difficulty; for the list of drawings set out in the Institute "Kalendar" mentioned that "two sheets of the Orders of Architecture" were required for that examination. Did that mean that the whole of the five orders were to be put upon the two sheets?

Mr. Cates said that the requirement in question related to the Intermediate Examination, and having read the paragraph referred to from p. 153 of the Institute "Kalendar," he said that the whole five orders were not wanted: the candidate could select any two, putting one order on one sheet and one on the other.

Mr. John Slater said he felt himself in some difficulty in speaking that night, because there was very little more to say upon the Examination part of the question than had been said by Mr. Cates. But there was a great deal more to be said on the educational aspect of the question, and with regard to that his tongue was to a certain extent tied, because, as perhaps they knew, he was one of the members of the Educational Committee now sitting, which was not yet quite in a position to report; and he could not very well divulge the secrets of that committee, nor could he mention there the conclusions towards which he thought they were drifting. But with regard to the Examinations themselves, he wished to say one or two words. The Preliminary Examination which had been instituted had been alluded to by Mr. Cates, who had mentioned the fact that although the programme of that examination was very precise in its terms, a number of candidates who came up for the Examination seemed to ignore altogether the fact that they would be examined in the subjects in which they had been told they were to be examined. It was no good for the Institute to carefully prepare a programme if it were to be ignored. He did not suppose that he was speaking to any candidates who had been up for examination and had failed, but he hoped he was speaking to many who would be going up for the Intermediate Examination, and he wished to impress upon them that if there were subjects set down in the programme of that Examination it would not do for them to think that if they ignored these subjects, and did well in others, that they would pass. To use a Shakespearian quotation, he "could a tale unfold" as to the Preliminary Examination which would move them to laughter. Answers were given on some subjects which showed that some of the candidates had not the very remotest ghost of a shadow of a knowledge of the subjects in which they were examined. He could not help thinking that whatever system of education, or whatever system of guidance, they might have in the way of classes, a very great deal depended, as Mr. Gotch had said, upon the personal influence of the master under whom the pupil was placed; and he (Mr. Slater) thoroughly agreed with Mr. Gotch as to its being absolutely incumbent upon a master to give his pupils time to prepare for these examinations, not only out of office-hours, but in office-hours. But they must bear in mind also that whatever amount of guidance they could get in the office, whatever amount of help they might get from classes and lectures, without their own individual effort all would be of no avail. They could not expect to become architects, or even to take a medium position in the architectural world, without hard work; and without hard work they had better give up architecture altogether. He was very sorry to hear what Mr. Appleton had said about the difficulties in the way of students and assistants associating with one another in the country, for he was quite sure that a great deal of good was to be gained by assistants and pupils meeting for mutual discussion; and he could not help thinking that it was a shortsighted policy on the part of the masters in provincial towns to prevent their students from doing that. Much, even in the masters' interests, was to be gained from such mutual discussion; for although one pupil or assistant might be very well up in some subjects, he might be deficient in others, and would be glad of such information as he might be able to get from his own fellow students and assistants. He would also urge upon the architect students to avoid all *mauvaise*

honte or shyness. They were not to be ashamed of showing their drawings freely to their fellows; for it was only by having the bad points criticised that they would learn the good. As he had said before, he could not now enter upon the question of the educational aspect of the question, but he thought it would be a very great help to the Educational Committee now sitting if they had the views of the younger members of the Association, for they would be able to say what they wanted. He had great pleasure in supporting the vote of thanks to Mr. Cates, and he was quite sure that if they knew what an effort it had been for Mr. Cates to be there that evening, they would hardly know how to adequately express their thanks.

Mr. H. O. Cresswell said there were some few points, he thought, in Mr. Cates's paper which ought to be a source of great satisfaction to them. They would see from the Memorial of 1855 that it was really the Architectural Association which first prominently drew the attention of the Institute to the fact that it was necessary for the Institute to found an examination at all; and, as Mr. Cates had said, that memorial might almost have been formulated within the last few years. It was almost marvellous to younger members like himself to find that, although the Architectural Association sent in its Memorial in 1855, it was only in 1889 that they had had anything like a realization of it. They did, indeed, travel slowly in the architectural profession. He thought that the description which Mr. Cates had given of the published returns of the increasing number of candidates for the Examination was eminently satisfactory, and that they might feel that the Examination could now take care of itself under the guidance of the Institute; at all events, he thought that the Association might very well leave it to the care of the Institute. But they had another question for them,—a very much more important one,—and that was education. He was not trammelled as Mr. Slater was, for he did not happen to sit on the Educational Committee to which reference had been made; he would therefore take the opportunity of expressing his opinions, and as they had Mr. Cates and other members of the Institute there that evening, he thought it would be much better to express their feelings freely and openly than to send official letters which only elicited very polite official replies. They were now all in a state of turmoil in that Association on the subject of education. They began their session by a very suggestive and interesting address from their President, which, however, hinted doubts as to whether they were on the right track at all, and whether they ought not to reconsider the whole of their system of education from beginning to end,—one of the principal reasons being that an organisation which worked very well with a small number of members, such as the Association possessed years ago, was not adequate now, considering their largely increased numbers. In addition to that, the requirements and needs of the scientific education of the present day were very much wider and larger; and they had also before them the Institute Examination, which said that if they wished to become members of the Institute they must qualify for that Examination. Was the Association able to give its members the necessary instruction to fit them for that examination? Were they able to do that in the same way that they had been doing hitherto? Those were questions which the Educational Committee had been appointed to consider, and he trusted that they would give them some practical advice on the subject; for he was perfectly sure that if any good was to come out of their Educational Committee, and if the instruction now gratuitously and voluntarily given was to be continued, they must be backed up by the Institute to a certain extent. For instance, supposing that their Education Committee and the general body were to suggest the institution of afternoon classes, would the Institute give them the benefit of its authority over its own members so far as to make the institution of afternoon classes a success? If the members of the Institute would not combine to promise that all their pupils should be free to attend such afternoon classes, the institution of such classes would be quite useless. He had much pleasure in supporting the vote of thanks to Mr. Cates, who was always very willing to help them with all the weight of his experience and authority.

Mr. A. Beresford Pite said he could not help feeling that their gratitude to Mr. Cates would hardly be met by a vote of thanks, for

he had descended from the lofty throne of the Chairman of the Board of Examiners for the discussion. The most practical way in which they could show their appreciation of his kindness would be to continue the discussion freely and frankly. Many of them had been seriously concerned for some months past to hear of the indisposition of Mr. Cates, and they would all congratulate him upon his restoration to health. Those of them who had been through the terrors of the Examination all felt under a great obligation to the Chairman of the Board of Examiners. A distinguished member of the Association said to him,—he was sure Mr. Cates would pardon him for mentioning it,—that, descending to the obnoxious Examination room, shaking with terror, it was like passing into the presence of the sun in mid-winter to meet the Chairman of the Board of Examiners. They had very cordially to thank him for all that he (Mr. Cates) was, and all that he had done for the trembling aspen-leaves of students who had fluttered down those stairs. With regard to the present discussion, it seemed to him that the underlying question,—the underlying principle,—of architectural education was—What was to be the object of that education? When he was asked, in the dim and distant past, the object which he set before himself was to learn to build a thoroughly successful building. Institute Examinations were not heard of then, and he was sure that he would have been considerably flattered if he had had to go up and be examined as to the contents of architectural dictionaries and encyclopedias. If the Institute Examination programme had been put into his hands, and he had been asked to sketch and give a description of a "squint," he was afraid that the "squint" he should have illustrated would not have been a hioscope. If asked to illustrate what was meant by a "respond," he was afraid he should have felt himself equally at a loss. It seemed to him that the programme of the Examination was not calculated to kindle enthusiasm in the breast of a young man who had a love for art. If the Institute would endeavour to develop in the student that artistic instinct which produced enthusiasm, they would find that education need not require forcing upon students: the divine afflatus would extend rapidly if it were delicately fanned by those who understood the fine qualities and the magnificent enthusiasm which the greatest architects had experienced. Enthusiasm was a quality which ought to be encouraged in the architectural student. A very distinguished student, who obtained the Association Travelling Studentship and the Bagin Travelling Studentship, and passed from one of the leading architects' offices in London to the University of Cambridge and took his M.A. degree, said that he was articled for five years to an architect in Manchester, and during that time he never thought that there was anything in architecture. It was not until he came to London that he had excited in him anything like enthusiasm; it was only when he came into contact with artistic souls that he found that there was something in it. Now, he (Mr. Pite) regretted to say that he could find very few traces of enthusiasm in the Institute Examination programme. The candidate was virtually asked to fill up the gaps in a dictionary which began with A and ended with S. He could not help thinking that there was something lacking on the part of the Examination,—something was missing in the way of encouragement to students who were enthusiastic. He found that the most successful architectural students had not of necessity had the greatest educational advantages; in fact, on the contrary, they found that some of the most distinguished architects had been country pupils and assistants, who had come up and put London students to shame by doing work which had set a seal of genius to their claim to be considered architects. Such men had in them qualities, of course, which they could not expect to find ready-made in the ordinary architectural pupil. Such a man naturally had an eye for proportion; he naturally understood what was beautiful in a building; he was able to tell them in a very decided manner, and with very good reason, as a rule, why he liked this and did not like that; why that building pleasantly affected his artistic sense, and why another building offended it. He firmly believed that it was possible to cultivate this artistic sense of architectural beauty even in those in whom it did not appear to exist at all; he thought it was possible to open men's eyes to architec-

tural qualities by architectural rather than what he must call for the moment educational means. It was not impossible to develop the critical faculties of the student. It was possible to obtain from the student an analysis of the impression produced on his mind by an important building. But he would like to know what sort of an answer was expected to question 5 in the programme,— "Describe fully the Parthenon," &c. The answer which would satisfy the Examiners would no doubt be a statement of the number of columns, their height, the number of steps, and so on, instead of a genuinely architectural description. With regard to detail, why not expect from the student, in his description of the Ionic volute, an answer which should illustrate his artistic perception of the reason why the curvilinear form of the volute was introduced in conjunction with the straight lines of trabeate construction? He not only ventured to suggest those points, but he thought that the Board of Examiners of the Institute should defer more fully to the suggestions of Professor Aitchison on such matters. It was with some amount of regret that he noticed that the recommendations of Professor Aitchison had not been followed. The architectural student should also be early set to fully measure buildings; such work should not be left until just before the Final Examination. Personally, he should always feel grateful to his father for paying 10s. to an old sexton in return for the use of ladders and other facilities in enabling him (the speaker) to draw and measure-up a church during the first year of his articled. Moreover, the cultivation of the power of detail drawing was most essential to an architectural student. The study of architectural detail was of great use, and he should be very early put to the measuring-up of detail, for the beauty of buildings must with largely depend upon detail. And he could not help commenting, with tears in his soul, upon the fact that students in the final examination were obliged to bring up drawings of mouldings a *quarter-fall size*. Why, that was disastrous, as mouldings could only be studied real size! He did hope that there was nothing more than a slip on the part of the Examiners; if not, it showed that they were not accustomed to measure-up old mouldings themselves. He thought that if they could draw out the experience of others in that room, the discussion might really be brought to a very profitable issue. He would add an expression of his sense of the extreme kindness of Mr. Cates in being there that evening.

Mr. Walter Millard said that while the Association had to thank Mr. Cates for attending that meeting, the whole profession had to thank him for the way in which he, during the last few years, had conducted affairs, sitting as Chairman of the Board of Examiners, and bringing to a head a scheme which he had aimed at for many years, and which might never have come to a head then but for his labours. Mr. Cates's work in that direction was not thoroughly appreciated yet, but it would be some day. The Association's memorial presented in 1855 was only fulfilled last year. It might even be sent up to the Institute now with one change made in it; for the word "examination" substitute the word "education," and they might send it up to-day. And why should it not be sent? It appeared to him that if they had done that at first, and had asked for education in 1855, it would have been a better way of going about the attainment of their object. He did not want to pick holes in what had been done, for they were only too thankful for it, but why should they not have asked for education first? The Association came into existence for that purpose; it came into existence by force of necessity; and what were they discussing now? How they might best promote architectural education. It seemed evident enough to him that every profession as a body had to see after the education of its members; but here they had had the Institute in existence for more than fifty years, and it had only succeeded in establishing an examination! Men were still asking to be prepared for that examination. How was such preparation to be accomplished? Time might have been saved in the past, and time might yet be saved, by fixing attention upon that one point more closely, instead of bothering about the details of examination. Better and more systematic means of instruction were required. Give these things, and the Examination became a secondary matter. The Association had struggled on all these years]

it grew out of sheer necessity, and at the time of its establishment afforded the only available means for mutual help. But, after all, it was an amateur effort, so to speak. Had they asked in 1855 for the establishment of a thorough scheme of education under a body which represented and was responsible to the whole profession, they would not find themselves in their present backward state. But instead of that the Institute had shirked its responsibility of educating its students, a duty which it owed to the whole profession,* while the Association had gone on playing at independence. He could not help thinking that there was room for change in these respects, and the sooner it came the better. Then, as to the Examination, he had to confess to a sneaking partiality to what Mr. Cates would call, he supposed, Professor Aitchison's "heresy," viz., that there were certain things which were essential to an architect, and there were things which were not absolutely essential. He meant, when he said an architect, an architectural practitioner of to-day. It was possible to distinguish between things which an architect could not ignore,—things in which he must be competent,—and things which might be termed accomplishments. He did not say he would give the title of architect to a man who did not know anything of architectural history or about the detail of past styles; but assuredly there was a difference in degree between that kind of knowledge and what might be described as the knowledge of "bricks and mortar,"—knowledge that the architect must have when he entered upon the practical work of building. Could not those two classes of subjects be dealt with in such a way that the former might be taken as optional subjects, allowing men to go in for honours for subjects beyond those which were compulsory? There was something in Professor Aitchison's contention that, in order to be able to make good bread, it was not necessary to know the name of Pharaoh's chief baker. There was undoubtedly a great difference between the various candidates who presented themselves, but under the present system they were all rolled out like one another. Could not the Examiners indicate to some degree the relative ability of the candidates who passed? Would not the adoption of such a course be an encouragement to candidates themselves? He had in his mind a notion of what he thought would be an ideal Examining Board, consisting of, say, one-third architects, one-third builders' foremen, and the remaining third of master builders, with, perhaps, a sprinkling of clients of both sexes.

Mr. Wilson said that he cordially agreed with the remarks which had fallen from Mr. Pite's lips. He had served his articled in Manchester, and he learned enough, no doubt, to enable him to pass the Examination; but he felt that if he had not come up to London, although he might have become a tolerably good clerk of works as the result of the Examination, he would never have had a chance of becoming an architect. He certainly learned more the first year in London than he had in the previous five years of his life. The Progressive Examinations, Preliminary, Intermediate, and Final, were more calculated to ensure qualified clerks of works than architects. There was one matter to which he would like to draw attention, and that was the present method of classifying the successful candidates, who, he believed, were put in alphabetical order. It seemed to him that course was somewhat conducive to cramming, for so long as a candidate just scrambled through by getting the requisite number of marks he stood as well on the list as much better men. There was no inducement offered by this arrangement to attempt to take high honours, and he would venture to invite Mr. Cates's attention to that subject.

Mr. Cole A. Adams said that if it were only for the purpose of superfluous the vote of thanks to Mr. Cates, he must rise to express, in the very strongest terms, their indebtedness to that gentleman. Every speaker who had risen had testified to the great advantages which Mr. Cates had been the means of giving to the students of the architectural profession, and, from a long acquaintance with his work, he

* We have before pointed out that this idea, which is taken hold of by some of the younger members of the profession, is completely illusory. The Institute of Architects was not founded with any idea of provision for its being an educating body (except in an indirect manner), and more than that the Institution of Civil Engineers; and it is perfectly absurd to expect that it could be so. An examining body it may be, and has in fact become, with very good results.—Ed.

could unhesitatingly say that there was no man who had done more to promote the study of architecture in this country. As years went on they would look upon him as the great founder of a system of architectural education in this country. Their thanks were more especially due to him, after recovering from a severe illness, for coming out that night and reading the paper which had given rise to so much discussion. One of the things which struck him was that now that the Examination was fairly launched, it of course brought with it the question of the education of the student preparing for it. He was not one of those who were disposed to look back with vain regrets at the disadvantages which pupils had had in the past, nor could he hold up his hands with horror at their disadvantages in the present day. Why, the advantages of the student of architecture in the present day were enormous, as compared with the advantages of the students of years gone by. The fact was that it rested with the student to get over what difficulties there might be in his way. If there were no difficulties to be surmounted, what was the use of the Examination? He hoped that things had not come to such a pass that the students of to-day expected everything to be cut and dried for them. That was decidedly a wrong view to take. Nevertheless, he thought that the conditions of the Examination might be improved, and he would be very glad to know whether in the future it would be possible to bring the question of the education of pupils more directly before the principals themselves. He was afraid there would be some difficulty. Mr. Cates and other speakers had laid stress upon the fact that principals would take premiums from their pupils, and the only *quid pro quo* was that the pupils might have "the run of the office." That was a very wrong state of things indeed, and he hoped that the Institute would be able to bring its members to see that they ought to afford facilities for their pupils' attendance at afternoon classes. Pressure must be brought to bear upon the masters to that end. They (the principals) would be gainers by afternoon classes, as well as their pupils. There were many pupils who were not able to attend classes in London during the evening. Mr. Pite had referred to the value of enthusiasm, and there was not one of them who did not recognise that enthusiasm was a quality eminently necessary to those who sought the highest success in their art. They must have enthusiasm, but he really did not know how they were to establish an examination in enthusiasm. That was a quality which must be cultivated in the "Common Room" of the Association, in the classes, in the Royal Academy schools, and wherever students congregated; but it would be a difficult thing to bring it into an examination. An examination, look at it as they would, was necessarily somewhat high and dry. As to the question of how the present advantages of professional education were to be brought home more closely to the men in the country, Mr. Appleton, who had had large experience in such matters, had told them of the objections which the country architects had to their assistants meeting together. Let them see if they could not take a hint from another profession. Solicitors in the country had their agents in London, and he believed it was the practice that every country practitioner taking a pupil sent him up to his agent in London for at least one year of his time; and while in London he had the advantage of studying and presenting himself for his examination. The application of any such a scheme to the needs of the architectural profession just yet was perhaps Utopian; but if in the future some scheme could be devised by which the country student might spend some of his time with a London architect, or if they might look forward to the establishment, not only of a few afternoon classes, but of a building where facilities would be given for further professional instruction, then, he thought, it might be possible for country students to come up to London and enjoy those privileges which were enjoyed by London students, and might have their enthusiasm stirred, and all the best qualities of the mind promoted, not by examination merely, but by contact with others and the contemplation of good work.

Mr. T. M. Rickman said he should be very sorry to go away from that meeting without giving expression to one or two things. One was to thank Mr. Cates, who had done so much for that Association. So long ago as 1855 Mr. Cates was working for them, and was head and

front in the preparation of the Memorial which he had read. He must congratulate the Association upon having at last obtained a paper from Mr. Cates, for he (Mr. Rickman) believed that during the last thirty or forty years they had never had a paper from Mr. Cates, although they had long tried to get one on pendentives, which they hoped to get even now, for that had been a special study with him. As one of those who had assisted in drawing up the Memorial of 1856 he (Mr. Rickman) would like to point out that most of those who formed the membership of the Architectural Association from the year 1852 to 1855, were men who were partly in practice for themselves, but who were partly architects' clerks. They were hardly of the student or pupil class; they were men who were seeking to practise for themselves, but who felt that they had very little chance of doing so without further professional education. They thought the one thing necessary for them was some guiding-post—something to point out what they should learn. At the present time they had plenty of books, small and large, which were most serviceable to them if they wanted to read up any question. They could go to the Institute Library and find not only ancient folios, but modern small hand-books, which put into their hands in a small compass and readily digested the information which they wanted, but which in the old days they did not know how to get. He was perfectly satisfied that, if he had been able to get those books when he was in his articles, he would have been saved a great deal of time which he could have devoted to practice or other subjects. He still leaned to the opinion that they had not been wrong in getting the Examination first, and now that they had it they must not seek to make it too easy. What they needed now, it struck him, was the cultivation of the habit of synthesis, or putting things together. In the early days of the Association they were obliged to proceed slowly and laboriously by analysis. The advantages were all in favour of the present generation of students making themselves masters of their subjects.

Mr. A. W. Earle said that, as other speakers had already stated, it was mainly due to Mr. Cates that they had examinations, and particularly progressive examinations. He had listened to Mr. Cates's address that evening, and had also read through his remarks at the Conference of Architects in 1887, but he was unable to find whether Mr. Cates in any way proposed any process or supplement to the present system of architectural pupillage, so as to enable students to pass the examinations promoted by the Institute. He would suggest that in addition to the establishment of the afternoon classes, which had been spoken of by several members that evening, what they really wanted was a proper system of, say, two years of architectural training, preparatory to, or in some cases succeeding, the serving of a pupillage. He thought that the Association might develop itself into the central architectural school, and that it should provide a course of study of from one to two years.

Mr. F. T. W. Goldsmith said that Mr. Cates must have been pleased with the discussion which his paper had called forth. Mr. Cole Adams and Mr. Pite had struck the keynote of the whole matter in what they said about enthusiasm. He thought that every student, whether young or old, whether just beginning practice, or an old master, must be perfectly aware of the lack of enthusiasm in the present day. He was not a very old student, but he fancied that in the days of his pupillage, when pupils were beset with more difficulties than they met with in the present day, there existed much more enthusiasm. If they were enthusiasts on the lines indicated by Mr. Pite, they would be thorough in their work, but it was just that kind of enthusiasm which the Institute Examinations did not encourage. Those Examinations put a premium on mediocrity, and that was the bane of the whole system. As one speaker had already pointed out, the plan of putting the names of the candidates in alphabetical order was not encouraging. What they wanted was a list of passed candidates published in the order of the number of marks that they received. Then they wanted that old spirit of real love for architecture, not love for mere bricks and mortar, to be recognised. It was only by being brought into contact with great masters of their art, by having opportunities of seeing the masterpieces of their art, and by having opportunities of measuring and studying those works, that enthusiasm

could be aroused. That kind of enthusiasm among the candidates for examination might have been greatly fostered by the Institute, but the Examination which it had imposed upon them was not calculated to encourage that feeling, but rather to put a sort of premium on mediocrity. On the other hand, the Institute had not provided them with any educational means whatever. The medical profession, the legal profession, and other professions had all their systems of teaching; they had their staffs of professors; they had their accepted courses of training and their universities. Only as a result of the *esprit de corps* which resulted from such organisation could they get enthusiasm. The great defects appeared to him to be the absence of early training and the absence of means of finished training in London for country pupils. The practice of country solicitors sending their articled pupils up to London for study had been referred to, and it was, perhaps, owing to that system that he had such a number of thoroughly qualified solicitors. The proposed afternoon classes appeared to him to be most essential, and he was quite sure that Mr. Cates, with other members of the Institute of Architects, would bring their moral force to bear upon their fellow-members to induce them to allow their pupils to absent themselves for the purpose of attending such classes, with the view of presenting themselves ultimately for examination.

Mr. F. R. Farrow said that a suggestion had been made in the course of the discussion for the classification of candidates who had passed the Institute Examination. At one time, when he knew less about the Examinations than he now did, he was strongly in favour of the proposal which had been made, as at the time that he was a candidate he felt, as others felt, that there was no incentive for any one, unless he was going in for the Asphit prize, to work for more than a mere pass. From that point of view it would no doubt be an advantage if the list of passed candidates was published with the names in their order of merit; but at present, at any rate, there was one very serious objection to that proposal, namely, that there were now entering and passing the Examination men in various positions in the profession; there were those who had been many years in practice, and there were at the same time men who were their assistants. He had known principals and assistants who had gone in for the Examination at the same time, and hence he thought it was better that the candidates who passed should be classified together. A classification in order of merit might possibly have the result that the principal might come out of the Examination below his assistant, not necessarily because he did not possess a similar amount of knowledge, but because, having the cares of practice, he had a great deal more to think about than his assistant, and a great many more claims upon his time and attention, so that he would not be able to give the same amount of time and thought to his work as a man who was an assistant. That, then, was the objection which he saw to the adoption of a list of passed candidates classified according to merit. On every other ground he was strongly of opinion that the adoption of a list of names according to merit would be advisable, and he had no doubt that it would be possible in the future, when all the men in practice had passed the Examination, and when those going up were simply students entering for the three progressive Examinations. He would next like to touch upon some points raised by Mr. Pite in his criticisms of the Examinations. He cordially agreed with Mr. Pite in the adverse criticisms which he had been bold enough to utter against the Examination questions as they were now set. It was perfectly heartrending to look through the Examination questions as they were set for candidates, and to have to advise men to get up subjects which were simply "cram," and which were not likely to be of any earthly use to them the day after the Examination,—matters which, as they were only to be retained for the Examination by a sheer effort of memory, were consequently only got up for the Examination, and were forgotten soon after. Mr. Pite, like many others, was very much irritated by the sort of questions that were put. Candidates were asked the names of architects of celebrated buildings, and the dates of their erection; but very often there was no question asked about the artistic design of those buildings. For example, there were no questions about the design of the Parthenon, and he had never seen a question set in the Institute Examination

papers asking candidates to say why the Parthenon was a Doric building, and why the Erechtheion was an Ionic building. These were questions of a great deal more importance than mere strings of questions as to dates and names. The establishment of afternoon lectures, which had been shadowed forth by many speakers, would undoubtedly meet with the approval of the majority of the members of the Association; and if the principals were not amenable to the moral force which it had been suggested the Institute might exercise, he thought the Association was strong enough, with its thousand members, to force the question upon the attention of the principals. But he did not think that force would be necessary; he thought the masters would be only too pleased to allow their pupils to attend classes during office hours. With regard to the difficulties of which Mr. Appleton had spoken in connexion with the affiliated societies, although the Committee had had the matter in hand some time, they had, unfortunately, only two affiliated societies, one of which was the Birmingham Association, and the other was the Glasgow Association, and the affiliation of the latter was nothing more than nominal. It was a difficult matter to deal with. They had been able to get a few young men to meet together in provincial towns, but he was afraid that, with the country students at large, the only means of education that they could offer them,—except where they were sufficiently large and numerous to form associations of their own,—was that of instruction by correspondence. But he had carefully studied that subject, and well knew that such a method of instruction was attended by enormous difficulties, for each man had to be taught individually. They could not form "classes" of corresponding pupils—that was perfectly impossible; and, as Mr. Appleton had said, they could not send the work of the London classes down to them in the country. The country students would have to send their work up to the classes in London, where it would be criticised and then sent back. Under certain circumstances education in London had advantages over country education; there were, on the other hand, many advantages which the country student possessed which they did not have in London. If they were to improve their educational system in the Association they must have money to do it with, and that was the way in which the Institute could help them, not perhaps directly from their own funds,—for their balance-sheet was sometimes not very much better than that of the Association, bearing in mind the relative incomes of the two societies. With the support of the Institute and the provincial societies they of the Association would be able to get funds which would enable them to start a good system of education.

The President, in putting the vote of thanks, said that he had made several notes upon points as to which he should have liked to say something, but as the hour was late and Mr. Cates would have to reply, he would abstain from making those remarks that he otherwise should have done.

The vote of thanks was then put and carried unanimously.

Mr. Cates, in replying on the discussion, said he had to thank them for the manner in which they had received his contribution on that important question. He had listened to the discussion with very great interest, notwithstanding that there had been some severe criticisms of the details of the Examination programme; he must say, however, that he concurred generally with the observations that had been made, although some of them might appear adverse to the work which he had done, which work could only succeed by being possible and meeting all requirements. Enthusiasm such as was manifested by Mr. Pite and Mr. Goldsmith was to be admired, commended, and encouraged in every student; but he did not see how they were to examine students in "enthusiasm." Possibly, as the Examiners became more experienced in the character of the candidates, and in the manner in which they were prepared to meet the questions put to them, some of the views which had been so ably put forth in the discussion would find acceptance, and no doubt questions which would satisfy all possible yearnings after enthusiasm and critical inquiry into what they used to consider the principles of beauty in art,—questions he would

say they used to discuss in the Association many years ago, with an enthusiasm not less than that of Messrs. Pite and Goldsmith. When that advance had been made the student would be able to satisfy his yearnings in those important matters, which the Examination in its present form, perhaps, did not encourage, but which, he hoped, it did not discourage. The programme as it stood, however, in his opinion gave sufficient scope and freedom for the development of that enthusiasm which seemed to be so much desiderated. He was sorry to have heard the observations of Mr. Appleton as to the difficulties which had arisen with regard to the combination of country students for purposes of mutual instruction. He feared that something of that kind would be said, but he thought the difficulty was one which could be overcome as soon as young country pupils and assistants found that they would derive advantages by combination. Young London architects availed themselves of combination in the early days of the Association, when the most active members of that Association were engaged in rival offices,—offices which were as antagonistic as any offices in the country could be; but he was not aware that any harm to their principals ever came of their meeting together. The advantages that followed from associations such as that were many, and the greater the number of such associations the more would old prejudices be broken down and harmony promoted between all classes of the profession. As regarded isolated students, great care had been taken in the Examination programme to give them such indications as to their course of study that, if they had a fair amount of that enthusiasm which was rightly said to be so necessary, they would be enabled to follow out their studies to great advantage, although somewhat independently. There were few towns where a student had not some opportunities for studying, although he might be isolated; there were public libraries and other institutions, of which the student should take advantage, and he was convinced, from the experience which he had of students who had come up from country towns,—from towns which were themselves almost as isolated as the students who resided there,—that there was no difficulty which could not be overcome in acquiring an amount of knowledge sufficient to pass the Examination. Of course, it required energy and perseverance. He could mention several instances in which gentlemen who had been living in country towns had prepared themselves by their own individual efforts, and, without the help of any college or special system of instruction, had passed the Examination in a most creditable manner. It was a most unfortunate thing to hold out to the student the idea that he must rest upon a college or courses of lectures for everything, and that he must have everything set out ready for him. He ought to try and shape his own path, to develop his own individuality,—an effort in which the Examination programme was, he (Mr. Cates) thought, well calculated to help him. He really could not conceive that any knowledge which might be acquired in order to pass the Institute Examination would be of no use to him next day, or that any one could be so foolish as to cast it aside directly, as Mr. Farrow had said. He thought Mr. Farrow had made a great mistake in his remarks about "cram," which every effort was made to discourage. Mr. Farrow himself had done a great deal of good service, if not as a "crammer" at any rate as a "coach" to candidates for the Examination. His system had certainly been most advantageous to many candidates, not by way of "cram," but by consolidating what they had learnt, and showing them how and where to acquire further knowledge intelligently and independently. Notwithstanding what Professor Aitchison had said on the occasion referred to in the discussion, he (Mr. Cates) contended that there was not a single thing in the programme of the Institute Examination that any one who professed to be an architect and a gentleman ought not to acquire; and he hoped that the day would come when that fact would be appreciated by all interested in the success of the Examination. An architect in these days had to come in contact with his clients, and if he was to take his proper position he surely ought to know at least as much of the history of architecture as his client was likely to know; unless the architect had that knowledge, he took an inferior position to his client. Those who criticised

the Examination programme so freely should recollect that that programme was really at present only tentative; the Board of Examiners were, as it were, only feeling their way at present; it was somewhat unreasonable to expect an elaborate programme of that kind to be perfect immediately; it was brought out; they had done their best to make it suitable to the requirements of the general body of students, and if it were found necessary from time to time to make alterations in it, as no doubt it would be found necessary, such alterations and modifications would be made, and the criticisms that had been made that evening would certainly be duly considered. Some remarks had been made about the pass-list, but he thought there was no need to touch upon that beyond saying that he agreed with Mr. Farrow's remarks in reply to those made by Mr. Millard on that point. He thought it was no doubt true that the publication of a class list with the names given in order of merit would do something towards raising the enthusiasm of the candidates; but at the present time the difficulties and objections appeared to be insuperable. At some future period, when no such difficulty as had been pointed out could happen, it would no doubt be a question worthy of consideration whether such a class list as had been asked for should be provided; or, better still, an honours list, after special examination for honours, which would signify distinction in scientific and artistic knowledge. He did not think that at so late an hour he need say much more, for he found that the observations of several of the speakers had been met by those who followed them in the discussion. He would only say, in conclusion, that in drawing up the Examination programme, the endeavour had been made to set forth only those things which were essential to an architect in these days,—no more and no less. He thanked the members for the attention which they had given to the subject, and for the great kindness with which they had received him.

The meeting then terminated.

CONCRETE FLOORS.

SIR,—In your article on "Concrete Floors," in the *Builder* of October 26, 1889, you remark that you know of no experiments on concrete beams. A few such experiments were made by Mr. C. Colson, M.L.C.E., in 1887, and were printed in the *Proceedings Inst. C.E.*, vol. 54.

The proportions of the concrete used were 6 screened, rounded, and smooth harbour shingle, 3 sand, and 1 Portland cement.

In these experiments a beam 1 ft. 9 in. by 9 in. deep, 8 ft. 3 in. span, tested at twenty-eight days, broke under 5 cwt. centre load, when simply laid on supports, but another of these same dimensions and proportions, but securely bracked at the ends, and tested at thirty days, cracked on the underside under a centre load of 5 cwt., but only ultimately failed by complete disintegration of the materials under a centre load of 1-292 tons, thereby showing that a great increase of strength was caused by blocking the ends so as to entirely prevent longitudinal movement, and, in fact, making the beam serve as a flat arch.

Does not this seem to show that Mr. Caws's floors are standing as domes and not as simple supported slabs?

C. H. COLSON.

H. M. Dockyard, Malta, Jan 21.

"POPE'S CHIMNEY VALVES."

SIR,—Can you or any of your correspondents, tell me where to obtain "Pope's chimney valves"? These valves were a patent of Messrs. Pope, Iron-mongers of the Edgware-road, but they have now retired from business, and I cannot learn to what firm the patent has been transferred. These valves were made to fit in the place of the ordinary registers of a grate, and, having two ground surfaces, they wore, when closed, air and smoke-tight, and prevented the nuisance of down-draught where two fire-places happened to be in rooms communicating.

W. H. C.

TAR PAVING.

SIR,—I shall be much obliged if some correspondent will inform me of a good plan, not too expensive, for making tar foot-paving for a provincial town; or refer me to the *Builder* within the last ten years.

A. NOVICK.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—V.

PRACTICAL UNITS.

EARLY all the quantities with which physical science deals can be measured in units derived from the three fundamental units of Length, Mass, and Time. The fundamental units which have been chosen are the centimetre, the gramme, the second. Any system of units based on these three standards is said to belong to the centimetre-gramme-second system, or, briefly, to the C. G. S. system.

For the purposes of electrical measurements two C. G. S. systems are used,—the electrostatic and the electro-magnetic. The former is based upon the force of attraction or repulsion which two electrically-charged bodies exert on each other; the latter upon the force which an electric current exerts on a magnetic pole. The electrostatic units are of great use in dealing with problems concerning electricity at rest. The electro-magnetic units are employed for measuring the effects of electricity in motion; and, as these papers are concerned almost entirely with electric currents and magnetism, we shall confine our attention to the electro-magnetic system.

Unfortunately, the C. G. S., also called the "absolute" electro-magnetic units, cannot be conveniently used in practice; indeed, they have never been named. Some are many millions of times too small; others as many times too great.

The practical units, which are suitable for telegraphic or electric lighting purposes, are multiples or fractions of the absolute units, and they are defined so that the same relationship holds between them as between the absolute ones. As the practical electrical units alone have received definite names, the fact of naming a unit will at once distinguish it from the corresponding absolute unit.

It has been shown, fig. 6, p. 66, how a conductor carrying a current is surrounded by a magnetic field. If such a conductor is bent into a circle, a certain field is produced at the centre, and it is the strength of this field that is used for defining "unit current" flowing in the ring.

"Absolute unit of current flowing in an arc 1 centimetre long, and of 1 centimetre radius, produces unit magnetic field at the centre of the arc."

The Ampere is one-tenth the value of the absolute unit of current.

As it is impossible to get a field from an isolated arc of current, a complete circle has to be used in practice, the length of its circumference being 2π centimetres; hence, the absolute unit of current flowing in a circle of one centimetre radius produces a field of strength 2π at the centre, and the Ampere produces a field of strength $\frac{2}{5}\pi$.

The Coulomb is the quantity of electricity conveyed past any section of a conductor by one Ampere in one second.

It may be advisable at this point to make a slight digression, so as to make more clear the nature of the quantity measured. Let Fig. 9

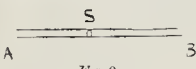


Fig. 9.

represent a portion of a conductor through which an electric current is flowing from A to B. We have assumed electricity to be an incompressible fluid, so that a flow of electricity in the conductor A B is analogous in many respects to a flow of water in a cast-iron pipe A B. In the case of water, if we know the area of the section of the pipe, S, and also the number of grammes that flow across S per second, it would be easy to calculate the average speed with which the particles of water travel at S. We can do this, because at any temperature we know the volume of a gramme of water. With electricity it is different. By measuring the current in Amperes, we know at once the number of Coulombs that pass through S, a section of the conductor; but not knowing the volume of a Coulomb, we cannot calculate the velocity proper of the electricity as it passes S. On this point confusion sometimes arises as to the nature of the electric current, because it is known that if an electrical disturbance takes place at A, its effect may be transmitted to B at a velocity of about 185,000 miles per second; but this proves nothing concerning the speed of electricity in a current.

If A B is a pipe full of water, and more water is forced in at A, water begins to flow out at B at virtually the same instant. This does not prove that water is flowing from A to B with practically infinite velocity; on the contrary, the highest speed at which any portion of the water is flowing may be but one centimetre per hour or less.

Certain so-called measurements of the speed at which a current flows, and deductions therefrom, have been made from time to time. It is therefore of as much importance, when dealing with the question of measurement, that a student should know what he cannot measure, as well as what he can and does.

Returning to fig. 9, if A B is an electrical conductor, and electricity is being driven from A to B, a certain electro-motive force is necessary, and in forcing the current against the resistance or other obstruction, a certain amount of work is done, the effects of which reappear as heat, chemical decomposition, or some other form of energy.

When the quantity of work done in A B is 10^7 ergs* for every coulomb which passes S, the electro-motive force, or difference of potential, between A and B is a Volt.

The word resistance as applied to electrical phenomena has a somewhat restricted sense. It is used to denote the obstruction that a current experiences when it flows through a conductor, which has been called friction; and the sole effect produced when "resistance" in its restricted sense, is the only obstruction encountered, is the production of heat. The unit of resistance is the Ohm. A conductor of 1 Ohm resistance allows a current of 1 ampere to flow through it when a difference of potential of 1 volt is maintained between its ends.

The relationship between the ampere, volt, and ohm may be roughly expressed by saying that "1 volt drives 1 ampere through 1 ohm."

When an insulated conductor is given a charge of electricity its potential rises, and the amount by which a given charge will raise the potential depends upon the conductor's size, shape, and position with respect to other conductors; or, what is called its "capacity for electricity." When a charge of one coulomb raises the potential of a conductor by one volt its capacity is one Farad.

The Coulomb, Ampere, Volt, Ohm, and Farad are all the electrical units with which we have to deal at present.

Occasionally when measuring very large or very small quantities, the prefixes meg(a) and micr(o), respectively multiplying and dividing the units before which they are placed by a million, are used. Thus the farad is inconveniently large, so that capacities are generally measured in micro-farads; while again, when enormously high resistances have to be measured, they are expressed in megohms.

The nature of the "resistance" which an ordinary conductor offers to the flow of electricity within it has already been explained in a previous article; knowing, in addition, the relations of the ampere, volt, and ohm, to one another, it is now possible to write down the equation expressing "Ohm's Law,"—

$$C = \frac{E}{R}$$

Showing the current C, which the electro-motive force E will send through a conductor of resistance R. Ohm's law is best regarded as the mathematical definition of what is meant by the resistance of a conductor. The above equation should then be written in the form:—

$$R = \frac{E}{C}$$

The daily use of the practical units has led electrical engineers to adopt two new mechanical units, the Joule and the Watt. The Joule is a unit of work or energy equal to 10^7 ergs, and before being called the Joule was called the volt-coulomb. The reason will be seen on referring to the definition, previously given, of the volt. The Watt was called the volt-ampere. It is therefore a measure of power, and is the rate at which work is done when a volt is producing a current of one ampere.

Let $E = c.m.f.$, producing a current in a circuit, $C = \text{current}$, $R = \text{resistance}$, $t = \text{the time the current has been flowing}$, then $Q = Ct$

* When the point of application of a force of 1 dyne moves through a distance of 1 centimetre in the direction of the force, the quantity of work done is 1 erg.

is the quantity of electricity that has been transferred past any point.

The total amount of work done is:—

$$J = EQ$$

The rate at which this work has been done is:—

$$W = \frac{EQ}{t} = EC$$

from Ohm's law, the number of watts, which is the quantity generally required, may be equally well calculated from any of the following expressions:— EC , C^2R , $\frac{E^2}{R}$, $\frac{J}{t}$, according to the details of the circuit given. The time, t , must always be measured in seconds.

The following quotation from Clerk Maxwell should be thoroughly appreciated by all those who are engaged in making scientific measurements of any description:—"Every expression of a Quantity consists of two factors or components. One of these is the name of a certain known quantity of the same kind as the quantity to be expressed, which is taken as a standard of reference. The other component is the number of times the standard is to be taken in order to make up the required quantity. The standard quantity is technically called the Unit, and the number is called the Numerical Value of the quantity." Attention must be specially directed to the words: ". . . the name of a certain known quantity of the same kind as the quantity to be expressed. . . ."

The veriest beginner does not need to be told that to refer to "3 watts" as "3 wats" would be wrong, there is never any difficulty with the "numerical value." Yet it is but too common to hear of "the work of so many watts" or "a power of so many joules," although the same people would never be guilty of saying "the weight of eight seconds" or "length of three pounds." It may be well to collect together the various units referred to and to state distinctly of what kind of quantity they are the standards.

Electrical Units.

THE AMPERE is the unit of CURRENT.

" COULOMB " " QUANTITY.

" VOLT " " E. M. F.

" OHM " " RESISTANCE.

" FARAD " " CAPACITY.

Mechanical Units.

THE JOULE is the unit of WORK and ENERGY.

" WATT " " POWER.

There is nothing absolutely wrong in speaking of a current of six amperes as a current of six coulombs per second, a power of eight watts as a power of eight joules per second or four hundred and eighty joules per minute; it is simply inconvenient and as unnecessary as to refer to a mass of "one gramme" as "the mass of a cubic centimetre of water at its maximum density"; it is foolish to use eight words where one will do, though not positively wrong.

The most important step made in any science is when experimental results which have previously been qualitative are made quantitative. Beginners cannot do better therefore than duly consider in every case what "kind of quantity" is referred to, and by the aid of what single unit it can be measured.

Berlin Technical College.—The official *Centralblatt der Bauverwaltung* publishes a notice showing that 1,043 matriculated, and 414 non-matriculated students are this winter attending the lectures, classes, and practical courses of the Royal Technical College at Berlin. Of the 1,043 matriculated students, 176 are non-German; of which number 58 fall to Russia, 31 to Norway, 17 to Austria, and 10 to England. North America and Luxemburg each have 8, Holland 7, Roumania 6, Sweden and Switzerland each 5, Greece 4, the Brazilian Republic and Japan each 3, Italy, Chili, and Servia each 2, whilst Spain, Turkey, the Argentine Republic, Mexico and Siam each have one representative. Of the ten Englishmen, two are studying architecture, two are attending the chemistry courses, and the remaining six are working with the engineers. The educational staff of the college consists of 63 professors in ordinary, 29 visitors, and 96 assistants. Professor Jacobsthal, of the Architectural Division, holds the title of "Rector" for the year 1889-90, and Professor Schlichting, of the Civil Engineering Division, who held the title for the year 1888-89, being "Pro-rector." The very popular Professor Ende, Hon. Corresponding Member of the R.I.B.A., has not been able to read this session on account of ill-health.

RECENT SALES OF PROPERTY:
ESTATE EXCHANGE REPORT.

JAN. 21.—By W. B. HALLETT St. John's Wood—Lg.t. of 418 2s., subject to a g.r. of 41, u.t. 48 yrs.	4385
L.g.r. of 450 ss., held at a pepper-corn, u.t. 48 yrs.	960
By C. W. DAVIES Hoxton—48, Gopsal-rd., u.t. 47 yrs., g.r. 43. 10s. By C. D. FIELD & SONS. Regent-st.—51, Beak-st., s. r. 480 p.a.	810 1,270
By VAUGHAN & CO. Kentish Town—121 and 123, Wedding-rd., u.t. 73 yrs., g.r. 42. 12s. r. 426 p.a.	640
108, Allcroft-rd., u.t. 76 yrs., g.r. 47. 7s., c.r. 488 p.a.	285
By WILKINSON, SON, & WELCH (at Brighton). Hove—10, Albany-villas, s. r. 475 p.a.	1,150
JAN. 22.—By HEAPS, SON, & BEVEY. Finsbury—3, 4, 7, and 8, Clifton-pl., s. r. 234 p.a. 65, Clifton-street, u.t. 30 yrs., g.r. 48, r. 470	1,295 995
By W. R. NORRIS. Chelsea—48 and 50, Blantyre-st., u.t. 430 yrs., g.r. 413, r. 480	730
JAN. 23.—By C. C. & T. MOORE. Minwell Hill—12,	125
By G. HEAD & CO. Kenington—41, Penbrooke-st., u.t. 32 yrs., g.r. 413, r. 455 p.a.	460
Upper Norwood—3, Belvedere-rd., u.t. 63 yrs., g.r. 43. 10s., r. 240	250
By G. JOSTIN. Harrow-rd.—8 and 9, Windsor-pl., u.t. 55 yrs., g.r. 49. 10s.	200
By WORSFOLD & HAYWARD (at Dover). Dover—38 and 29, Priory-rd., s.	570
11, Portland-pl., s. r. 435 p.a.	215
8, Union-row, l. r. 414 p.a.	220
5 to 8, Finsbury-hill, l. r. 447 p.a.	140
Duckland, near Dover—2, 3, and 4, St. Radigunde- rd., l.	600
70 to 82, Oswald-rd., l.	715
JAN. 24.—By E. OWERS. Tottenham, Willow-walk—Three cottages, u.t. 83 yrs., g.r. 41. 12s. 6d.	100

[Contractions used in these lists—E.g.t. for freehold ground-rent; l.g.r. for leasehold ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; c.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; s. for street; pl. for place; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

MEETINGS.

- SATURDAY, FEBRUARY 1.
St. Paul's Ecclesiological Society.—Annual Meeting. 2.30 p.m.
Association of Public Sanitary Inspectors.—Sixth Annual Dinner. 6 p.m.
- MONDAY, FEBRUARY 3.
Royal Institute of British Architects.—(1) Announcement of the name of the person the Council propose to submit to Her Majesty the Queen as the recipient of the Royal Gold Medal, 1890. (2) Mr. J. Alfred Gatch on "The Renaissance in Northamptonshire." 8 p.m.
Royal Academy.—Professor Aitchison, A.R.A., on "The Private Houses and Palaces of the Romans." 8 p.m.
Royal Institution.—General Meeting. 8 p.m.
Society of Engineers.—Presentation of Premiums awarded for papers read during the past year. (2) The President, Mr. Henry Adams, will deliver his Inaugural Address. 7.30 p.m.
Society of Arts (Centur Lectures).—Mr. Silvanus P. Thompson, D.Sc., on "The Electro-magnet." III. 8 p.m.
Victoria Institute.—8 p.m.
Cloths of Works Association (Carpenters' Hall).—Monthly Meeting. 8 p.m.
Leeds and Yorkshire Architectural Society.—Mr. E. Sulistars on "Mural Painting." 7.30 p.m.
Liverpool Architectural Society.—Mr. T. Haigh on "Mouldings." 7 p.m.
- TUESDAY, FEBRUARY 4.
Institution of Civil Engineers.—Mr. W. H. Wheeler, on "Bars at the Mouths of Tidal Estuaries." 8 p.m.
Society of Biblical Archaeology.—8 p.m.
Glasgow Architectural Association.—Mr. H. D. Walton on "The Influence of French Renaissance on Modern Architecture." 8 p.m.
- WEDNESDAY, FEBRUARY 5.
Free Lectures to Artisans and others on Matters Connected with Building.—Mr. Banister Fletcher on "Architecture in all Ages," Carpenters' Hall, London-wall. 8 p.m.
Civil and Mechanical Engineers' Society.—Mr. C. H. Cooper on "Recent Progress in Sewage Treatment." 7 p.m.
British Archaeological Association.—Mr. Michael Drury on "A causeway, supposed to be Roman, at Lincoln." 8 p.m.
Builders' Workmen and Clerks of Works Institution.—Ordinary meeting. 8.30 p.m.
- THURSDAY, FEBRUARY 6.
Royal Academy.—Professor Aitchison, A.R.A., on "The Private Houses and Palaces of the Romans." II. 8 p.m.
Royal Institution.—Mr. E. Roscoe Mullins on "Sculpture in Relation to the Age." III. 8 p.m.
Edinburgh Architectural Association.—Mr. J. Kinnear will read a paper. 8 p.m.
- FRIDAY, FEBRUARY 7.
Institution of Civil Engineers (Students' Meeting).—Mr. C. F. Fowler on "Reclamation of Land on the River Tees." 7.30 p.m.
Society of Arts (Indian Section).—Dr. Schlich on "The Utility of Forests and the Study of Forestry." 5 p.m.
- SATURDAY, FEBRUARY 8.
Architectural Association.—Visit to Mr. Doyle Cart's theatre, Shaftesbury-avenue.

Miscellaneous.

The Sanitary Institute.—A course of thirteen lectures for sanitary officers, specially adapted for candidates preparing for the Institute's examination for inspectors of nuisances, has been arranged for. These lectures are a continuation of the courses previously held by the Parkes Museum, and it is proposed to repeat the course twice each year, to suit the requirements of persons preparing for the examinations of the Institute. The lectures will comprise the subjects scheduled for those examinations. The course will have a further use in supplying the wants of acting inspectors and of other persons desirous of obtaining a practical knowledge of sanitary requirements and regulations. At the close of each lecture, students will be allowed to ask questions upon the subjects treated of. The lectures will be given on Tuesdays and Fridays, at 8 p.m., in the Parkes Museum, 71A, Margaret-street, W., and students attending the course will be granted free admission to the Museum and Library during February and March.

The Berlin Building Trade.—The building trade in Berlin last year was very brisk, the population of the German capital increasing through immigration so rapidly that the demand for dwellings nearly exceeds the supply. This is particularly the case with small houses, the rents of which have in consequence risen greatly; but this was not the case with more expensive dwellings. There was a great deal of speculation in house property in Berlin last year, and as it was often recklessly indulged, a building crisis like that prevailing in certain Italian towns was feared, but it was averted. Several new house-building companies were floated last year, and certain desirable house properties changed hands three to four times at advancing prices.

St. Giles's, Cripplegate.—In continuation of last year's restoration of this church, when Messrs. Jones & Willis made and fixed the wrought-iron screen and the oak and ebony altar-table, they have now completed the new system of lighting. The whole of the old fittings, pipes, &c., have been removed. The new system embraces the lighting of the nave and chancel by drops from the centre of each arch; the coronæ are each of eight lights, and are of hammered leaf-work to match the screen. The whole work has been carried out from the designs and under the superintendence of Mr. F. Hammond, architect.

Wood-paving in Berlin and Paris.—A German contemporary draws attention to the small progress made in wood-paving in Berlin compared with other European capitals; for instance, Paris and London. It is further pointed out that, whilst the wood-paved roads in the two latter towns are comparatively smooth and even, they are in Berlin rough and cut-up, owing, it is said, to the different modes of shoeing horses in use; but more probably to a defective system of laying.

The New Swedish Houses of Parliament.—The designs sent in for the new Houses of Parliament to be erected in Stockholm are now being exhibited. The deciding jury has, in addition to the prizes awarded, and to which we recently referred, decided upon purchasing two more designs, by Herr E. Strömkir and Herr G. Krüger for 1,000 kronor each, in order that they may be used in parts for the final design.

Royal Victoria Hall (the People's Palace for South London), Waterloo-road.—The following science lectures will be given during February at the above Hall:—Feb. 4, "Algeria and Morocco," by Mr. Henry Backburn; Feb. 11, "Arsenic," by Mr. Ward Goldridge; Feb. 18, "Eyesight and some of its Defects," by Dr. Collins; Feb. 25, "Sinal and Pale-tine," by Sir Charles Wilson.

New Married Quarters, Royal Marines, Chatham.—The tender Messrs. J. G. Naylar & Son, of Rochester, has been accepted by the Lords of the Admiralty for the erection of these buildings. The cost of the work will be between 5,000*l.* and 6,000*l.*

Election of a Royal Academician.—At a general assembly of the members of the Royal Academy last week, Mr. Ernest Albert Waterlay, painter, was elected an Associate.

Mr. F. W. Maxwell, of Manchester, having successfully passed the requisite examination, has been admitted as a Fellow of the Surveyors' Institution.

Electric Lighting at the British Museum.—On Tuesday evening there was a "private view" of the installation of electric lighting just carried out at the British Museum. On November 17, 1888, when the Museum Estimates were discussed in the House of Commons, the Government were pressed from both sides of the House to open the British Museum in the evening. The First Lord of the Treasury undertook to communicate with the Trustees with that view. Provision was made in the Museum Estimates for 1889-90 for installation of the electric light in the public galleries, in addition to the then existing limited installation which served the Reading Room, entrance-hall, &c. This latter partial installation has now been incorporated into the new system. The public galleries on the ground-floor are lighted by arc lamps, sixty-nine in number, of various powers. Those on the upper floor are lighted partly by arc lamps, partly by glow lamps. The arc lamps are fifty-seven in number; the glow lamps, which are used in the long suite of vase and bronze rooms on the west, and in the ethnographical gallery on the east, where the exhibits are seen to better advantage under this kind of light, are 627 in number. In addition, there are five large arc lamps in the Reading Room, and six in the courtyard, and upwards of 200 glow lamps in offices and passages. The total current required to work the whole of the lamps is nearly 1,200 amperes, with an E.M.F. of 115 volts at the lamp terminals; and this output is produced by the expenditure of nearly 200 horse-horse power. The current is generated by four Siemens dynamo machines, each capable of giving an output of 450 amperes and 130 volts, which are connected to a general switch-board in the engine-room by means of which they can be put to work in parallel to any or all of the circuits. The switchboard is fitted with instruments indicating the current given off by each dynamo, and four circuits are led from it round the Museum, two for the upper and two for the lower floor. The main wires are laid outside the building. In order to insure safety, and to guard, as far as possible, against failure of light, the motive-power is in duplicate. The four dynamos are driven in pairs, each pair by a separate engine with a separate countershaft. Each engine has a separate steam-pipe, in direct communication with the boilers, and there is an ample reserve of boiler power. The power of the engines and dynamos is so adjusted that each of the two sets is capable of working the whole of the lamps in those galleries proposed to be lighted in any one evening, the other set standing by ready to work. The eastern and western wings of the Museum will be opened on alternate week-day evenings. Further, in order to work, if required, at half-power, or in order to provide half-light for the whole of the galleries, which light should suffice for an emergency such as a sudden fog or accident, the lamps are connected in pairs alternately, so that, half of the number being cut off, the light of the other half still remains evenly distributed. The steam-engines have been supplied and erected by Messrs. Marshall, Sons, & Co., Limited, of Gainsborough, and the electrical work has been executed by Messrs. Siemens Brothers, & Co., Limited. The installation has been carried out under the supervision of Mr. W. H. Prece, a F.R.S. Electrician to the General Post-office, who acts as Consulting Engineer to the Trustees of the British Museum.

The Association of Manchester Students of the Institution of Civil Engineers held their annual dinner on Wednesday evening, Jan. 22, at the Victoria Hall, Manchester, the President, Mr. F. Crook, M.Inst.C.E., in the chair, supported by Mr. J. Alderman W. H. Bailey, J.P., Mr. J. D. Moulden, sec. of the Manchester Architectural Association, Mr. J. H. Lynde, and many other gentlemen.

Main Drainage and Sewerage Works, West Ham.—The Local Government Board have recently held two inquiries at West Ham upon the application of the Corporation for permission to carry out a large extension of the main drainage system, pumping, and outfall works adjoining the metropolitan boundary, designed by the Borough Engineer, Mr. Lewis Angell; and on the 23rd ult. sanction was given for a total expenditure of 98,620*l.*

The New City Engineer of Liverpool.—The *Liverpool Daily Post* says that Mr. H. Percy Bonhous, the new City Engineer, will commence his duties on the 8th inst.

LONDON.—For the erection of a school to provide accommodation for 708 children on the site in Cubitt Town, for the School Board for London. Mr. T. J. Bailey, architect.

Table listing contractors and amounts for the school project in Cubitt Town, including Kilby & Gayford, W. Cubitt & Co., D. Charlton, etc.

LONDON.—For new bank premises, No. 275, Brixton-road, S.W. for the North Brixton Branch of the London and South-Western Bank, Limited.

Table listing contractors and amounts for the bank premises at No. 275, Brixton-road, including Co-operative Builders Society, Nightingale, etc.

LONDON.—For the erection of a school-keeper's house and a cookery centre on the Baltic-street site, for the School Board for London.

Table listing contractors and amounts for the school-keeper's house and cookery centre, including Kilby & Gayford, W. Cubitt & Co., etc.

LONDON.—For alterations and additions to the Alexandra Club, 12 Grosvenor-street, London, W.

Table listing contractors and amounts for the Alexandra Club alterations, including Aldin Bros. & Davies.

LONDON.—For alterations and additions to the "Ford Burrell" Tavern, Vauxhall Bridge-road.

Table listing contractors and amounts for the Ford Burrell Tavern alterations, including Mollett, Head, etc.

YARMOUTH.—For concrete paving, for the Corporation of Great Yarmouth.

Table listing contractors and amounts for the concrete paving in Yarmouth, including J. Lawrence, W. B. Wilkinson, etc.

REDHILL (Surrey).—For the erection of a new printing warehouse, and additions to existing printing works, for The Homard Publishing Union (Limited).

Table listing contractors and amounts for the printing warehouse in Redhill, including Gills & Sons, Gould & Brand, etc.

STRATFORD.—For certain alterations and additions to No. 32, Broadway, Stratford, E.

Table listing contractors and amounts for alterations at No. 32, Broadway, including B. E. Nightingale, J. S. S. Williams & Son, etc.

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The Builder.

Vol. LVIII. No. 2435.

SATURDAY, FEBRUARY 3, 1890.

ILLUSTRATIONS.

Bronze Statue of Victory, in the Roman Museum at Brescia.—Drawn by Mr. Gerald C. Horsley	Double-Page Photo-Litho.
Restorations (Plans) of Pliny's Villa at Laurentum, illustrating Professor Altchison's Lecture at the Royal Academy, viz. :—	
Scamozzi's Restoration, 1615; Felibien des Auvais's Restoration, 1689	Two Single-Page Ink-Photo's.
R. Castell's Restoration, 1728; Bouchet's Restoration, 1852	Double-Page Ink-Photo.
Marquez's Restoration, 1796; Haudebourt's Restoration, 1838	Double-Page Ink-Photo.

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Map of the country between Rome and Laurentum, showing the Site of Pliny's Laurentine Villa	Page 96
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On the Weathering of Oolite Building Stones.



For the greater number of the freestones used in building in the South and East of England are geologically known as oolites. Portland, Bath, Douling, Chilmark, Minchiampton, Ancaster, and Weldon, are amongst the principal stones included under this term. Everyone knows that the value of these materials in regard to their weather-resisting properties is not the same: that they are widely divergent in this respect. Some of the stones are softer than others, their grain and lie are different, and what may be suitable for some purposes may not be recommended for others,—they have specific uses. It is remarkable that so little attention has hitherto been paid by scientists to the causes of this variation in weathering, and it is yet more surprising that educated people who deal with this class of freestone every day of their lives in their business avocations should understand so little concerning the properties of the material. They know by repute that one stone is better than another, though they would in many cases not be able to make the differentiation were the blocks of each kind placed before them for selection. A certain stone may be specified for a building, but many amongst us could not say, definitely, from an inspection of the stone itself brought on to the work, whether this was what was ordered or not. From our faith in those who have executed the order for us we have often every reason to believe that the material supplied is that which was specified, but it is not advisable to be more independent in the matter? It is not a difficult thing to learn the peculiarities of, say, a dozen of the leading oolites in the market, but they must be carefully and minutely studied in the first instance.

An oolite is a limestone differing from all other calcareous building-stones in that it is largely made up (sometimes entirely) of small shot-like granules, often bound together with a cementing material. This congregation of granules imparts to the stone the appearance of the roe of a fish, hence the name oolite (Gr. *oou*, egg; *lithos*, stone). Oolites differ

from each other in the size and abundance of the granules, the nature of the cementing material, and the presence of more or less foreign matter, such as shells, grains of sand, &c., intercalated amongst and bound together with the granules. They may also be distinguished, in some cases with comparative ease, by difference in tint, though when spread over a wide geographical area this character is of no importance. It should be distinctly remembered that these peculiarities are not necessarily confined to any one district, or even to one quarry. That is to say, we do not find that a peculiar class of structure is indigenous to a definite area, but, on the contrary, we may, and do, get four or five entirely distinct kinds of structure in the oolite from one quarry. But in the vast majority of instances these different appearances occur along separate horizons,—each horizon presents some readily distinguishable feature, known perfectly well to the quarrymen. Where all the kinds of stone from a quarry are, to the superficial eye, of distinct tint or grain, the outsider has no difficulty in seeing that the stone specified is that actually sent on the building; but where (as is often the case) the quarry presents two stones having a general resemblance to each other, they may not be distinguishable except to the trained eye, and the difficulty of seeing that the specification has been adhered to proportionately increases. Outward appearances of stone are very deceptive. A stone derives a certain amount of local repute from its having weathered well in old buildings, and rightly so; but it by no means follows that because a somewhat similar material is found in the vicinity that it will weather as well, though this is the kind of conviction that is largely traded upon. Two oolites having the same general appearance may weather very differently from each other, one being good stone and the other bad, the cause of which will presently be explained.

If we take any horizon in a quarry, as defined by jointing, and examine the stone at intervals along the bed, we shall find that, except in a few notorious instances, it very seldom varies in structure or quality for short distances; but, when that same horizon is traced into another quarry a few hundred yards off, or even in the same quarry where the workings run underground for long distances, the character of the stone often varies, it may be slightly, yet quite enough to alter a good horizon into a bad one. Conversely, a horizon that may give a had stone

in one quarry may improve in quality as it is traced a short distance away into another. We mention these facts to show how fallacious it often is to specify a stone bearing a good name, and found along a definite horizon, unless the quarry from which it is to come is also mentioned; and, likewise, how absurd it is to depreciate the value of the material solely because stone of the same name has proved to weather indifferently. The bad stone may have come from a point three miles off from where the stone bearing the same name is of excellent quality. The circumstance is not always appreciated, and it serves to explain many apparent anomalies in regard to the weathering of oolites.

Let us now examine the mode of weathering more minutely. In all works treating of the disintegration of stone, we find that great stress is laid on chemical composition; it is a fundamental axiom that stones largely made up of certain mineral matter of known chemical composition are proportionately attacked by atmospheric agencies. If the chemical composition in the aggregate is such that, theoretically, it is capable of being readily disintegrated, the stone is judged from that standpoint. This is why we find, in the elaborate treatises referred to, that attention is first paid to chemical analysis of the material. Stone merchants and quarry-owners are usually careful to circulate the results of a chemical examination of their stone, and we have often wondered whether they know what it really means, and whether the recipients of the circulars are any the wiser after reading them. Once we put the question to a well-known quarry-owner as to why he had had his material chemically analysed, and his reply was that "It was the proper thing to do." Another answered that, "By means of the chemical analysis we are enabled to tell how the stone will resist the action of the weather." Pressed as to how he would, within reason, judge of the analysis in this respect, he said that "He himself did not sufficiently understand the subject"; and this we find is the refuge behind which most people take their stand. The fact is that the value of chemical analyses in regard to estimating the weathering qualities of stones, and particularly oolites, has been very much overrated. We do not deny that in a general sense this analysis is good; it might be useful, for instance, in assisting us to distinguish a limestone from a magnesian limestone, or from a close-grained sandstone. In other words, it is useful in differentiating

rocks of extreme character. But when we come to consider any particular section of building-stones, such as the oolite freestones now under discussion, the value of a chemical analysis is reduced to a minimum. Oolite after oolite may be subjected to the chemist, and, within very circumscribed limits, the result in each case is about the same; we get a large proportion of carbonate of lime, a little carbonate of magnesia, iron, alumina, silica, &c. Two stones may show an almost identical chemical composition, and yet one is known by experience to weather well and the other badly. Where, then, does the use of the chemical analysis come in? Clearly in a case like this it is of no practical value whatever. But this is not all. We should not mind so much if the results of the chemical analysis were only negative in character; when, however, we come to learn that in certain cases they are so very misleading as to result in an altogether incorrect idea of the value of the materials to which they refer, and especially when we know that the erroneous impressions are being traded upon, we can hardly refrain from inquiring further into the matter.

We give a few published analyses of well-known oolite building-stones by way of illustration:—

Chemical Analyses of Oolites.

	Bath Box.	Portland.	Chilmark.	Doubling.	Amcastar.	Barnack Mill.	Ketton.
Carbonate of lime	94.52	95.16	76.0	95.89	93.59	93.4	92.17
Carbonate of magnesia	2.50	1.20	3.7	0.11	..	..	..
Silica . . . . .	..	1.24	10.4	2.44	2.90	3.8	4.10
Iron	1.29	0.50	2.0	0.83	0.80	1.3	0.99
Alumina . . . . .	..	..	..	0.79	..	..	..
Water	1.73	1.94	4.2	0.28	..	2.71	1.5
Loss . . . . .	..	..	..	..	..	..	2.33
Bitumen	trace	..	..	..	trace	trace	trace

We will now endeavour to trace the connection between denuding agents and the weathering of oolites from a chemical point of view. It will be noticed in the above table that carbonate of lime is the main constituent of each rock mentioned, and there can be no doubt that this is the mineral chiefly attacked in the process of disintegration, and the great chemical disintegrator is rain. Carbonate of lime is insoluble in water, but as rain contains a certain proportion of carbonic acid, the carbonate of lime is reduced by this acid to a bicarbonate, which is soluble, and in the end the surface of the stone is dissolved; and washed away, and each successive surface is treated in a similar manner. *Ceteris paribus*, it would appear that the stone containing the highest percentage of carbonate of lime is the worst in quality; yet this is not necessarily so,—it is not even the rule. Anyone who understands the relative qualities of the stones mentioned in the table, will see what we mean. The chemical analysis of chalk is practically identical with that of pure statuary marble, both being wholly composed of carbonate of lime, but everybody would admit the absurdity of suggesting that the former substance is as durable as the latter. Why not, if the percentage of carbonate of lime present has anything to do with it?

The same remarks apply to the carbonate of magnesia. Again, we hear on all sides that it is desirable for an oolite to possess a great proportion of silica, on the ground that silica is to all intents and purposes an insoluble mineral. But we submit that a chemical analysis is wholly incapable of determining the question as to whether an oolite more durable or not. Suppose (as we know is frequently the case) the silica is present only in the form of grains of sand interspersed amongst the oolite granules, in what way can its presence render the stone more durable as a whole? On the stone being attacked by carbonic, hydrochloric, sulphuric, or other acid in the atmosphere, the grain of sand would simply be weathered out

and fall away,—it would lend no support to the material. Then, again, the presence of iron might be thought to be deleterious to preservation, and so it is in anything like large quantities; but its presence in oolite building stone is manifested by the colour of the rock, for the cream and blue tints are mainly due to iron; so that the presence of the mineral can be foretold merely by an appeal to common knowledge, and without an analysis. Iron does not enter so materially into the composition of the stones under consideration as to affect their weathering properties to an appreciable extent, though in certain oolites not used as building stones that mineral is sufficiently abundant to afford an excellent iron ore. In certain stones iron occurs as pyrites.

Alumina is clayey matter found but sparsely in good oolites, and does not affect our chief arguments.

Seeing, then, that an ordinary chemical analysis is of so little use in enabling us to determine the durability of oolite, we may inquire whether any other and better method is known. Considerable light may be thrown on the subject by studying the origin and structure of the stone. It has hitherto been customary for so-called "practical" people to altogether ignore the origin of different kinds of building stone, on the ground that it has no direct bearing on the practical side of the question, it being merely of philosophical interest. But this is not so. We do not for a moment contend that it is necessary for practical purposes to enter into the intricacies of the divers hypotheses concerning the origin of all known kinds of stone,—that would be absurd. What we do say is that by gaining some idea of the main facts concerning "origin," the *raison d'être* of the all-important factor in building-stone selection,—structure,—is intuitively learnt also. To no class of stone does this more closely apply than to that now under review. Before explaining what is known concerning the origin of oolite, however, we must know something of its structure. This is best studied by examining very thin, transparent sections of the stone under the microscope. We shall then see (in a typical representative of the group) that the small granules alluded to in the earlier part of this article usually exhibit the following structure:—In the centre of the majority of the granules we observe a minute grain of sand, shell, or other fragment which serves as a nucleus around which successive layers of carbonate of lime occur, not unlike the coatings of an onion. Occasionally the centre is a hollow cavity, produced, probably, by the dissolution of what was once there. From the centre to the circumference, exceedingly minute lines or cracks radiate. The stone is made up of myriads of these granules, which sometimes adhere to each other without having much cementing material between, but more often are joined together by a considerable amount of mineral matter. In some of the Lincolnshire oolites, the granules are relatively far apart, and do not form more than half the bulk of the stone, the spaces between being filled in with natural cement, of which more anon. Except in rare instances, however, we shall observe that large shells and other fossils are present, imbedded in the cementing material between the grains, and it may be that the granules are cemented closely to the shells.

Fossil shells enter largely into the composition of Portland, Bath, and nearly all the best-known oolites. The shells are of marine origin; and it is quite clear, therefore, that the stone itself was originally formed in the sea. It has been shown that, at the present day, granules of similar structure to those of oolite are forming near the coral reefs of the Bahamas, and off the coast of Jamaica; and it would appear that the granules are made by particles of sand, or other objects, being kept in motion in water highly charged with carbonate of lime, which latter is deposited and encrusts the particles, so that they eventually become enveloped by successive coats of the mineral. Oolitic grains of this character are also being formed in the

springs of Carlshad (Sprudelstein). At the same time, whilst it may be admitted that oolitic structure in general has been produced in this manner, we have unequivocal proof that it has also occasionally been formed in the stone subsequent to its deposition. Quite recently, again, it has been shown that in certain oolitic stones of very coarse grain (pisolites) the spherules are of entirely different origin. Mr. E. Wethered, F.G.S., has discovered* that in these cases the nuclei are enveloped by minute tubes of peculiar organisms; and two months since he further described them before a meeting of the Geological Society. On that occasion, also, Professor Judd, F.R.S., stated† that he had examined some recently-formed oolitic grains, and that the structure of some of them was very similar to the tubifolium pisolite referred to. So much for the origin of the granules.

We now approach the most important part of the structure of oolite,—the nature of the mineral matter which cements the granules and shells together. It will be obvious that the rate of weathering of the stone is almost entirely dependent on the character of this cement, for assuming it did not exist, we should merely have a deposit of loose material like sand, instead of a stone. There is every gradation of compactness, from an incipient substance in which the grains are only just held together, up to a rock so hard and close as to be difficult to tool. As we have before stated, the chemical composition of these two kinds of oolite,—the soft and the hard,—is often identical. What greater proof is needed of the futility of an aggregate chemical analysis in showing the weathering properties of the stone? Further, suppose every space between the granules has been filled up with what we know to be carbonate of lime, *per se* this is no guarantee that the stone will weather any the better for it. When carbonate of lime is amorphous (having no crystalline form) it is readily washed out of the stone by the action of rain, and so the fabric decays; but when the lime is crystalline, leaving taken on the form of calcite, it resists the weather for a very much longer period, and the oolite is better in quality. It depends whether the cement is crystalline or not.

Now we have to consider the structure of the shelly matter found in the stone. In the first place it is necessary to explain that, generally, the original shells have disappeared long ago. They have been dissolved out of the rock by the action of percolating water containing acid, and the cavities thus formed have been refilled by other mineral matter,—mostly carbonate of lime,—deposited from solution, and this secondary mineral has nearly always taken on a crystalline form. But here, again, we have to pause in considering that carbonate of lime crystallises in two different ways, producing two distinct minerals, calcite and aragonite, the former being much more durable than the latter. From the fact that aragonite is harder and heavier than calcite, it might be supposed that the reverse would be the case. It is another proof that the hardest minerals are not always the most durable. In examining stone in buildings erected only a few years since, we often find the surface pitted with holes and cavities, &c., which are mainly the result of the weathering out of aragonite shells. Where the oolite is largely made of such shells, it becomes a serious matter, for the whole substance gradually wastes away.

It may be asked, seeing that calcite and aragonite are of identical composition, how can they be differentiated? This is done by the aid of the microscope and polariscope, the optical characters of the two minerals being very distinctive. There can be no question that a microscopic examination is the best available method of determining the relative durability of oolites. By it we can arrive at the whole structure of the stone, the state of crystallisation of the component minerals, and the nature and disposition of the foreign frag-

* "Geological Magazine," N.S., Dec. 3, vol. vi. (1889) p. 190.
 † "Abstracts Proc. Geol. Soc.," Dec. 18, 1889, p. 25.

ments which so frequently prejudice the chemical analytical method. If the material contains an abnormal quantity of silica it is only by an appeal to the microscope that we can say whether that durable mineral, in a particular case, adds to the strength of the stone by entering into its constructive framework, or is merely present as the nuclei of granules. Microscopic analysis must, therefore, become the method of the future.

So far, we have only discussed the weathering of oolites from chemical and mineralogical points of view. Like other stones, they are disintegrated to a certain extent by the action of frost and wind; and in this connexion it is important to know how much water they absorb. The position in which they are built with reference to the rainfall of the district is also an important factor. But these things are now tolerably well known,—and they refer to all kinds of stone alike,—and their consideration does not fall within the province of the present article.

We may take this opportunity, however, of correcting a rather popular error in regard to the method of placing laminated stones in buildings in course of erection. It is everywhere understood that it is the correct thing to lay the stones so that the bedding is horizontal, and specifications frequently insist on this point. This is because of the well-known fact that laminated stone built exteriorly, with the bedding planes parallel to the face of the building, weather by flaking off, coat after coat being removed, whereas when the bedding planes are horizontal, the stone cannot flake in this manner. This is quite right, but laminated stones could also be safely built with the bedding-planes vertically disposed "end on," and suffer none the more for it, providing they are not placed at corners. Such, in fact, should be the proper positions of the key-stones of arches subjected to great stress.

The vexed question as to when it is advisable to clean down freestone buildings is more intimately connected with oolite than with any other class of stone. It is known that Bath and other similar limestone chemically forms a hard crust on exposure to the atmosphere for lengthened periods, and that this crust acts as a protection to the rest of the material. It is equally clear that if this hardened surface is cleaned off that it does not re-form so perfectly as before, and that the stone, consequently, is more easily weathered. This being so, the question arises whether it is advisable to clean down a building during process of erection, or subsequently; or whether the stone to be used should be seasoned or otherwise. We think that this depends very largely on the length of time to which the actual face finally to be left has been exposed to the atmosphere since it was quarried. The protective crust is derived from a slight decomposition or alteration taking place uniformly within about the depth of an inch or so of the exposed part of the stone. If the material is first seasoned at the quarry, and the seasoned surface is subsequently left in the building in an exposed position, any attempt at cleaning down will assist the disintegration of the stone; but if the latter is seasoned at the quarry, and the outside inch or two is tooled off on its being built up, the stone may be cleaned down during erection, as another hard surface will form, though, as far as our observations go, it is not quite as perfect as it might be. Under other conditions it is often advisable to use unseasoned stone after the moisture has fairly dried out. It is certainly not desirable to scrape down old buildings of oolite, as the weathering of the stone is much facilitated thereby.

London Geological Field Class.—A course of four lectures will be delivered by Prof. H. G. Seeley, F.R.S., on February 15 and the three following Saturday afternoons, at four o'clock, by the kind permission of the Gresham Committee, at the Gresham College, Basinghall-street. Subject: "The Tertiary rocks on which London stands."

NOTES.

THE Railway Rates Inquiry has now entered upon its second phase, Mr. Balfour Browne having opened the case for the traders in a speech of four days' duration. The efforts of the learned counsel were mainly directed to demolishing the statements and figures put in by the railway companies,—indeed, he asked the Court to disregard the whole of them as absolutely worthless. Seeing that the London and North-Western Company alone have spent 10,000*l.* in the preparation of these figures, this seems rather too much to ask; in fact, Mr. Balfour Browne proceeded to deal with them for what he considered them to be worth, being quite disposed, apparently, to adopt certain of them which bore out his own views. He maintains that Parliament never said that the traders were to be constructive in the making of schedules and classifications, but that the constructive work was to be done by the Board of Trade if they could not agree with the proposals of the railway companies. His principal objection to the proposed maximum rates is that they are based upon existing powers, instead of actual rates; and the evidence of his witnesses will probably be directed to this latter point, as the railway companies have avoided it. By the by, it is proposed to call no fewer than 136 witnesses on behalf of the Mansion House Committee alone, but endeavours will doubtless be made to dispense with some of the number. As to classification, Mr. Balfour Browne acknowledges that if that compiled by the Railway Clearing House were honestly made the basis of the new one, the traders would have no great cause to complain. The recent conference have resulted in the departures from this classification being so reduced in number that we think this condition may be looked upon as complied with,—the remaining points of difference being still left open to discussion. Having regard to the inevitable authorisation of "terminals" in some shape or another, Mr. Balfour Browne makes a very practical suggestion. He said that the evidence showed that even in the case of an important firm like Huntley & Palmer, although they have their own siding and do their own work, the rates charged to them are precisely the same as those charged to other traders at Reading. He asks the Court to fix maximum charges for every terminal service, separately, and to give the trader a rebate where the services are not performed. Of course there are difficulties in the way, as the Court is dependent upon the railway companies for evidence as to the cost of all these various services; and seeing that there are a host of objections raised against such figures of this nature as have already been submitted, it would no doubt be very difficult to arrive at a satisfactory understanding as to the reasonableness of the amounts for which they would ask Parliamentary sanction.

IN regard to the possible new offices for the London County Council, a correspondent (a London architect) writes:—"It is no secret that the City authorities are most anxious to thrust on the Council a piece of land facing the Embankment, near Blackfriars. I would beg of you to consider the advisability of suggesting,—amongst other sites that I daresay will occur to you,—the identical site of Whitehall Palace, where proposed to be placed by Inigo Jones. One advantage, possibly, would be that this site is already covered with one building which might be suitable,—viz., a Banqueting Hall. Besides this building the site is occupied with the statue of James II., the office of the Board of Trade (which wants re-building), and about a dozen private houses. I believe all the land is Crown property, so that compensation for disturbances could not be serious, and there would be no hurry to pull down the existing buildings. It is possible the site is not well known to many among your readers; I would explain, therefore, that I mean that if the road at present leading from

the east side of Whitehall to Whitehall-gardens, along the north side of the Duke of Buccleuch, were continued right through to the Embankment, and if the road, or rather the "Slough of Despond," at the north side of the Banqueting House, were also continued right through to the Embankment, a grand rectangular site would be obtained, with a long frontage to new streets on the north and south, a long frontage to the widest part of Whitehall on the west, and the same length of frontage to the Embankment on the east. I need hardly point out what a grand addition to the Embankment such offices might be, or how centrally situated amongst Parliamentary, Police, and Home Offices is such a site."

THE death of Dr. Salvati is announced, at the age of seventy-four. His name has been to a great extent identified in Venice and in England with the revival of the art of mosaic and of the Venetian artistic glass industry. He was not himself an artist or designer, and his efforts in setting up again these two artistic crafts on their old ground seem to have been prompted a good deal by patriotic feeling, coupled with that kind of insight which enables the possessor of it to foresee a probable demand and provide for it. In as far as the Murano glass manufacture was concerned, it was carried on in too archæological a spirit, even to the conscious production of irregularities and crookednesses of make; a kind of thing which took the public when it was novel, but which the best artists saw through and on occasion denounced. In regard to this kind of effort the Murano glass work has had its day of fashion, and capricious modern taste is getting tired of it, as is pretty sure to be the case with all art work which is a revival of old fashions for the sake of revival; but there is no doubt that incidentally it gave an impulse to the long-forgotten idea that table glass was a thing capable of beautiful artistic design and expression, and not merely a utilitarian class of goods for practical use; and most of the other efforts at giving artistic form and spirit to glass utensils have been at all events stimulated by the example of Salvati's enterprise or the desire to rival it. In regard to mosaic, the position taken by Salvati and his coadjutors is more stable. They provided for the manufacture of the material and the proper carrying out of the process of fixing; and though a good deal of too archæic work was done by them for church architects in the high tide of the Gothic movement, the more rational artistic use of the material by designers has now brought mosaic decoration into higher repute, and the gratitude of the artistic world is equally due to the man who recalled and revived the use of such a splendid medium for architectural decoration.

MR. ROBINS'S paper on "The Relation of the Fine Arts to the Applied Arts," recently read at the Society of Arts, and published in the last issue of the Society's *Journal*, had for its main object the suggestion that technical schools should include art-teaching in their curriculum, instead of leaving those who receive instruction in technical processes of manufacture to learn elsewhere how to apply design in these processes, or to leave that little matter altogether unlearned. Mr. Robins said:—

"At the Central Institution no such art teaching has been commenced, although that was the first intention, and a portion of the building was set apart for the fine arts, which has since been devoted to science-teaching purposes, and no professors of the fine arts have as yet been appointed."

This branch, however, is never found wanting in foreign polytechnics, which are not considered complete without their art side,—with its staff of professors of architecture and construction and painting and sculpture. The Professor of Architecture at Carlsruhe was the architect of the new Strasburg University, which has cost half a million of money. In this particular, therefore, the Central Institution in its present development cannot compare with foreign polytechnica, being almost exclusively devoted to the applied sciences; and my regret that this should be the case has had its influence in determining the subject of this paper. During the delivery of Mr. Alan Cole's in-

interesting paper on Irish Lace Industries last Session, a striking example was given of the importance of maintaining a close alliance between the fine arts and the applied arts. The paper was illustrated by enlarged photographs of original laces, contrasting designs made before and after art lessons had been introduced into that country, and showing the waste of energy which had long been expended in bad designs, wherein the workmanship was beautiful, but the value was deteriorated by reason of the lack of taste in the design, and the absence of fine art culture observable in its general arrangement and ornamental detail."

In the course of his paper Mr. Robins frequently quoted from the volume of papers read at the Liverpool Art Congress, which, as he truly said, formed too valuable a *resumé* of opinions and suggestions upon art to be left buried in the recesses of libraries.

THE London County Council, at their meeting on Tuesday last, as reported in another column, received with much surprise, and many expressions of regret, the intimation from Sir John Lubbock, the Vice-Chairman, that Mr. Clement Duncombe, late of Liverpool, who was elected to the post of Chief Engineer of the Council so recently as December 3 last, in succession to the late Mr. Gordon, had written tendering his resignation, on the ground of ill-health. We are very sorry indeed to hear of this. As was recently mentioned in our column, Mr. Duncombe, on leaving his duties as City Engineer of Liverpool, went for a sea voyage as far as the Canary Islands, preparatory to entering upon his duties in London. The London County Council and the inhabitants of London are to be consoled with on the loss, within so very short a period, of the services of two gentlemen who stood in the very front rank of municipal engineers. Mr. Gordon's very sudden death on November 9 last, after only about two months' tenure of office, will be fresh in the recollection of our readers; and now his successor, Mr. Duncombe, has felt compelled to tender his resignation owing to ill-health, just as he was about to enter upon the important duties of the office to which he had been elected. We had hoped much for Londoners from the professional ability first of Mr. Gordon and then of Mr. Duncombe. The London County Council have decided to fill up the vacancy as soon as possible. We trust that they will secure a capable man, and one whose tenure of the post of Chief Engineer will be very much longer than that of his predecessors. In the meantime, the Council appear to us to have made a very good appointment in electing Mr. W. Santo Crisp (Engineer to the Wimbledon Local Board) as Assistant-Engineer, in the room of Mr. Thomas Lovick, who is about to retire after a long period of service under Sir Joseph Bazalgette.

DR. CHARLES WALDSTEIN, the Director of the American School of Classical Studies at Athens, gave his inaugural address for the present session in the School Library, on Monday, January 27. Dr. Waldstein, who holds the appointment of Reader in Classical Archaeology at Cambridge, has recently resigned the Curatorship of the Fitzwilliam Museum there, in order to devote more time to the furtherance of the objects of the American School. He will reside in Greece each session from Christmas till Easter, and during this time, in addition to directing the general work of the School and any excavations that it may have in progress, he will give a series of lectures to students, both in the School and at the museums, on various archaeological subjects. This year he is devoting his attention to sculpture, while Mr. Gardner, the Director of our British School, has taken up vases and topography, the two Directors being particularly anxious that the English-speaking schools should combine and work together as much as possible in this way. In addition to their permanent Director, the Committee of Management in America, which is composed of representatives from the principal American colleges, appoint annually a second director, generally one of their professors of

Greek, who more particularly undertakes the superintendence of the students' work in the classical languages and literature, the American school differing from ours in being a school of classical studies as well as of archaeology. Dr. Waldstein began his address by speaking of the increased facilities now offered to students in the museums of Athens, and in Greece generally, owing to the enlightened zeal and energy of the General Ephor of antiquities, Dr. Kabbadias, who is busily arranging the vast quantities of materials of all kinds, the products of the various diggings which are constantly being carried on by the Government, the Greek Archeological Society, and the various foreign schools. He insisted on the necessity for the formation in Athens of a vast museum of casts embracing the whole range of Greek sculpture, and he appealed to the patriotism of the wealthier Greeks, who have already done so much for the Athens of to-day, to make this want a reality.

REFERRING to the water-supply of St. Petersburg, a correspondent states that it is still very defective. The water is obtained from the Neva, and last autumn, for the first time, a certain system of filtration was introduced, but has failed to improve the condition of the water, as it is rendered impure in filthy cisterns on the roofs of the houses, into which dangerous rubbish is often thrown. In consequence, the hygienic state of the Russian capital is very bad; and in December last, the rate of mortality rose to double that of London. Proposals, however, have been made to the City authorities for erecting modern water-works, the proposal being to obtain the water from a couple of lakes some distance from St. Petersburg.

A GENOA journal draws attention to the increasing erection of timber dwellings in Northern Italy since the earthquakes in 1887. As is well known, the latter are far safer than stone houses in this respect. However, the opinion is expressed that along the Riviera these houses cannot pay, on account of the great expenses attending the excavation of the rocky ground. For instance, in Genoa, houses have to be run up eight or ten stories, in order to yield a return upon the capital invested. It is also doubted whether timber will be able to withstand the great summer heat prevailing in the Mediterranean and keep free from rot. As to the reputed greater coolness in summer of wooden houses, the journal in question points out that no houses can be cooler than the thick-walled stone buildings of Italy, Spain, &c.

A REPORT by Dr. Parsons to the Local Government Board (dated December 21, 1889) on certain outbreaks of diphtheria in the Leek Rural Sanitary District, Staffordshire, gives, among others, the following particulars as to the sanitary state of some of the houses in which the disease appeared. In one case,—

"The sanitary state of the house is very imperfect. The whole family sleep in a single bedroom of about 950 cubic feet capacity. There is another small bedroom, but it is not used, as it is dark and unventilated, having only a single small window which will not open. The privy is close to the pantry-window, and the smell from it is complained of. Drainage is into a cesspool; the drain has an untrapped inlet out of doors, but close to the house. (Both the untrapped inlet and the fixed window, it is right to say, were put in by the tenant himself, who is a mason by trade.)"

Of another case we read:—

"The house, like most of the cottages in the district, has windows in the front only, and the window of the downstairs room does not open. There are two bedrooms. The back wall is partly below the level of the ground. There is no drain, slops being thrown over a low wall on the farther side of the footpath in front of the house. For the four houses there are two privies, which are at the upper end of the row; they are low and dilapidated, with wet cess-pits, of which the contents ooze out on the surface of the ground."

Another infected house is described as follows:—

"The house stands by itself among fields; the surroundings are uncleanly. The drain is a rough

stone sough, the flat bottom of which is covered 3 in. deep with black stinking sediment. It is in direct untrapped communication with the interior of the house, and ends in a field, with an open mouth, so that when the wind is in that direction all the foul air generated in the drain must be blown up into the house. The privy, with a wet, open pit, is built against the end of the house; the wall of the living room at that point is saturated with damp, and a bad smell is complained of as being perceived in the house. Fowls are kept in a dirt-stato in a shed abutting against the back of the house, and water from an old land drain, which is blocked sometimes, wells up into the pantry."

In regard to general considerations as to the sanitary state of the district, Dr. Parsons says:—

"A primary duty of a sanitary authority, which requires more attention than it receives in this district, is the remedying of unwholesome conditions of houses and their surroundings. It will be seen from the foregoing pages that at all the houses where diphtheria had occurred gross and dangerous nuisances were to be met with, such as a damp, dilapidated, and ill-ventilated condition of the house; defective drains, some in direct connexion with the interior of the house; faulty-placed privies; and water supplies exposed to contamination; and though there is no sufficient ground for ascribing the origin of the diphtheria solely to such defects, it is likely enough that they assisted its spread and aggravated its severity. Yet (with the single exception of Horton Vicarage, where efficient works had been spontaneously carried out by the vicar) I found that these conditions had remained entirely unremedied or without any effectual remedy up to the time of my visit. In some cases they had occurred since others had been removed and been served, but not complied with; and in other cases trivial works had been done, which were insufficient for their purpose. In the latter cases, the failure to secure the effectual carrying out of the required works appeared to be the result of the view locally taken of the legal powers of the Authority—namely, that the Act in question has been superseded by recent legal decisions—viz. that the authority have only power to order the abatement of a nuisance, and must not specify in their notice the particular works required to be executed for the purpose. However this may be, having regard to the prevalent want of sanitary knowledge, the difficulty of getting country workmen to carry out works in any way but that to which they have been accustomed, and the hardships felt by owners when works which they have had carried out to the best of their knowledge and ability are not found satisfactory, it seems desirable, in the interests of owners themselves as well as of the public health, that when they are called upon to execute structural works for the abatement of nuisances, they should be told what the required works are, and the best way (which is by no means necessarily the most expensive one) of carrying them out."

BY direction under the will of the late Lord Falmouth, who died on Nov. 6 last, his town house, in St. James's-square, together with his property at Newmarket, is to be sold. The house, No. 2, on the eastern side, has long been distinguished by a row of posts, which are ship's cannon. These were put by Admiral Edward Boscawen, son of Hugh, first Viscount Falmouth, and ancestor of the first and second Earls of that title, at the capture of the French fleet by Anson, off Cape Finisterre, on May 3, 1747. It was about this time that Savage and Dr. Johnson, having no resting-place, spent a summer's night in walking round the square, resolute "to stand by their country." A print of 1773 shows the rows of ordinary posts around the pavement, the octagonal enclosure having obelisks and lamps at its angles, and the central oval-shaped pond, with a fountain, where Bacon's statue of William III. was afterwards set up. In the Parish Clerks' "New Remarks of London," 1732, it is stated that the pedestal for the statue was already there, and that the enclosure "was done at the Expence of the Nobility and Gentry inhabiting the East, West, and North sides of the square, who obtained an Act of Parliament for the performance thereof." This was the pond into which the "No Popery" rioters threw the keys of Newgate Gaol in 1780; and there they were found many years later.

BY the incorporation of Paul's Chain and Godliman-street with the existing thoroughfare of Bennet's-hill, two old landmarks will disappear from the maps of London. A court in Godliman-street still commemorates the name and situation of the

baking-house for the supply of bread to the Church of St. Paul, latterly the Admiralty Registry. By Paul's Chain—the "south chain of Paul's," mentioned by Stow—we are reminded of the old practice of stopping traffic around this side of the Cathedral during the hours of service therein. The whole of its eastern side is now in course of demolition. Godliman-street also lay within St. Gregory's parish. The derivation of its name appears to be uncertainly known. Some regard it as a corruption of Godalming, or Godalmin, street: early in the last century it was styled Godly-man-street. No less an authority than Edward Cocker once lived on the southern side of the church, over against Paul's Chain, and there in 1660 he wrote his masterpiece of calligraphy, "The Pen's Transcendancy." He was buried in the former church of St. George the Martyr, Southwark, *teste* Hatton, who was so told by the sexton.

IN the very interesting "Early Diary of Fanny Burney," just published, is a reference to Robert Adam, the eminent architect, which places him in a very agreeable light in his social character. Miss Burney, then seventeen, first recalls meeting Robert and James Adam at a dance at her friend Mrs. Debieg's; like many writers of the present day, even professed writers on architecture, she makes the mistake of writing the surname "Adams" instead of Adam (though this is corrected in a subsequent chapter of the diary). "Mr. Adams, very sensible, very polite, very agreeable,—the most so, Mr. Debieg excepted, of the whole party, Mr. — Adams, his younger brother, a well-behaved good sort of young man." Another passage later on shows that Robert and James were the two special brothers present on this occasion; and this rather melancholy praise of James, the younger, as "a good sort of young man," confirms the opinion we recently expressed, in reviewing Mr. Brydall's book on Art in Scotland, that Robert was in every way the master personality in the family. But as Fanny's reminiscences of the evening proceed, her recollections of Robert Adam grow still more pleasing; in the quotation we give Adam his proper surname, which Miss Burney did not get right till a year or two later in her diary, though her reference there leaves no doubt of the identity of the man:

"We then left off for supper. During the time of rest, I was happier than in dancing, for I was more pleased with the conversations I then had with Mr. Dundas, Mr. Adam, and others, than with my partners, and they all in turn came to chat with me, with as much good humour as if I had been as good a talker as I am a listener. Mr. Dundas the elder and Mr. Adam are quite high conversers. I was never more pleased. . . ."

"When supper was over, all who had voices worth hearing were made to sing,—none whose more than Mr. Adam; though in truth he had little or no voice . . . yet he sang with so much taste and feeling, that few very fine voices could give equal pleasure: I cannot but much regret the probability there is of my never seeing him again. I may see many fools ere I see such a sensible man again."

On the matter of Mr. Adam's taste in singing the opinion of Dr. Burney's daughter, who lived in the midst of music and musicians, was of course a sound one; and no one who reads her diary will doubt that she was an equally good judge of personal charm of manner and conversation. It might have pleased Robert Adam as much as his architectural success, to have known that a century later his name would be found recorded, in the diary of one of the most lively and attractive young girls of her day, as the most pleasant and accomplished man she had met in society.

Bridge Across the Bosphorus.—The Constantinople journal *Habibak* states that a syndicate of French capitalists has obtained a concession for the construction of a bridge across the Bosphorus in the narrowest part, between Rumeli and Anadol-Hissar. It is to have a length of 800 metres, with a height above the water level of 80 metres.

* The break here is in the Diary.

LETTER FROM PARIS.*

THE conflict which has arisen in the ranks of the Société des Artistes Français, referred to in our last,† far from having subsided, has assumed such proportions that the rupture between the two parties in that body is now complete, and this year we shall have, along with the old Salon exhibition of the Palais d'Industrie, a rival exhibition organised under the auspices of the new association, which will bear the title of "Société Nationale des Beaux-Arts."

Laudable efforts were no doubt made to prevent this ill-adviced schism. On the part of the old Société, MM. Guillaume, Bonnat, and Chas. Garnier have vainly attempted an overture of conciliation, which was refused categorically by M. Meissonier, who is supported in his position by numerous adherents. A committee, including MM. Puvis de Chavannes, Carolus Duran, Roll, Gervex, Galland, Cazin, and Bracquemond, has drawn up the statutes of the new society, which will be composed of "Membres Fondateurs," "Membres Sociétaires," and "Membres Associés." The "Sociétaires" will be artists, either French or foreign, who shall give their adherence to the statutes of the Society on the invitation of the Membres Fondateurs. The Associés will be artists whose works have been admitted into the exhibitions of the Society, and who will have been adjudged worthy of the title at a general assembly of the Sociétaires. Associés can become Sociétaires by the vote of the general assembly. The number of Sociétaires and Associés is not limited.

The title of "Membre d'Honneur" or "Membre Adhérent" can be conferred by the Sociétaires on persons who have rendered services to art or to the Society, but these titles will not confer any right to take part in the deliberations of the Society.

The funds of the Society will be devoted to the establishment of annual exhibitions, and to the expenditure arising therefrom. The surplus revenue will be devoted to the purchase of works of art, which may be offered to the State museums, to the formation of a reserve fund, &c.

The administration of the new Society will be confided to a delegated Council of Membres Fondateurs, Sociétaires, or Associés. Such are the general terms of the constitution of the new Société Nationale, which will distribute no medals or rewards. Members will not be limited as to the number of works they may exhibit, but they will, on the other hand, be formally interdicted from exhibiting at the old Salon. The "Salon Nationale" will open every year on the 15th of May, fifteen days after the other Salon, an arrangement which will at all events render matters easier for the art-critics. It will last a month, and will be held, pretty certainly, in the Palais des Beaux-Arts at the Champ-de-Mars; the building has not been either offered or asked for as yet, but there is no doubt the Government will give the use of it when asked.

What will be the future effect of this movement it is difficult to predict. On the one hand we have a Society of long standing and prestige, numbering many eminent men in its ranks, and presided over by the venerable M. Bally, who is beloved by everyone and has devoted himself heart and soul to the cause. The old Society has been for a long time the battle-field in which all the young artists have first taken up arms, and it has enjoyed long successes and honours. On the other hand, the new Society, with a title which is somewhat pretentious and in bad taste, since it does not, in fact, represent the national art any more than the other body, has obtained the adhesion of nearly all the representatives of the younger school, and its ranks are augmenting every day. Among the new recruits are already to be counted Ribot, Stevens, Lhermitte, Rixens, Sargent, Boldini, Boivin, Dinet, Maurice Courant, &c. There is therefore a great deal of curiosity and interest about it on the part of the public; and as, in reality, it is a movement of decentralisation in artistic matters, we have no objection to make to this dualism, provided that the State, which is always indulging the hope of resuming its original authority over the artists, does not profit by these divisions to assert an official right to interfere in questions which ought to be decided wholly by artists, instead of confining itself to the wholesome office of encouraging art by purchasing such works as seem worthy of acquisition for State collections.

Among other artists who have joined the new

* Unavoidably held over from last week, as we then stated.

† See p. 7, ante.

Salon, besides those already mentioned, are MM. Lambert, Edelfelt, Mesdag, Mathey, Toulmonche, John Lewis Brown, Dubufe, Mdma. Madeleine Lemaire, &c. The new Salon exhibitions will be open not only to all French but to all foreign artists, whose works must be sent in from the 1st to the 8th of March. The Sociétaires will have to the 26th April to complete and send in their works for exhibition.

From among the list of Sociétaires twenty names will be selected by lot to form a jury of examination of works sent in; but these names will not be published until the jury have completed their task.

It is hardly necessary to add that this event has given special importance to the annual election of officers of the Société des Artistes Français, which has just taken place. The election left no doubt, however, of the determination of the Société to affirm its position: M. Billy was re-elected President by 60 votes out of 64; the two vice-Presidents, MM. Guillaume and Bouguereau, also obtained a large majority, and the secretaries, M. Chas. Garnier among them, were re-elected by acclamation.

The season of "expositions particulières" in Paris has commenced. At the Galerie Georges Petit is to be seen that of the works of M. Leopold Berstamm, sculptor, who has made a speciality of the exotic types of the Universal Exhibition (Indians, Javanese, Soudanese, &c.) an exhibition indicating at all events great ability and cleverness of execution. After this will follow the annual exhibition of the club of the Rue Volney, that of the water-colours of Madame Madeleine Lemaire at Gonpils, that of the "Peintres-Graveurs" at Durand-Ruel's; and, in a few weeks, the exhibition of the "Union Artistique" and that of the Water-Colour Society.

At its last sitting, the Municipal Council approved of the permanent retention not only of the Palaces of M. Formigé and the Galerie des Machines, but of the 30-mètre gallery and the Bouvard dome.* The Council has now to decide the treatment of the large space of ground between this latter building and the Seine. The scheme for this has actually been submitted to Parliament, which will pronounce upon it shortly. In the meantime the work of demolition goes on, and on the Esplanade des Invalides the Palais des Colonies, the Pagoda, and two or three foreign pavilions alone remain: even the elaborate and solid-looking palace of the Ministry of War has entirely disappeared. On the Champ-de-Mars the principal foreign pavilions are still in position; but the "Histoire de l'habitation" has disappeared.

While removing the remains of the Exhibition, the Government is at the same time occupied in dealing with those of the Cour des Comptes, which have for twenty years been an eyesore on the Quai d'Orsay. A special committee deputed by the Ministry of Instruction to report on the matter has sent in its report, which unfortunately points to a necessarily great expenditure: seven million francs for reconstruction if the two principal façades are utilised; ten millions if they are razed and rebuilt. The original foundations can in any case be utilised. It remains to be settled what, after all, will be built or rebuilt on the site. Will it be the ancient Cour des Comptes, or the new Musée des Arts Décoratifs asked for by M. Antonin Prost? The Committee has suggested nothing, and the Government authorities are perplexed. *Adiuvato sub iudice lis est*: and it is to be feared that in this doubtful case things will still be let alone, though it is really almost a public duty to remove this painful reminder of our civil discords; not to speak of other public interests that might be affected. There is a kind of demand for public work to put new life into the building trade of Paris—not that there is any lack of possible projects waiting for execution; besides the proposed new water supply from the sources of the Avey and the Vigne, there is the removal of the Gare des Sceaux, the new line from the Invalides to Moulins, and the metropolitan railway scheme. With this latter scheme are connected also important street improvements. Then there are the haulage railways for Belleville and Montmartre, and the "chemin-de-fer glissant," which it is proposed to establish on the old exterior boulevards,

* This unexpected decision we think a serious mistake. M. Bouvard's dome and facade might pass muster as a temporary exhibition design, but regarded as a permanent building it is little better than architectural gingerbread.—Ed.

from the Place Clichy to La Villette. There is, moreover, the long-desired completion of the Boulevard Haussmann; and here at least, considering the recent state of things, there ought to be decisive action. In view of the crowded state of the Boulevards Montmartre and des Italiens, and the narrowness of the adjacent streets, people are asking emphatically why the completion of this work has been so long delayed.

The École de Droit is soon to be enlarged, M. Lheureux being the architect entrusted with the work. The establishment as enlarged will occupy all the space between the Place du Panthéon and the Rues Cojart, Jacques, and Soufflot. The new buildings, which will cost about 250,000 francs, are to be carried out partly at the expense of the Government. They are to include an entrance-court from the Rue St. Jacques, with a vestibule and corridor connecting the new building with the old, a large theatre, lecture rooms on different floors, a hall for the distribution of prizes, and the enlargement of the library.

Another intended construction is an iron bridge at Conflans, between Charenton and Ivry, at a cost of about 850,000 francs.

The two national museums are to undergo some important alterations. At the Luxembourg, where the objects lent for the Centennial Exhibition have been reinstated, several new works are to be hung, among them the "Femibre Maria Lamécie" of M. Roll and the "Rêve" of M. Détaillé. The Museum at present contains 430 works, of which 300 are pictures. At the Louvre, the galleries on the first floor devoted to ceramics are to be considerably rearranged. In the Pastels room an allegorical ceiling by M. Hector Leroux has been fixed, divided into three compartments. The most important composition represents the triumph of Venus, another represents "Junon au bain," and the third the union of Greek and Latin poetry. In the Louvre there are also to be placed the "Sacre" of David, the fine portrait of General Fournier Sarlovèze by Gros, and the "18 Brumaire" of Bonchot. It has been said also that the Louvre is to have Manet's "Olympia," but this seems to be a mistake; a group of artists and amateurs combined to purchase this work of the impressionist master, but the Louvre is not concerned in the purchase.

At the École des Beaux-Arts the eighty-seven competitive designs in the second class, for a Maritime Sanatorium or hospital for children, have been before a jury presided over by M. Ginain; but only "mentions" have been awarded, "premiers" to MM. Fiault, Petin, Armbruster, and Bretagne, and thirty-four "secondes mentions" to other competitors. In the competition in "éléments analytiques," subject a funeral chapel, fifty-one "mentions" have been given among sixty-one competitors; and in the sketch competition for a Prefecture of Police, "mentions" have been awarded to ten out of 132 competitors.

The competition in decorative composition for students in the three classes, the subject for which was a "cadran solaire,"* has been a rather remarkable one, and after having voted a "première médaille" to M. Armbruster and second medals to M. Desgardin and M. Berger, the jury have added an expression of general satisfaction at the very high style of work exhibited.

For subjects modelled after casts, by architects, M. Baot has obtained a medal, and for figures drawn after nature and after the antique thirteen "mentions" have been awarded. The level of architectural students' work this year, therefore, seems to be very good.

The month of January has brought a long obituary list, in part caused by the influenza epidemic, directly or indirectly. Among the deceased is an eminent member of the Académie des Beaux-Arts, Arthur Stanislaus Diet, a former pupil of Duban and Bloet, who has died at the age of sixty-three. He was Honorary Inspector-General of "Batiments Civils et Palais Nationaux," and Honorary Architect-in-Chief to the City of Paris. He obtained the Prix de Rome in 1853, the Cross of the Legion of Honour in 1867, and a medal of the first class in the Exhibition of 1878. In 1884 he was created Officer of the Legion of Honour and Member of the Institut. Diet was the architect of numerous important works; among which may be specially mentioned the completion of the Museum at Amiens, the new Prefecture of

Police at Paris, the new Hôtel Dieu, the completion of the hospice of Charanton, and the architectural treatment of the new reservoirs of Montmartre. He was a fine artist and a man of benevolent character, and is universally regretted.

Another architect, Demangeat, has died in his 71st year: he took part in the construction of the quartier de l'Europe and of the old Gare St. Lazare.

Among engravers we have to record the death of Etienne Guillaumot, the illustrator of M. Alphonse's "Promenades de Paris;" and that of Joseph Lefman, whose name is connected with the discovery of zingography, and who did a great deal generally to promote the art of facsimile reproduction.

Among painters who have died during the month are Bouquet, Sauzier, Mayeur, and Protais. Michel Bouquet, who received a medal as long ago as 1835, and was 82 at the time of his death, excelled as a painter of faience "sur cra," and all the ceramic museums possess examples of landscapes and seascapes painted on faience by him. Noël Sauzier, the landscape painter, who has died at the early age of 42, was a pupil of Pils, a modest and hard-working artist, whose exhibits at the annual Salons were much esteemed. Max Mayeur, also a landscape painter, has exhibited every year for twenty years past works of excellent character and truthfulness.

Alexandre Protais had made for himself a special name and fame in military subjects, in which he may be said to have been the precursor of Détaillé and De Nerville. He has died of heart disease at the age of sixty-four. From 1853 to 1855 he painted various classes of subjects, but on the commencement of the Crimean War he followed the whole campaign, studying closely the military life which he so ably reproduced in his paintings. In 1857 he exhibited "The Battle of Inkerman," "The Taking of a Battery on the Mamelon," "The Death of Colonel Brancion," and the "Devoir." The success which these works had plainly pointed out his future path. In 1859 he followed the campaign in Italy, and returned with numerous studies. In 1861 he exhibited the "Deux Blessés" and "Une Sentinelle," the picture which drew from Thophile Gautier the remark that "M. Protais a trouvé la Poésie du Soldat." The "Matin avant l'Attaque" and the "Soir après le Combat," exhibited in 1863, brought his reputation to its height. During the last war he served in the army under General Ladmirault.

Protais had received medals in 1863, 1864, and 1865; he became officer of the Legion of Honour in 1877, and obtained a medal at the 1878 Exhibition. By his artistic truthfulness, his perfect courtesy, and the great "distinction" of manner which characterised his personal bearing, he had gained the regard and esteem of artists of all schools, and in his later years was appointed on the jury regularly at each annual exhibition. He was not only an excellent painter, but a thoroughly good man.

We hear at the last moment of the death of M. Jules André, architect and member of the Académie des Beaux-Arts. André was born in Paris in 1819, and studied at the École des Beaux-Arts; he obtained the second prize in architecture in 1842, and the Prix de Rome in 1847, in a competition of which the subject was "Une Chambre des Députés." He went to Rome, and thence to Greece, where he executed a fine restoration of the Temple of Theseus. On his return to Paris in 1852, he was appointed "Inspecteur des Travaux" at the Natural History Museum, and "Sous-inspecteur" at the National Library, and subsequently diocesan architect for Corsica. In 1867 he was appointed chief architect to the Museum, and built the gallery with the monumental façade which terminates the main avenue of the Jardin des Plantes.

André was an officer of the Legion of Honour, and a distinguished professor at the École des Beaux-Arts; and in 1834 he succeeded to the place formerly filled by Lesueur in the Institut.

The New Harbour at Copenhagen.—The Danish Government has presented a bill to the Parliament for the immediate construction of a new harbour at Copenhagen, a scheme under contemplation for some time. It will be situated on the so-called "Castle Point," and divided into two parts, covering a total of about four million cubic feet.

ROMAN ARCHITECTURE.*

BY PROFESSOR AITCHISON, A.R.A.

PLINY THE YOUNGER'S LAURENTINE AND TUSCAN VILLAS.

THERE are but few sources from which we can get a distinct idea of the arrangement of a Roman house. These sources are the remains at Herculaneum and Pompeii (although Pompeii was probably a sort of Roman Margate or Broadstairs), the descriptions of houses and villas in the Roman writers, and the description of some of the parts of a house in the treatise of Vitruvius.

We must bear in mind that Vitruvius's treatise was published with illustrations, though they have unfortunately perished, and that he never describes anything that was well-known to his contemporaries; so we are unable to construct a house from his description. He seems to have published his treatise just as the great improvements in Rome were begun by Augustus, when the Roman peace allowed wealth to accumulate, and architecture and building to develop throughout the civilised world. We cannot, therefore, be sure that great variations in the arrangement of houses did not take place after the publication of Vitruvius's treatise.

The parts of a house Vitruvius mentions are these:—The Vestibulum, or vestibule, where the toga was put on before going out; the Cavadium, or atrium, the first main hall, though Pliny calls this the Atrium only, and the second, or innermost one, the Cavadium,—the middle one he merely calls a portico; the Alae, or wings; the Tablinum, or meeting-room, which was used as a hall of audience; the Fanees, passages that ran on each side of the Vestibulum to the back or private part of the house; Cubicula, living-rooms, but where one might take a midday nap; Peristylum, the peristyle round the garden at the back of the Tablinum; Triclinium, the dining or banquetting-room; Exedrae, rooms for conversation; Cœci, halls, often used for banquets, called tetrastyle, Corinthian, Egyptian, and Cyclicæ; Pinacotheca, the picture-gallery; Bibliotheca, the library; Balneum, the bath; Calia, the kitchen; Cœnaculum, originally a supper-room above the ground-floor, but eventually used to describe the garret or cock-loft; and, in noblemen's houses, the Basilica, originally a hall for trying cases referred to them, or for meetings on party questions, and subsequently for recitations.

After hearing the names of the rooms that are given by Vitruvius, we shall best see their arrangement in the description of his villas by Caius Plinius Cæcilius Secundus, commonly called the Younger Pliny, or Pliny the Consul, the nephew and adopted son of Pliny the Elder, who wrote the Natural History. It must be borne in mind that his Laurentine Villa was a suburban retreat, mainly used in the winter (for he tells us that he resided at his Tuscan villa in the summer), and it was mainly used in the afternoon and at night, when his work in Rome was done.

In giving the translation, I have inserted the Latin names of such portions as may be necessary to identify them with those described by Vitruvius, though there are several parts whose names are not found in that author.

Pliny describes his Laurentine Villa in a letter to Gallus (Lib. 2, 17). The translation given is by Melmoth, as emended by the Rev. F. C. T. Bosanquet, but I must warn you that the English words used as translations of the parts of the villa may mislead you, for it is by no means certain that they adequately convey the meaning of the Latin ones; e.g., atrium is translated by "courtyard," while it is still a question as to what it was, and according to Vitruvius it was a covered hall, with or without an opening in the middle. I now give you Pliny's words:—

"My villa is of convenient size, without being expensive to keep up. The courtyard (atrium) in front is plain, but not mean, through which you enter the porticoes, shaped into the form of the letter D," (but Mr. Bosanquet is of opinion that there were two D-shaped porticoes, and that the space between them was the area. In some editions the letter is "O," and a circular or oval portico was shown by the elder restorers) "enclosing a small but cheerful area between. These make a capital retreat for had weather, not only as

* It would seem from this that the attention which has been given to the subject of sundials the last year or so is not peculiar to England.—Ed.

* Being the second Royal Academy Lecture on Architecture this season. Delivered on Thursday evening, January 30.

they are shut in with windows (specularibus), but particularly as they are sheltered by a projection of the roof." (I believe he means by "imminentibus tectis" covered by a lean-to roof, otherwise the passage is nonsense, if the windows were wholly glazed.) "From the middle of these porticoes you pass into a bright pleasant inner court (Cavædium), and out of that into a handsome hall (Triclinium—a dining or banqueting room) running out towards the sea shore, so that when there is a S.W. breeze, it is gently washed with the waves, which spend themselves at its base. On every side of this hall (the dining-room) there are either folding doors, or windows equally large, by which means you have a view, from the front and two sides, of three different seas, as it were—from the back you see the middle court, the portico, and the area; and from another point (about which there is nothing in the original) you look through the portico into the courtyard (Atrium), and out upon the woods and distant mountains beyond.

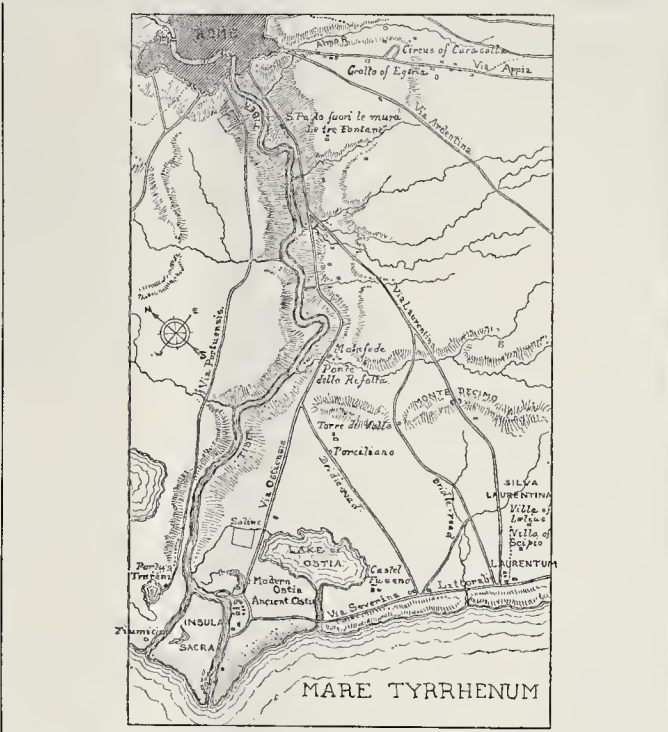
On the left hand of this hall (the dining-room) a little farther from the sea lies a large drawing-room (cubiculum, a sitting-room, or a room in which you might sleep, but not a night bedroom), and beyond that a second of smaller size, which has one window to the rising, and another to the setting sun; this as well has a view of the sea, but more distant and agreeable. The angle formed by the projection of the dining-room with this drawing-room retains and intensifies the warmth of the sun, and this forms our winter quarters, and family gymnasium" (family, here applies to his slaves and freedmen), "which is sheltered from all the winds, except those which bring on clouds, but the clear sky comes out again before the warmth has gone out of the place. Adjoining this angle is a room forming the segment of a circle (inapsida curvatum), the windows of which are so arranged as to get the sun all through the day. In the walls are contrived sorts of cases, containing a collection of authors who can never be read too often. Next to this is a bedroom" ("membrum dormitorium": I incline to the opinion that this is a wing of bedrooms) "connected with it by a raised passage furnished with flue-pipes (this should be a hanging passage, "suspensns et tabulatus"), which supply at a wholesome temperature, and distribute to all parts of this room the heat they receive.

The rest of this side of the house is appropriated to the use of my slaves and freedmen; but most of the rooms are respectable enough to put my guests into.

In the opposite wing is a most elegant, tastefully fitted-up bedroom, next to which lies another, which you may call a large bedroom, or modified dining-room" (I believe he means a moderate-sized eating-room). "It is very warm and light, not only from the direct rays of the sun, but by their reflection from the sea. Beyond this is a bedroom, with an ante-room (procceton), the height of which renders it cool in summer, its thick walls warm in winter, for it is sheltered every way from the wind. To this apartment another ante-room (procceton) is joined by one common wall.

Thence you enter into the wide and spacious cooling-room (cella frigidaria) belonging to the bath (balneum), from the opposite walls of which two curved basins (baptisteria) are thrown out, so to speak; which are more than large enough, if you consider that the sea is close at hand." (This seems rather far-fetched, and I believe he means, if you like to swim in what is close at hand.) "Adjacent to this is the anointing-room (unctarium), the sweating-room (hypocauston), and beyond that the bath heating-room (propriogion). Adjoining are two other little bath-rooms, elegantly, rather than sumptuously, fitted up. Annexed to them is a warm bath (calida piscina) of wonderful construction, in which one can swim, and take a view of the sea at the same time. Not far from this stands the tennis-court (spheristerium), which lies open to the warmth of the afternoon sun.

Thence you go up a sort of turret, which has two rooms (diæta) below with the same number above, besides a dining-room (œcunatio), commanding a very extensive look-out on to the sea, the coast, and the beautiful villas scattered along the shore-line." (It seems to me that what Pliny says is that on this a tower or belvedere is built, for the space contains two rooms and a dining-room, so you could scarcely call it a turret.) "At the other end is a second turret, containing a room (cubiculum) that gets the rising and setting sun. Behind this is a large



Map of the Country between Rome and Laurentum, showing the Site of Pliny's Laurentine Villa.

store-room and granary" (Apotheca et Horreum; it is supposed that this latter was not a granary, but a room for curiosities). "and, underneath, a spacious dining-room, where only the murmur and break of the sea can be heard even in a storm. It looks out upon the garden, and the gestatio running round the garden. The gestatio is bordered round with box, and, where that is decayed, with rosemary; for the box, wherever sheltered by the buildings, grows plentifully, but, when it lies open and exposed to the weather and spray from the sea, though at some distance from this latter, it quite withers up. Next the gestatio, and running along inside it, is a shady vine plantation" (I presume what the Italians call a pergola), "the path of which is so soft and easy to the tread that you may walk barefoot upon it. The garden is chiefly planted with fig and mulberry trees, to which the soil is as favourable as it is averse from all others.

Here is a dining-room (œcunatio) which, though it stands away from the sea, enjoys the garden view, which is just as pleasant: two apartments (diæta) run round the back part of it, the windows of which look out upon the entrance of the villa (Vestibulum villæ), and into a fine kitchen-garden. From here extends an enclosed portico (cryptoporticus), which from its great length you might take for a public one. It has a range of windows on either side, but more on the side facing the sea, and fewer on the garden side, and these, single windows and alternate with the opposite rows. In calm, clear weather, these are all thrown open; but if it blows, those on the weather side are closed, whilst those away from the wind can remain open without any inconvenience. Before this enclosed portico lies a terrace (Xystus) fragrant with the scent of violets, and warmed by the reflexion of the sun from the portico, which, while it retains the rays, keeps away the North-East wind; and it is as warm on this side as it is cool on the side opposite; in the same way it is a protection against the wind from the south-west, and thus, in short, by means of its several sides, breaks the force of the winds from whatever quarter they may blow. These are some of its winter advantages. They are still more appreciable in the summer time; for at that season it throws

a shade upon the terrace (Xystus) during the whole of the forenoon, and upon the adjoining portion of the gestatio and garden in the afternoon, casting a greater or less shade on this side, or on that, as the day increases or decreases. But the portico itself is coolest just at the time when the sun is at its hottest, that is, when the rays fall directly upon the roof. Also, by opening the windows, you let in the western breezes in a free current, which prevents the place getting oppressive with the close and stagnant air. At the upper end of the terrace and portico stands a detached garden building, which I call my favourite; my favourite, indeed, as I put it up myself. It contains a very warm winter room (Heliocaminus), one side of which looks down on to the terrace (Xystus), while the other has a view of the sea, and both lie exposed to the sun. The bedroom opens on to the covered portico by means of folding doors, while its window looks out upon the sea." (This last sentence seems to me to be altogether incorrect, though correctly given by Melmoth as follows:—"Through the folding-doors you see the opposite chamber, and from the window is a prospect of the enclosed portico.")

"On that side next the sea, and facing the middle wall, is formed a very elegant little recess, which by means of transparent windows (specularibus) and curtains (Velis) drawn to or aside, can be made part of the adjoining room, or separated from it. It contains a couch and two chairs; as you lie upon this couch, from where your feet are you get a peep of the sea; looking behind you, you see the neighbouring villas, and from the head you may have a view of the woods; these three views may be seen either separately, from so many different windows, or blended together in one.

Adjoining this is a bedroom (Cubiculum noctis et somni) which neither the servants' voices, the murmuring of the sea, the glare of lightning, nor daylight itself can penetrate, unless you open the windows. This profound tranquillity and seclusion are occasioned by a passage (Andiön) separating the wall from that of the garden, and thus, by means of this intervening space, every noise is drowned." (This word "Andiön" was used by the Greek writers for the public dining-rooms for men.

It is mentioned by Vitruvius, lib. 6, cap. 7, p. 5, in his description of Greek buildings:—"But between the two peristyles there are passages, which are called Mesaulæ, because they are placed in the middle between two halls; but our people call them Andions. But this is very remarkable, for it neither suits Greek nor Latin. The Greeks call these halls *Ἀνδριῶνας* where the men's banquets are, because women do not go there." The word is still in use in Italy. Andron is defined as "a covered place, long and narrow, which goes from the street-door to the staircase or to the court in houses which have no Atrium or Vestibule." *Vide* Vocabolario Domestico, by Carona. 1859.

"Annexed to this is a tiny stove-room, which by opening or shutting a little aperture lets out or retains the heat from underneath, according as you require. Beyond this lies a bedroom (Cubiculum), and ante-room (Procoena), which enjoy the sun, though obliquely, indeed, from the time it rises till the afternoon." (I have taken no notice of any part of the translation I did not agree with, except such parts as relate to the buildings.)

Although this letter seems to me to be a very agreeable one, I fear it has appeared rather long to you; but as it is the programme on which V. Scamozzi, J. P. Felibien des Avaux, R. Castell, P. Marquet, Macquet, Haudebourt, and Bouchet have constructed their restorations, I did not see how I could help giving it you.

Pliny describes himself as not rich, but when one considers that he had a town house, this suburban retreat, and his country house at Città de Castello, in Tuscany, and tells us that he had several villas on Lake Larius (the Lake of Como), two of which he liked best, and villas at Frascati, Tivoli, and Paestrina, that he built a temple, endowed a college, presented money to his friends, and bought a small piece of property for 24,000*l.*, we must suppose him to have been comfortably off.

You have probably observed that he does not say a word about those parts of the house that were used by his wife, nor does he give the slightest indication of the outward appearance of his villa, nor deign to mention the architect of this or any other of his villas; and from what he says of the other Fine Arts, we may judge of the still lower estimation in which he held our profession—*e.g.*: "However, as you would direct a painter or sculptor who was representing the figure of your son what parts he should re-touch or express, so I hope you will guide and inform my hand in this more durable, or (as you are pleased to think it) this immortal likeness which I am endeavouring to execute." He thought polite letter-writing was not only the highest art, but so much beyond comparison with all others, that he scarcely deigns to mention the architect. When Pliny was about to rebuild the Temple of Ceres, he wrote the following letter to Mestius, who is supposed to have been an architect, and Haudebourt supposes he was the architect who built the Laurentine Villa:—

"In compliance with the advice of the Atruspices, I intend to enlarge and beautify the Temple of Ceres, which stands upon my estate. It is indeed a very ancient fabric, and though extremely small, yet upon a certain stated anniversary is much frequented. On Sept. 13, great numbers of people from all the country round assemble there, at which time many affairs are transacted, and many vows paid and offered; but there is no shelter at hand for them either from sun or rain. I think, therefore, I shall perform an act both of piety and munificence if, at the same time that I build a beautiful temple, I add to it a spacious portico; the first for the service of the goddess, the other for the use of the people. I beg, therefore, you would purchase for me four marble pillars, of whatever kind you shall think proper; as well as a quantity of marble for laying the floor and encrusting the walls. You must also either buy a statue of the goddess or get one made; for age has maimed, in some parts, the ancient one of wood which stands there at present. With respect to the portico, I do not recollect there being anything you can send me that will be serviceable, unless you will sketch me out a plan suitable to the situation of the place. It is not practicable to build it round the temple, because it is encompassed on one side by the river, whose banks are exceedingly steep, and on the other by the high road. Beyond this road lies a very large meadow, in which the portico may be conveniently enough placed,

* See plans of six of these restorations in this week's *Builder*.—Ed

opposite to the temple; unless you, who know so well how to conquer the inconveniences of nature by art, can hit upon some better plan.—Farewell."—(Pliny's Letters, lib. 9, lit. 39.)

Scamozzi's is, I believe, the first attempt at a restoration. It is published in his book called "An Idea of Universal Architecture," in 1615, and by Felibien, but it is not much more like the villa Pliny describes than Newton's.* In his drawing, the shape of the portico was given as an O, and he makes it circular [see lithograph in this number of *Builder*], and he seems to believe that the Atrium and Cavadium were both open; he puts the Cyziene Hall into the sea, and supposes the second bedroom to the left to be the gymnasium; he puts the two towers over his garden entrances on either side, and the bath-rooms are not distinguished from the other rooms, and his cloisters (Cryptoporticus) he puts on both sides of the Atrium and circular portico, without any regard to Pliny's description of the position of his single cloister, and omits the garden pavilion altogether. Scamozzi's plan is a very fine one, with the internal circular portico, but can hardly be looked on as a serious attempt to reconstruct the villa from Pliny's description.

Jean François Felibien des Avaux, who was secretary to the Academy of Architecture, published his book at Paris in 1699, though the one most commonly known in England was published in London in 1707. He, being an antiquary, has made a much more careful attempt to construct the plan in accordance with Pliny's words than Scamozzi, though the plan is by no means so good, merely looked on as a plan; this, however, was to be expected, for we naturally look for a good plan from an architect of Scamozzi's reputation.

To return to Felibien's plan [see lithograph] his Atrium is a very shallow portico preceding the large circular one, his Cavadium is a large open court, and his Cyziene dining-room keeps quite clear of the sea, and so leaves a terrace for the athletic exercises, but if the sea washed the foot of the dining-room, I fear it would wash the terrace too. In the angle room at the extreme left he altogether ignores the Apse. To the right of the dining-room we get a room, and ante-room, not mentioned in Pliny's description, nor does the Piscina correspond with the description, as it is doubtful if you could get a glimpse of the sea from it while swimming; there is no nectarium, and the tennis-court has only two small windows to the west, the main light being from the north. There are no staircases shown to the two towers, and it is by no means certain that the dining-room, with its two chambers, was detached; instead of two, he makes seven chambers, beside the dining-room. The *Dinctor* is sometimes used like the French word *apartment*, meaning a suite of rooms.

The Garden Pavilion certainly does not answer to the description as regards the dining-room, for the Cryptoporticus could not be seen from its window; The night bedroom opens on to the area of a peristyle which does not seem to answer to the common acceptance of Andron, and the store-room and granary are omitted. It is possible that he supposed these to be over the dining-room as Haudebourt does, but it seems rather a curious position for them, though Pliny himself uses the word horreum for a museum, repository, or lumber-room for curiosities (see letter 13, book 8, Pliny's Epistles).

As Pliny does not give a single dimension (what would we not give for him to have stepped the width and depth of his villa and those of some of the main parts), he does not name the offices nor give the number of his servants' rooms, is vague about the connexion of the various parts of the villa, and does not tell us which way they turn, it is not easy to solve the problem, nor is it wonderful that everyone who has attempted the solution has constructed it differently.

R. Castell, in his book on the villas of the ancients (fol. London, 1728), gives his translation of Pliny's letter to Gallus describing his Laurentine villa, and is quite original in his restoration; though we must not forget that before the excavations at Pompeii, architects knew even less than they do at present about Roman houses. The Atrium is shown as a great

* This learned translator of Vitruvius gives an illustration of the villa pseudo-urbanæ, founded on Pliny's description.

† We do not quite understand this criticism of Professor Aitchison's; as in the translation of Pliny's letter, as given above, it is not said that the windows of this chamber looked upon the Cryptoporticus.—Ed.

open forecourt the whole width of the villa [see lithograph], and about two-thirds of its width in depth.

The portico, in the shape of an O, is a large oval. The Cavadium is also open, with two porticoes projecting into it, on the right and left; the one on the right being the width of the cold room; the Cyziene dining-room has a portico in front that forms a vestibule to it, and the room itself scarcely extends to the edge of the shore. He makes the rooms to the right and left of the dining-room of the same size, and gets a vestibule, the small room, and the library into the left apsidal wing. His supper-room to the right corresponds with the other wing, the end being also apsidal; he then gets the bedroom and ante-room on the left. The cold room of the bath on the right flank is very large, with two semicircular baths, a large anointing-room, and the two bath-rooms; but his hypocaust is the furnace for heating the water, and not the sweating-room. Beyond these, again, is the tennis-court, and attached to the angle of that are enormous dining-rooms. He puts his swimming-bath on the first floor, as well as the two apartments, and the other rooms he puts on the second floor. The covered portico he makes wide enough to require two columns in its width, and consequently to form three aisles; he attaches it to the side of his Atrium, with the garden face to the west; the supper-room and two suites of rooms next the Atrium; and the small garden pavilion at the other end.

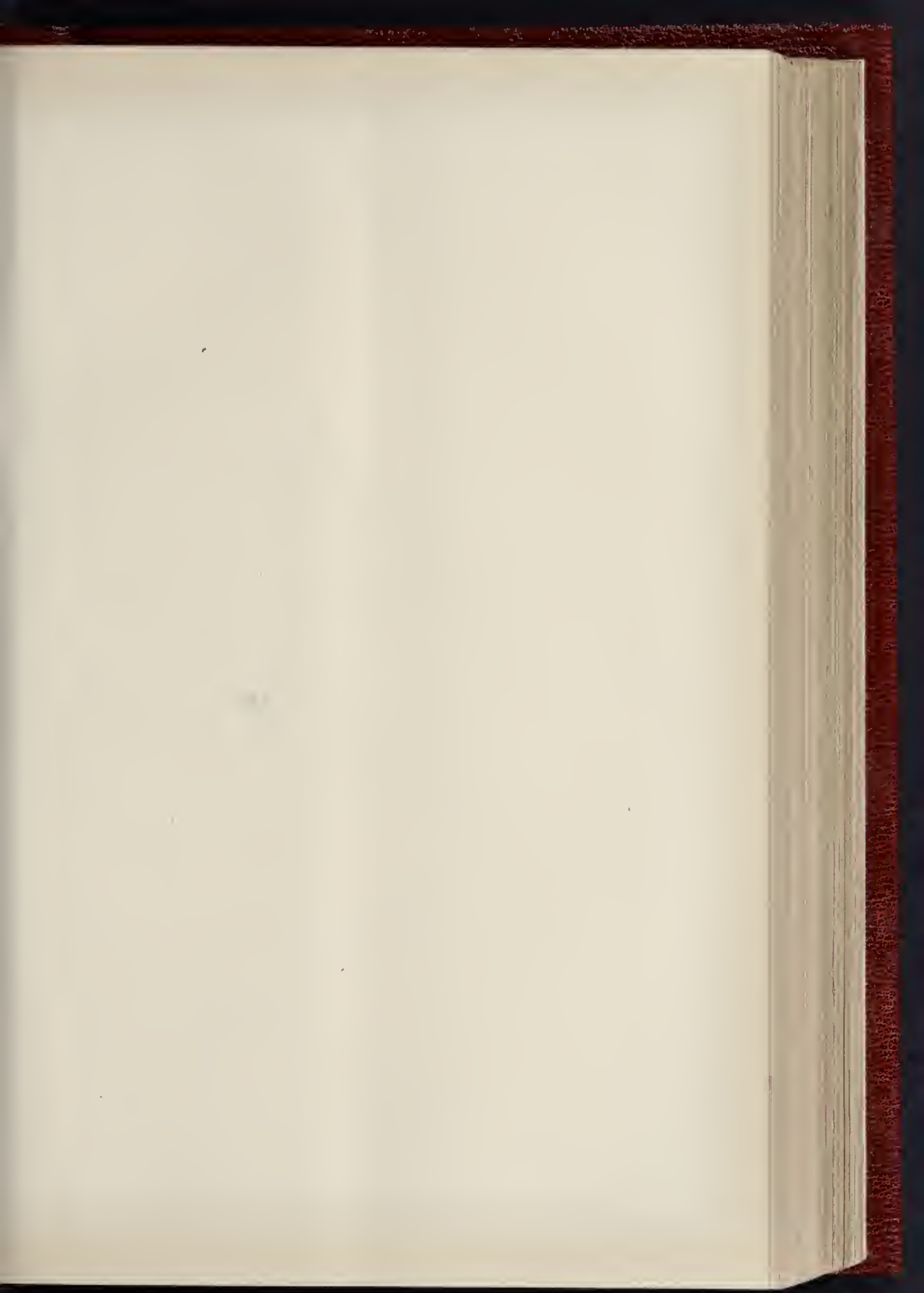
The recess in this pavilion that held the couch and two chairs he makes come out of the warm-room, as Haudebourt has done after him. No hypocaust is shown, and the bedroom windows look out on one side into a dark passage (Andron) and on the other into the covered portico.

P. Marquet, who was, I believe, a Mexican priest, published at Rome his restoration in 1796. He shows the villa of much greater pretensions than the description of the owner would lead us to believe, as he shows two open courts [see lithograph], with the surrounding chambers to the right and left of the buildings on either side of the Cavadium, about which there is not a word in Pliny's letter. He gives a vestibule, a small Atrium, and puts his circular portico into the open space which he calls the Cavadium; the Cyziene dining-room is far from the sea; he gives no tennis-court, and supposes they played on the terrace; he shows two towers, with the barn and store-house between them; the Cryptoporticus has a bend in it; his garden pavilion is in pieces, the Heliocaminus being detached.

Haudebourt is the next who has made a restoration; he was a French architect, known throughout Christendom by his work on P. Peruzzi's Palazzo Massimi at Rome, and who had also the advantage of having seen the published drawings of Pompeii, and the ruins themselves; in most respects his restoration agrees best with the description.

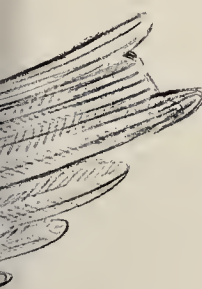
He shows a vast portico in front, not mentioned by Pliny [see lithograph]; behind it are the two front cells of the Oestiarium and Atrienis (though he allots both to the Atrienis), with the passage between them, leading into a tetrastyle Atrium with Alm, but no tablinum; the portico is D shaped, and the peristyle of it has square piers; he does not leave the Cavadium as an open space, but surrounds it with porticoes, eight columns lengthwise to each side, and six to the shorter ends. It is hardly likely that an open court should be left as the only means of getting to the banquetting-hall in a villa that was mainly used as a winter residence, as all the other restorers have done; but one of these porticoes, *i.e.*, that on the left, would prevent the setting sun from entering the back window of the smaller room to the left of the main banquetting-hall. The apsidal room is made circular inside, but square outside, with recesses for the book cases. In the bath, the warm swimming-bath (Calida piscina) is very small, and the sweating-room (Hypocaust) circular. The tennis-court (Spheristerium) is open to the north-west; the inclosed portico (Cryptoporticus), after running parallel with the sea, turns towards it at a right angle, and runs nearly to it. At the end is the garden pavilion, projecting a little into the sea, but he makes the Heliocaminus the room with the recess, which does not seem to me to be what Pliny describes.

I cannot pass to the next restorer, Bouchet, without paying an affectionate tribute to the memory of this delightful enthusiast, who trudged



THE BUILDER, FEBRUARY 8, 1890.





Bronze Statue of Victory
Museo. Brescia
1887

DRAWN BY MR. GERALD C. HORSLEY, A.R.I.B.A.

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



from Rome to Ostia, along the road Pliny once travelled, slept on rushes in the prison there, and walked over the ruins, then covered with earth and verdure, visited the Holy Island made by the fork of River Tiber, between Ostia and Fimicino, which once contained a Temple of Apollo,—and where games in his honour were celebrated,—and trudged back to Rome, by the Laurentine-road, close to the villas of Scipio and Lælius, and dreamt that he had an introduction to Pliny, who showed him over part of his villa, and then turned him over to his architect, Mustius, to show him the rest. The relish with which he discourses every part of the Roman house and the learning he displays is both delightful and admirable. I found I had been forestalled by him in the scraps of knowledge I fancied I was bringing fresh to the subject from Plautus and Terence (Plant. Mil. Glor. Act 2, S. 3, line 16; and Act 2, S. 2, line 4, Amp. 5, 1, 59, Epid. 2, 2, 43, Terence Eun. 3, 5, 41), for Vitruvius calls the opening in the roof of the Atrium "Compluvium," while Plautus and Terence call it "Impluvium."

Jules Bouchet, a French architect, published his restoration at Paris in 1852, and though he owes much to Haudebourt, he has taken great pains, and shows great ingenuity in trying to make his plan agree with the description.

He puts a decastyle portico in the front [see lithograph], with four columns on each flank, about which Pliny is silent; he has two porters' rooms with the passage between, and a tetrastyle Atrium with Aile; he adds a tablinum, not mentioned by Pliny, with one passage, and rooms on either side the tablinum. His portico takes the D shape of the late editions of Pliny; his Cavadium is a vast open court from which the Cyclic dining-room opens directly.

To get the sea washing its foot he has made it very long, and broken the terrace so that to the left is a wide terrace for the athletic exercises. To the left of the dining-room are the two chambers, and the third one with an apsidal end, and he has shown the space between that and the warmed bedroom, which Pliny describes. To the right are the other two chambers, though Pliny says nothing about the further one being apsidal. He makes an ample ante-room to lead to the Baths, and another large room adjoining it. The cold room has two ample cold baths, but the anointing-room, the sweating-room, and the furnace-room can only be got at from the two chambers. The hall containing the piscina takes the whole depth of the building, with porticoes at each end, and the tennis-court is separated from the baths by a long passage, with stairs to the towers at each end. Under the south tower are the two rooms and the dining-room. By breaking back the coast-line, he gets a view of the sea from the window on the west side of the dining-room, but he leaves out the museum and the store-room, though possibly he makes them on the first floor. He translates the obscure passage about the north tower as having the bedroom above, and the little pavilion fulfils all the requirements, except that the sleeping-room has only one window, and Pliny says "windows." Bouchet gives all the plans but one of the former restorers, as well as one by Macquet not published, but he omits Castell's.

I give you the extracts from Pliny's letter to Domitius Apollinaris (Lih. 5, Let. 6), describing his Tuscan villa, partly because Felibien, Castell, and Marquez have tried to restore it, and partly because you may as well have as much additional light as it can throw on the Laurentine. In this description, however, there is such an absence of method and such vagueness that any attempt to restore it is merely an exercise of the imagination.

[We omit here the letter describing the Tuscan villa of Pliny, as we shall be able to give next week Castell's restoration of it, and the description will be of more interest when taken in connexion with the plan.]

In spite of the charges of luxury and vanity that have been made against Pliny, which perhaps are not altogether without foundation, he seems to have been a courageous and hard-working man, and one determined to do right in spite of consequences, for he was proscribed by Domitian, and only escaped through the tyrant's death. He was certainly a liberal man, with kindly feelings, and humane enough not to have his farm filled by chained slaves; of refined tastes, and enjoying the friendship of all the principal authors of his time.

Pliny is a sufficiently interesting man to

make it perhaps worth one's while to investigate the charges against him. The charge of luxury seems to be founded mainly on the number of his villas. There were eight at least, but most of these were farms from which came the greater part of his income, for he tells us so, and that he only had a portion of his money at usury. No one would now call a man a sycophant if he had forty farms. A town and country house and a suburban villa is not more than many a successful barrister of the present day indulges in. Pliny, unfortunately, does not give us the bill of fare of his banquet, but three snails are all the meat, or, as the Italian would say, fish, he provides for the dinner he has with a friend; he sees the rope-dancing, pantomimes, and the can-can at his neighbour's houses, but does not have them at home. Very few rich men now are Anachorites.

He was evidently a case-winner as a harrister; he was Governor of Bitynia, and a friend of Trajan. Success, high employment, and the friendship of the great do not usually conduce to great modesty, and though vanity lies mainly in the temperament, would not most of us be vain if we spent so much time on our works that we could even hope they might last and be popular for 1800 years? Perhaps we cannot place much reliance on Martial's panegyric, as Pliny paid his travelling expenses to Spain. I now give you his account of how he spent his time in the country—

"You want to know how I portion out my day in my summer villa at Tuscum? I get up just when I please; generally about sunrise, often earlier, but seldom later than this. I keep the shutters closed, as darkness and silence wonderfully promote meditation. Thus free and abstracted from those outward objects which dissipate attention, I am left to my own thoughts; nor suffer my mind to wander with my eyes, but keep my eyes in subjection to my mind, which, when they are not distracted by a multiplicity of external objects, see nothing but what the imagination represents to them. If I have any work in hand, this is the time I choose for thinking it out, word for word, even to the minutest accuracy of expression. In this way I compose more or less, according as the subject is more or less difficult, and I find myself able to retain it. I then call my secretary, and opening the shutters, dictate to him what I have put into shape, after which I dismiss him; then call him in again, and again I do not observe one fixed hour, according to the weather, I either walk upon my terrace, or in the covered portico, and there I continue to meditate or dictate what remains upon the subject in which I am engaged. This completed, I get into my chariot, where I employ myself as before, when I was walking, or in my study; and find this change of scene refreshes, and keeps up my attention. On my return home, I take a little nap, then a walk, and after that, repeat out loud and distinctly some Greek or Latin speech, not so much for the sake of strengthening my voice, as my digestion; though indeed the voice at the same time is strengthened by this practice.

I then take another walk, am anointed, do my exercises, and go into the bath. At supper, if I have only my wife or a few friends with me, some author is read to us; and after supper we are entertained either with music or an interlude. When that is finished I take my walk with my family, amongst whom I am not without some scholars. Thus we pass our evenings in varied conversation; and the day, even when at the longest, steals imperceptibly away. Upon some occasions I change the order in certain of the articles above mentioned. For instance, if I have studied longer, or walked more than usual, after my second sleep, and reading a speech or two aloud, instead of using my chariot, I get on horseback, by which means I ensure as much exercise and lose less time. The visits of my friends from the neighbouring villages claim some part of the day; and sometimes, by an agreeable interruption, they come in very seasonably to relieve me when I am feeling tired. I now and then amuse myself with hunting, but always take my tablets into the field, that if I should meet with no game I may at least bring home something. Part of my time, too (though not so much as they desire), is allotted to my tenants, whose rustic complaints, along with these city occupations, make my literary studies still more delightful to me. Farewell!"

* Book IX. Letter 56. To PUSCUM.

ARCHITECTURAL SOCIETIES.

The Architectural Association.—The ordinary fortnightly meeting of this Association was held on Friday, Jan. 31, the President, Mr. Leonard Stokes, in the chair.—Mr. E. S. Gale, hon. secretary, announced that the first sessional visit would be made this day, Saturday, Feb. 8, to Mr. D'Oyly Carte's new theatre in Cambridge-circus, Shaftesbury-avenue. Arrangements had also been made for the second sessional visit, which would be to the Imperial Institute, South Kensington, on Saturday, the 22nd inst., when Mr. Colcott, the architect of that building, had promised to meet the party.—Mr. F. R. Farrow, senior hon. secretary, announced that the "Common Room" discussion which should have taken place on the 28th ult. had been postponed to Tuesday, Feb. 11, when the subject to be discussed will be "A Revised Scheme of Architectural Training." The discussion will be opened by Mr. A. W. Earle.—Mr. Farrow also read a letter from the Rev. T. H. Le Bouf, rector of Croylaud, appealing for subscriptions for the restoration of Croylaud Abbey. About 3,000*l.* is the sum needed.—The Chairman said he regretted to announce that Mr. Mountford, who was to have read a paper on "Free Libraries," was confined to his bed by an attack of influenza; but he had entrusted his paper to Mr. H. D. Appleton, who then proceeded to read it. We regret, however, that in consequence of the space occupied by Professor Atchison's lecture, we must hold over our detailed report of the meeting and discussion until next week.

Liverpool Architectural Society.—The fifth ordinary meeting of this society was held on Monday evening, in the Royal Institution, Colquhoun-street. Mr. T. Mellard Heade occupied the chair, and there was a pretty numerous attendance. The principal business before the meeting was a paper entitled "Mouldings," read by Mr. T. H. Haigh. The lecturer spoke of mouldings as being of the very first importance in all architectural detail, so much so that unless a student or professor had a sound and thorough knowledge of its alphabet, it was impossible for him to produce any work of any really true or artistic merit. Great ignorance of the subject prevailed among architects of fifty years ago, and though much progress had been made in recent years in this department, the knowledge of modern architects on the subject was not so complete as could be desired, many important buildings being woefully deficient in detail. A knowledge of mouldings was also most essential to the architect in enabling him to determine the dates of old buildings, their mouldings being often the only guide. In main lines and features the ancient builder sometimes copied work of a much earlier period than his own, but their mouldings were almost invariably to be depended upon as those of their own epoch.

Manchester Architectural Association.—At a meeting of this Association, held at the Diocesan Buildings on Tuesday last, Mr. J. H. Woodhouse, President, in the chair, Mr. J. A. Gotch, F.R.I.B.A., of Kettering, read a paper on "The Homes of Queen Elizabeth's Courtiers." After giving a general sketch of the domestic arrangements of the homes of the nobles prior to this period, he pointed out that it was about this epoch that house-planning took a new departure. Whereas formerly safety from invasion was the chief object to be attained, even at the sacrifice of convenience, internal comfort began to be studied. Light was admitted by large window openings in place of narrow slits. In speaking of Hardwick Hall, with its large and numerous windows, Lord Bacon remarked "there was too much light, it was impossible to get out of the sun, always streaming through the windows." The paper was illustrated by views shown by an oxy-hydrogen lantern. A vote of thanks was proposed by Mr. Booth, seconded by Mr. Davies-Colley, and supported by Messrs. Mould, Mee, Hodgson, and Chadwick.

SURVEYORSHIPS.

Aberdare.—Mr. T. Lloyd Edwards has resigned his position as Surveyor to the Aberdare Local Board.

Wimbledon.—Mr. W. Santo Crimp, Engineer and Surveyor to the Wimbledon Local Board, has been elected Assistant Engineer to the London County Council.

Illustrations.

BRONZE STATUE OF VICTORY, ROMAN MUSEUM, BRESCIA.

THE statue is a little over life-size, and a beautiful bronze casting. It has the distinction of being, we believe, the most complete large statue of "Victory" yet found, as only the shield, and the helmet under the foot, are restorations. The drawing was made in pen-and-ink on the spot, and was exhibited at the Royal Academy, 1888.

RESTORED PLANS OF PLINY'S LAURENTINE VILLA.

THREE-FOURTHS of our illustration plates are occupied this week by reproductions of the various plans for the restoration of Pliny's villa collected by Professor Aitchison as illustrations to the second of his present series of Royal Academy lectures. They are referred to and described in the lecture, printed in full in another column.

As embodying the ideas of eminent architects of various periods since the Renaissance in regard to the plan of a typical Roman villa, we hope their juxtaposition in one issue, and its connexion with Professor Aitchison's interesting and learned lectures, may be of permanent value to students of Roman architecture.

We are indebted to Professor Aitchison's courtesy in placing the plans, as prepared by him, at our disposal.

HOGARTH'S HOUSE, CHISWICK.

THIS house, which stands about half-way up Hogarth-lane, on the west side, is a good specimen of the brick house of the eighteenth century. The walls generally are of red stock bricks with rubbed brick dressings. The chief features are a bold wooden bay-window on the north side (which is the principal front) supported not on an iron column, and a moulded wooden eaves course. The gutter has disappeared, and the roof is in a ruinous condition. There are two good gate-posts, but the old gates which were probably here have been replaced by a wooden door.

The entrance-door is just to the right of the bay-window, on the ground floor, and near this is a window retaining some lead glazing. The house stands at a sharp angle with the road, the east wall abutting on it.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE sixth ordinary meeting of this Institute for the present session took place on Monday evening last, Mr. Arthur Cates, Vice-President, in the chair.

Obituary.

Mr. W. H. White (Secretary) said:—I have to announce with deep regret the decease of Mr. Edward William Stephens, Fellow, of Maidstone, and also of M. Jules Louis André, Hon. Corresponding Member, of Paris. M. André died on January 30, and he was buried to-day. He was a member of the Institute of France in the Section of Architecture of the Academy of Fine Arts, also a member of the Société Centrale, and architect of the Museum of Natural History in Paris, a Professor of the School of Fine Arts, a Commander of the Legion of Honour, and was also perhaps most distinguished as the master of many hundreds of pupils.

The Royal Gold Medal, 1890.

The Secretary having read By-law No. 64, relating to the award of the Royal Gold Medal,

The Chairman said:—I have now to announce that the Council propose to submit to her Majesty the Queen the name of John Gibson, past Vice-President, as the recipient of the Royal Gold Medal for the current year, for his works as an architect.

The Renaissance in Northamptonshire.

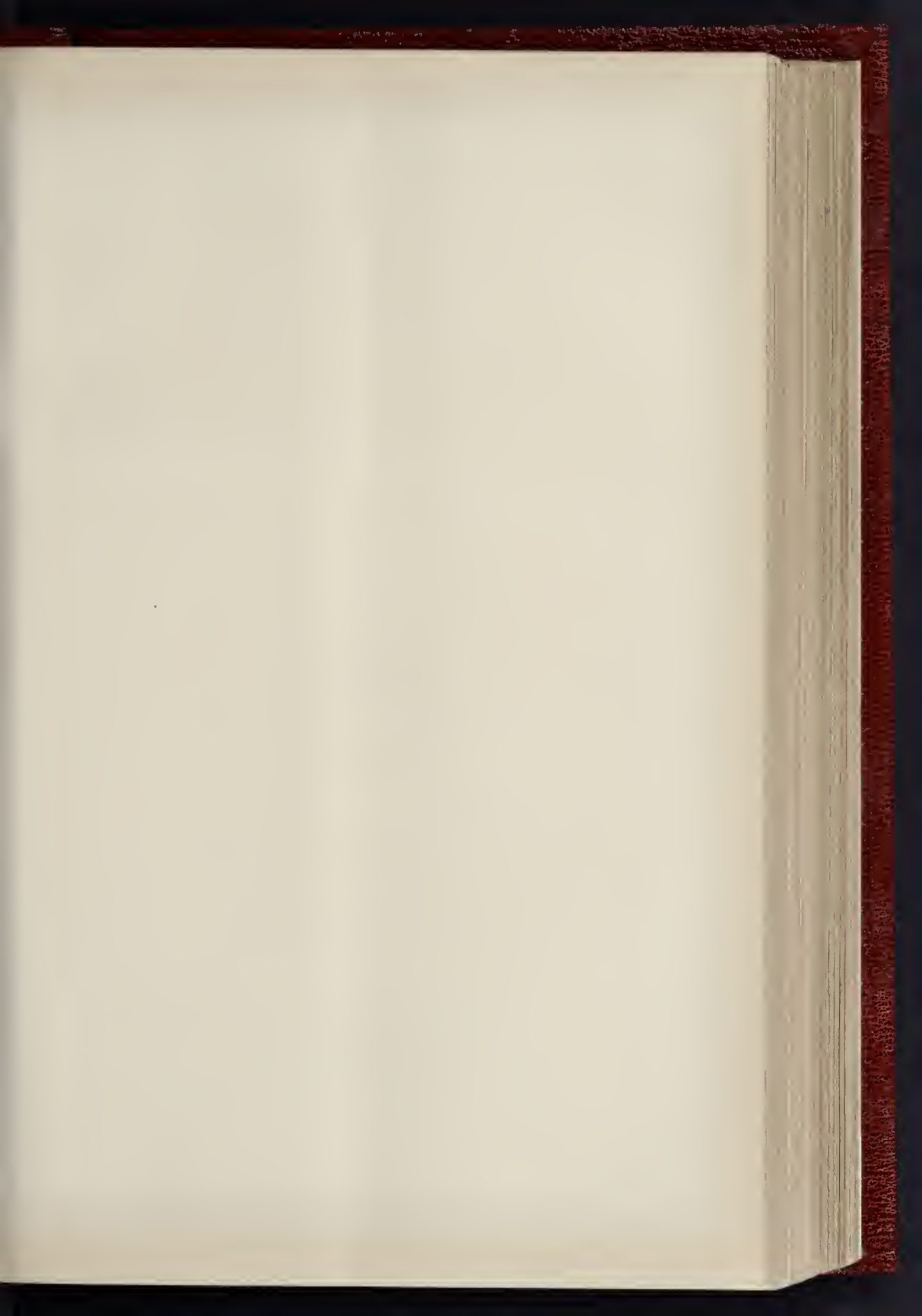
Mr. J. Alfred Gotch then read a paper, entitled "The Renaissance in Northamptonshire." The author, in his opening remarks, referred to the influence of Italy in the middle of the sixteenth century on the arts and literature of England, but considered that up to the third quarter of the century the Tudor style of architecture still reigned supreme. About 1550 to 1560 the new forms were universally adopted, and the comparative quietude of the age, and



Hogarth's House, Chiswick.

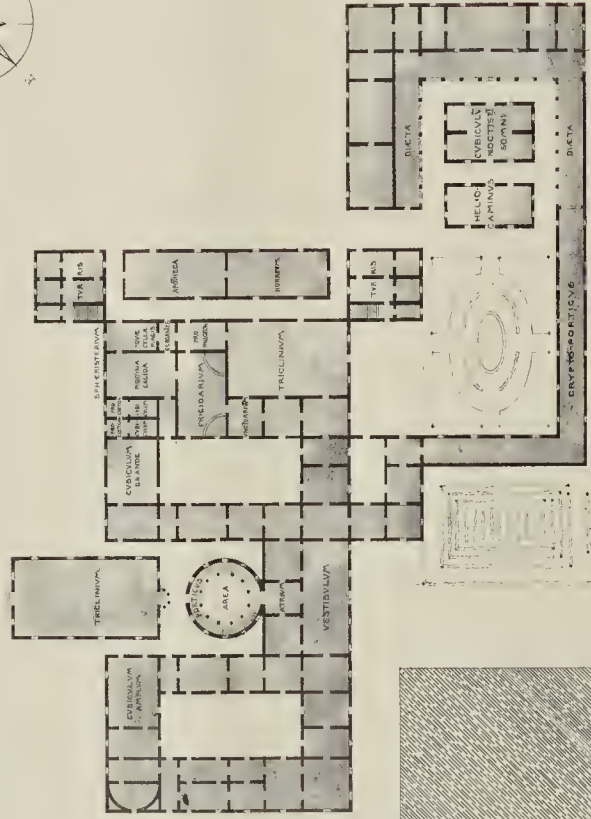
the great wealth of many ministers and courtiers of Elizabeth, enabled them to build mansions in which to establish themselves and their posterity. Lord Burghley, Sir Christopher Hatton, and Sir Thomas Tresham were the most illustrious builders in Northamptonshire. The capricious way in which the details of the period varied in excellence was most striking. Side by side, so to speak, might be found work the most delicate and refined, and work the most coarse and clumsy; but there was no gradual growth and decadence, no possibility of assigning a date to the work by slight changes in the detail or modification of the mouldings. In Northamptonshire, however, the work was of more even excellence, and, on the whole, of more intrinsic merit, than that of any other district with which the author was acquainted. Although one John Norden, in his "Delineation of Northamptonshire," in 1610, enumerated some fifty seats of noblemen and squires, there now only remained about ten for him to refer to, some having entirely disappeared and others being completely modernised. The first described by Mr. Gotch was Dingley Hall, built about 1558, which still retained some notable specimens of the early Renaissance, the work of Edward Griffin, Attorney-General to Queen Mary, who not only made use of most eccentric mouldings, but adorned his work with highly curious inscriptions, of which examples were quoted. Burghley House was next dealt with, and letters written by workpeople at Burghley to Sir William Cecil in London referred to, which, in common with others relating to Holdenby House, Hatfield House, and Cobham Hall, threw some light on methods of procedure connected with building in that era. The workpeople appeared to have applied direct to the owners for instructions; of the architect, as such, not a word was mentioned. A surveyor was here and there spoken of as going to inspect the works, but he was not always the same man. The owner apparently arranged everything and furnished the drawings, the carrying-out of which was entrusted to a foreman or clerk of works, who hired the workmen on behalf of his master. The details seemed to have been generally left to the fancy of the various artificers, who probably carried out the small scale drawings according to their own lights, though occasionally requests were met with for full details, which in some cases appeared to have been supplied by Thorpe, John Shute, Henryck, and others. Mr. Gotch then gave quotations from letters addressed to Sir William Cecil from the mason, foreman, and others at Burghley, and having alluded to Wothorpe, the Dover House at Burghley, which was built about 1600, proceeded to describe Sir Christopher Hatton's palace at Holdenby, and quoted the commendations of Lord Burghley and Sir Thomas Henshaw upon it. Turning next to Sir Christopher's purchase of Kirby Hall, Mr. Gotch thought there could be no doubt that the whole of the main building was built by the Staffords, and from Thorpe's plan it was known that he laid the first stone in 1570, and the work appeared

to have gone on until 1576, while subsequent to 1580 various extensions took place. Fifty years later, under Inigo Jones, another and the last period of active building set in, and fortunately the judicious care of the present owner was preventing Kirby, as far as possible, from falling into the same state as Holdenby. Reference was then made to John Thorpe's connexion with the building of Kirby Hall, Burghley, and Holdenby, and also to his plans of Lyveden New Building, which was built for Sir Thomas Tresham, who presented to the town of Rothwell a new market-house, which, however, was never finished, and had never had a roof. It was in some respects a typical Elizabethan building, and though its detail was coarse, yet it could not be denied that the whole composition had the merit of vigour and piquancy. Having remarked upon the chequered life of Sir Thomas Tresham, reference was made by the author to the Triangular Lodge, Rushton Hall, and the Lyveden New Building, which were all about the same date, the last two being described in considerable detail. Mr. Gotch considered Tresham's work more severe than that of his successors, the Cokaynes. His gables were straight, theirs were many of them curved, and all his architectural work was simple, elegant, and suggestive. Aphetorpe Hall, one of the most striking specimens of Renaissance in the county, was next described, and its similarity to Rushton pointed out. At Lilford, a few miles from Oundle, was a fine example of the circular bay, but there was something in the stiff arrangement of the windows that told of the tame slavery to which architecture in England was about to succumb. At Drayton House was a veritable storehouse of architecture, from walls and gateways of the Edwards, to pediments and panelling of William III. One wing was dated 1584, and the exterior still proclaimed its date; the principal interest, however, lay in the vaulted cellars, which a close inspection showed to be vaulting of the days of Elizabeth. Buckingham Castle was enlarged in similar manner to Drayton House, and was well worthy of inspection. Turning to the southern part of the county there was not much Renaissance, but Canons Ashby and Castle Ashby could not be omitted. The former was a beautiful old house, presenting work of the end of the fifteenth, the end of the sixteenth, and the beginning of the eighteenth centuries. Castle Ashby was begun about 1583, and the bay windows of that time were easily recognised, while the fine entrance screen was the work of Inigo Jones, dated 1624. The Renaissance impressed itself not only on the great houses; every kind of building was touched, from the palace of Holdenby to the little cottages of Brigstock and Geddington, and the author considered there were few districts in England where more suggestive features could be found for stone treatment. Having alluded to the almshouses at Weekley, Mr. Gotch, in conclusion, said the style was the outcome of a fascinating period. All England was quivering with vitality; when Dingley was built, Spenser was sixty years old; when Thorpe laid the first stone of Kirby, Shakspeare was the same age;

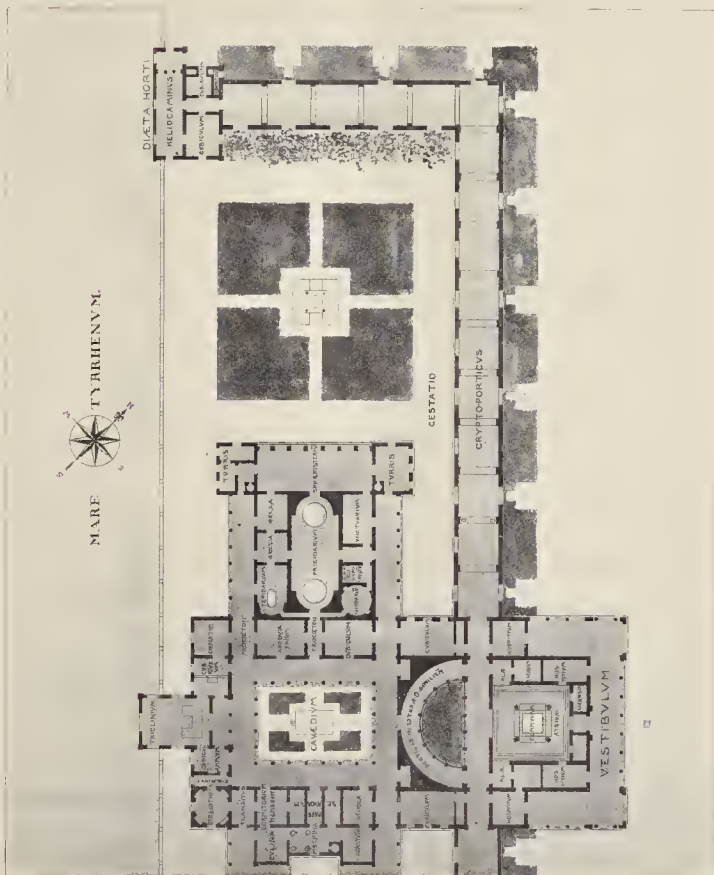


THE BUILDER, FEBRUARY 8, 1890.

PLINY'S VILLA AT LAVRENTVM.



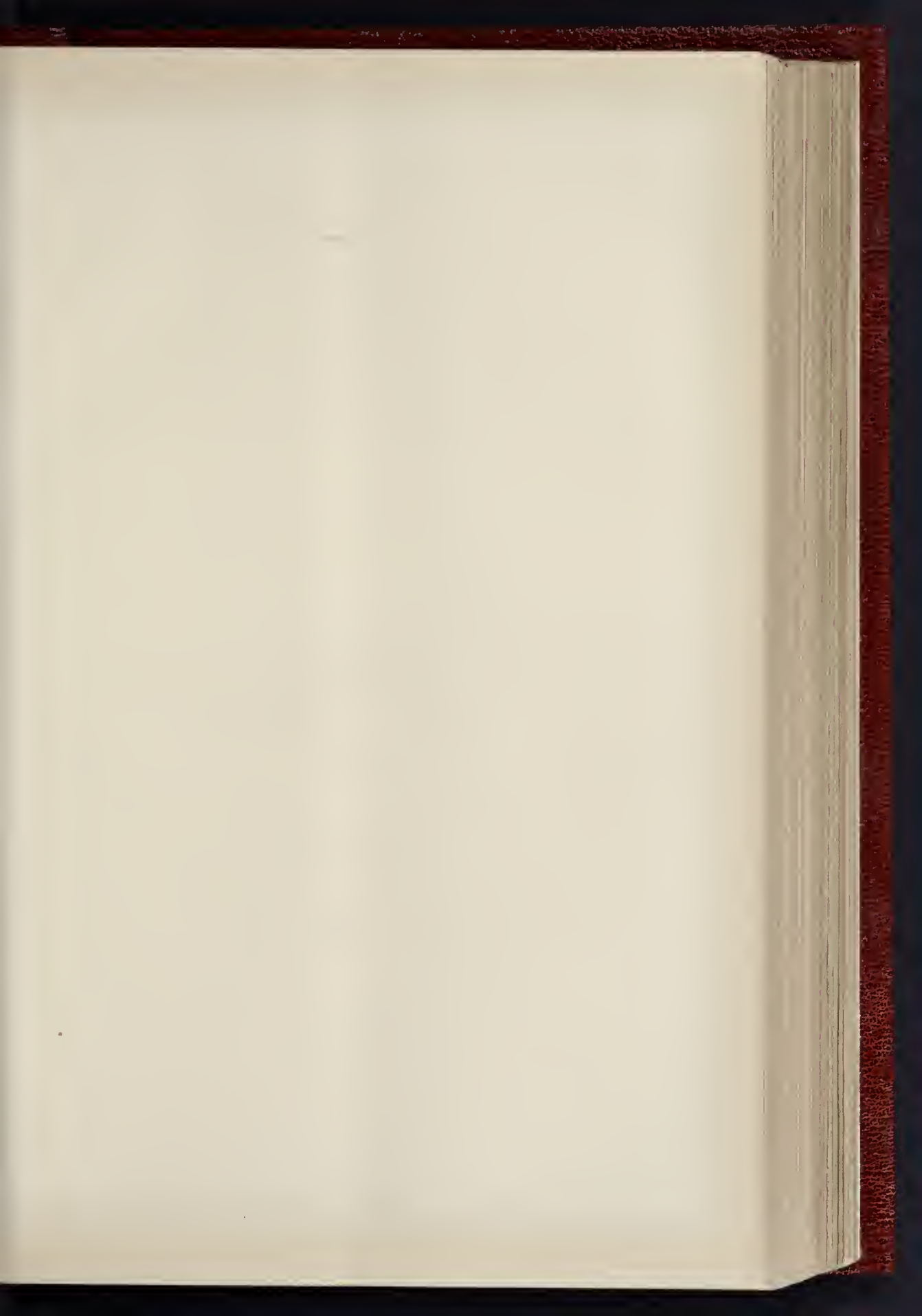
RESTORED BY MARQUEZ. 1796.



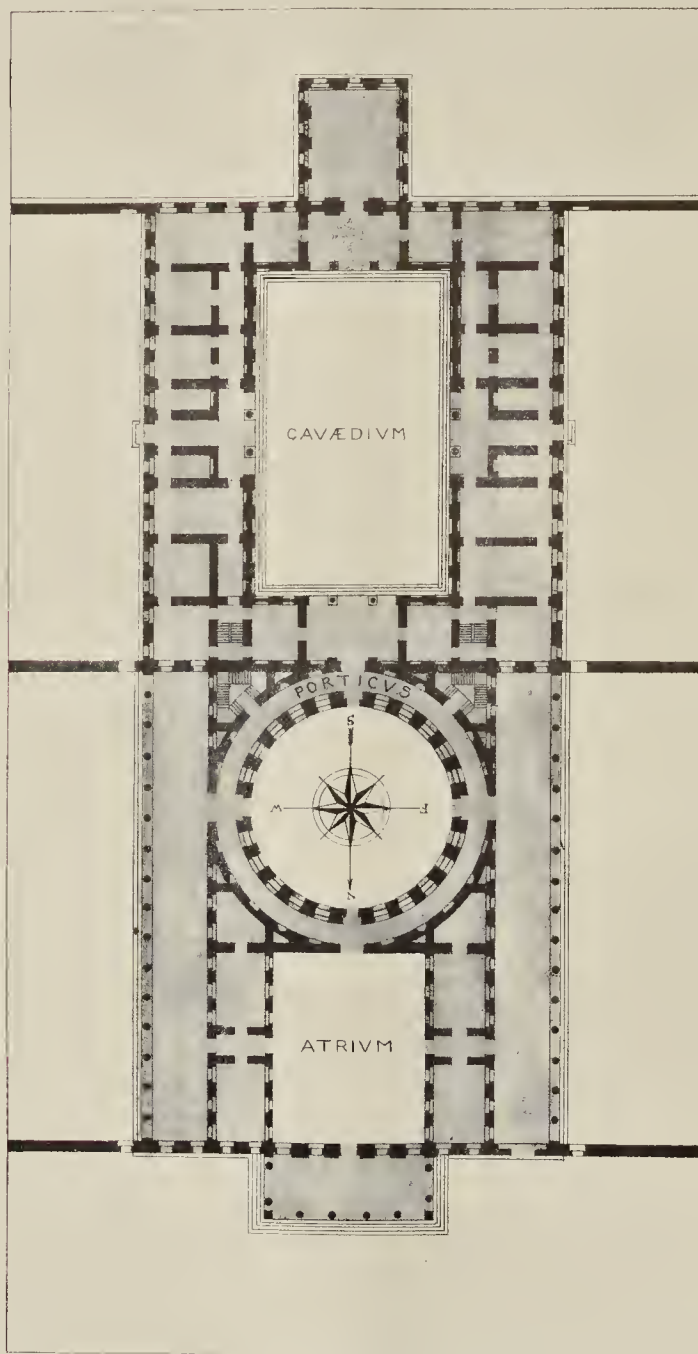
RESTORED BY HAVDEBOVRT. 1838.

THE PHOTO BRUNNIE & CO. 22, MARTINS LANE, LONDON, E.C. 4.

ILLUSTRATIONS TO SECOND ROYAL ACADEMY LECTURE ON ARCHITECTURE,
BY PROFESSOR AITCHISON, A.R.A.; JANUARY 30TH, 1890.



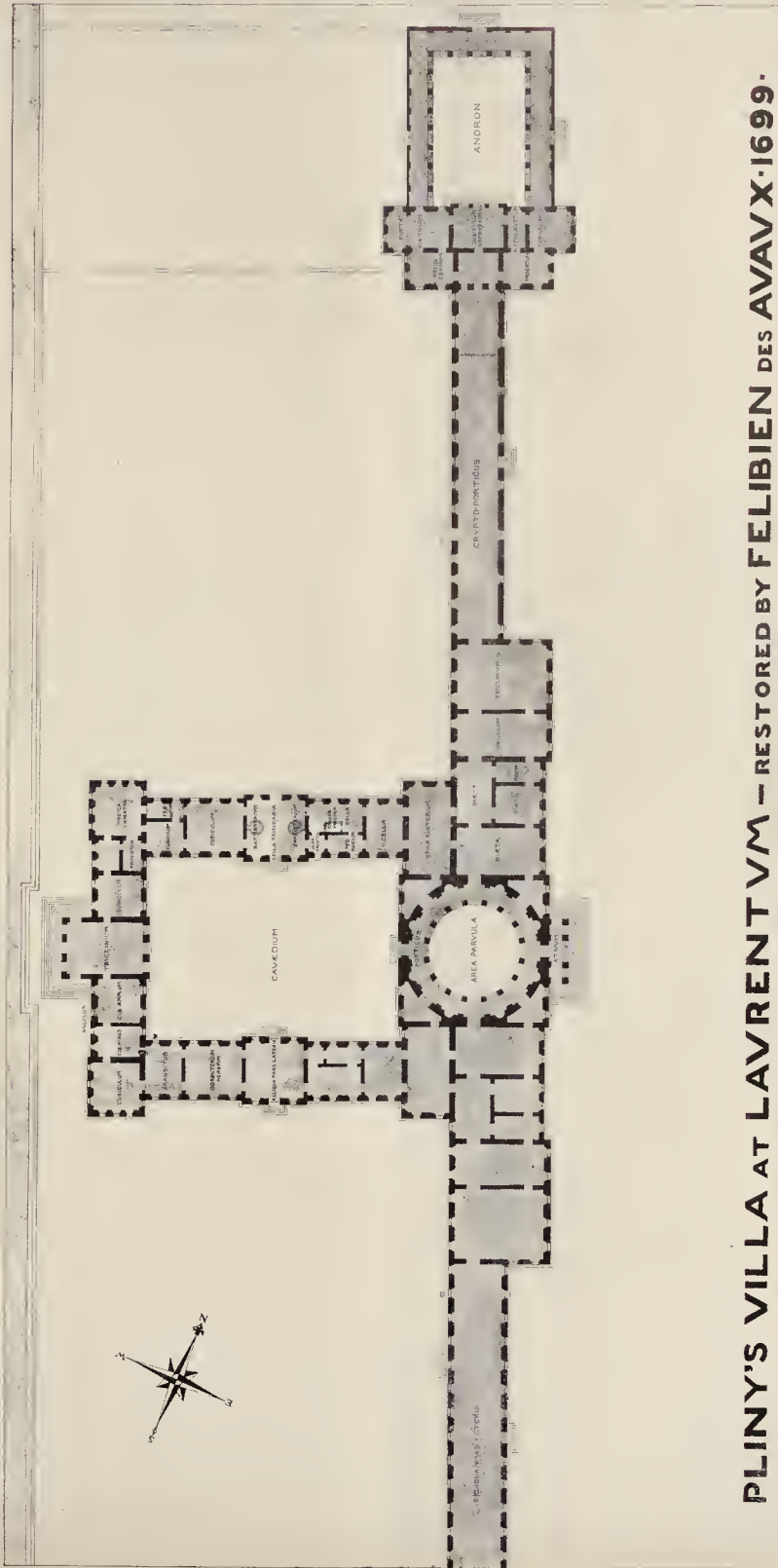
PLINY'S VILLA AT LAVRENTVM.



"THE PHOTO SPRINGUE & 22, NEW-TIME LANE, LONDON E."

RESTORED BY **SCAMOZZI. 1615.**

ILLUSTRATIONS TO SECOND ROYAL ACADEMY LECTURE ON ARCHITECTURE.
By PROFESSOR AITCHISON, A.R.A., JANUARY 30TH, 1890.

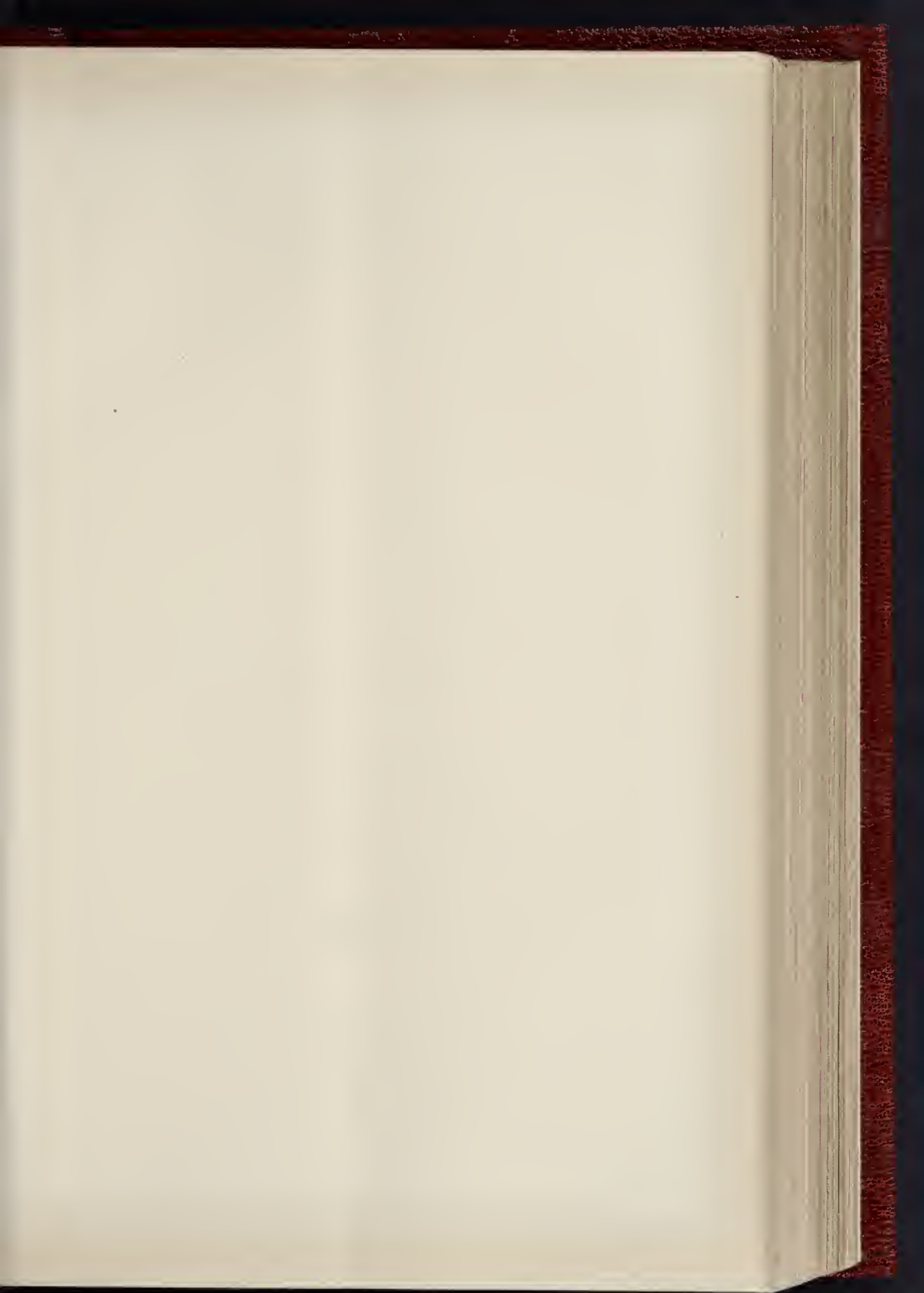


PLINY'S VILLA AT LAVRENTVM — RESTORED BY FELIBIEN DES AVAVX-1699.

ILLUSTRATIONS TO SECOND ROYAL ACADEMY LECTURE ON ARCHITECTURE,

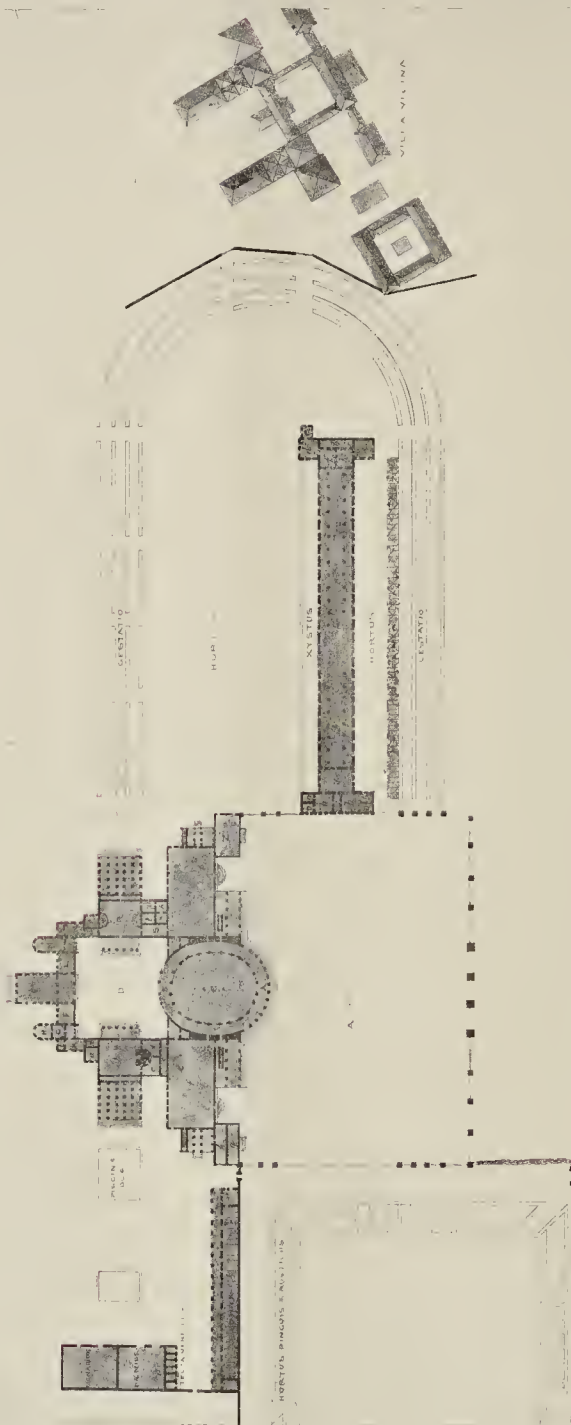
BY PROFESSOR AITCHISON, A.R.A. : JANUARY 30TH, 1890.

THE PHOTO-GRAPHIC ARTS OF MARTIN LAMB, AND CO., LTD., LONDON.



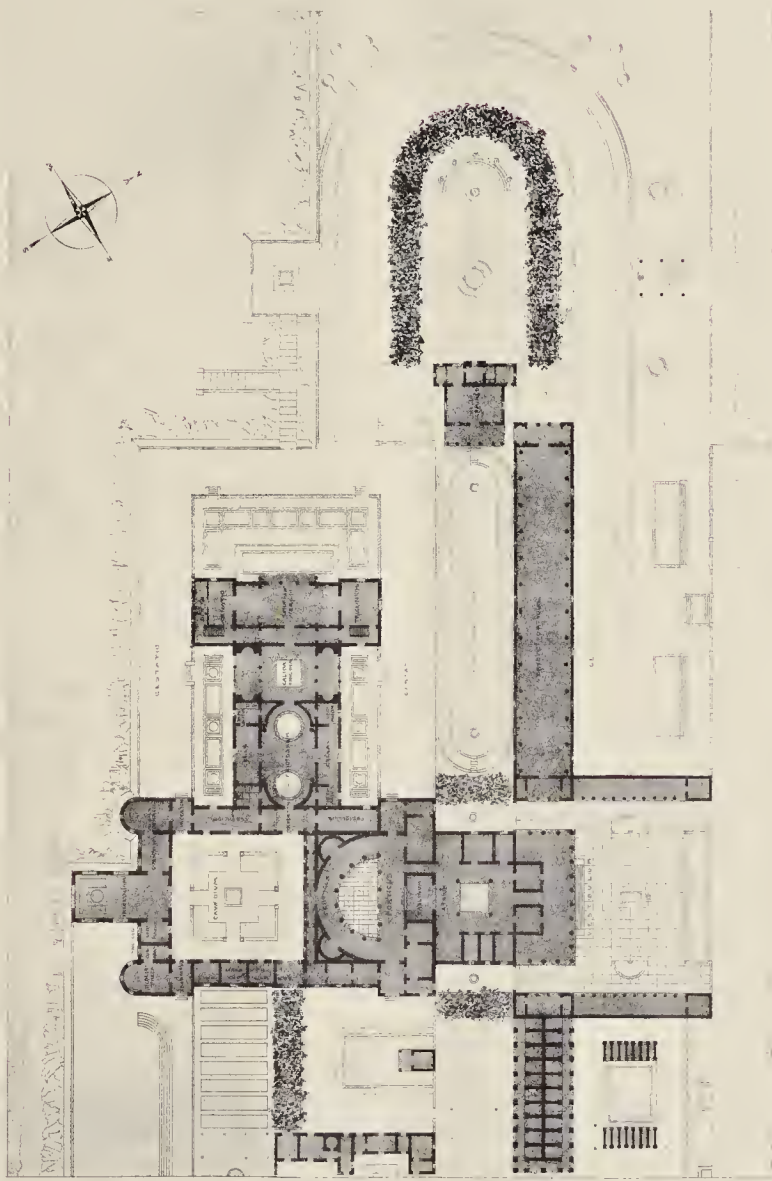
THE BUILDER, FEBRUARY 8, 1890.

PLINY'S LAURENTINE VILLA



RESTORED BY R CASTELL 1728

VESTIBULUM F. FABRICULUM AMPHITHEATRUM K. DORMITORIUM AMPHITHEATRUM P. CUBICULUM ALIUD U. PROPRIUM U. CELLA LIBERTORUM / ERGASTULUM



RESTORED BY BOVCHE T. 1852.

ILLUSTRATIONS TO SECOND ROYAL ACADEMY LECTURE ON ARCHITECTURE.

BY PROFESSOR HITCHISON, A.R.A., JANUARY 30TH, 1890.

THE PHOTO-PROCESS OF HARTNUNG AND KNORR'S LONDON E.

A. S. ...
 B. ...
 C. ...
 D. ...



when Lilford was rising above the Nene, Ben Jonson was still alive; while, between the stoppage of Rothwell Market-house and the beginning of the Triangular Lodge, the great Armada was shattered. It was no wonder that the architecture of the time was interesting. Into the stones of their houses the men of Elizabeth's time hewed their greatness and their simplicity. The paper was copiously illustrated by lantern views and plans of the buildings referred to.

Mr. Wyatt Papworth proposed a vote of thanks to Mr. Gotch, who, he said, had certainly given the members great enlightenment on the subject of his paper. They all knew the interest which he (Mr. Papworth) had taken in the subject of the introduction of Renaissance architecture into England. The difficulty had always been to know who were the persons employed. His own impression, from the researches he had made, was that a great deal of the work of those buildings was done by the local masons. The County of Northampton contained a large number of good stone quarries, and the masons who wrought the stone apparently came of families who inherited considerable taste in the use of the material. He had been rather more strongly impressed with that view after reading Professor Willis's and Mr. Clark's History of Cambridge. He found that there was the old family of Grimbold, who did a good deal of the work of the Colleges, who apparently settled at Cambridge and became contracting architects. The buildings shown by Mr. Gotch seemed to convey some traditional work of the Early Tudor period, continued later down even through the transitional period of the introduction of Renaissance architecture. They were still in the dark as to how the Italian work came into England, and Mr. Gotch had scarcely touched upon that matter. It was known that John Shute was sent over by the Duke of Northumberland to Italy to study architecture. Unfortunately, however, he died a year or two after he published his interesting and scarce book; but although his epitaph stated he had erected a number of buildings, we did not know the name of a single one, and that was the misfortune with so many of those architects. It had been for a long time a matter of doubt as to whether such a person as John Thorpe ever really existed. His book in the Soane Museum, from which Mr. Gotch had copied some of the plans that had been shown on the screen, was well known; but whether Thorpe designed or sketched the buildings referred to there was great uncertainty; in fact, there was not a single record connecting his name with these valuable buildings. He (the speaker) had been able to discover a few records connected with Crown Lands, which Mr. Gotch was in possession of. There was one curious point which he had come upon lately, and that was the finding out where John Thorpe had lived, and almost where he died. In looking into an old volume of the *Builder*—one of his fine old bottles of crusted port—he found a reference by Henry Cunningham to a work by Pecham. In hunting that up, he found there was a family of the name of Thorpe who were surveyors, and lived in St. Martin's-in-the-Fields. From the context it was evident there was a father and a son, and if that was the case, it threw them into the difficulty as to which of the two designed the buildings. Having searched the registers of St. Martin's-in-the-Fields from about 1600 to 1624, he found three Thorpes. In 1618,—a rather peculiar date from other circumstances,—the burial of John "Thorpes" was registered, and the question was whether this was their John Thorpe. He also came across a book called "The Northampton and Rutland Wills of 1570 to 1602," and looking through the index that he found the names of various Thorpes; while in 1566 there appeared the name of Ann Thorpe, of Oakham, which would rather confirm the suggestion he had made that "Thorpe" and "Thrope" were the same name. As to the word "trick," which had been mentioned, it was an old expression for a drawing, while the word "plat" was the same as the present word "plan." He thanked Mr. Gotch for the very interesting, elaborate, and entertaining paper he had read, and hoped that some of their friends might take up the other counties, and illustrate them in the same way. If that were done, they might then get a very interesting idea of a most important part of the history of architecture in England.

Mr. Ralph Nevill, F.S.A., seconded the resolution, and referred to the excellent views of the buildings which had been given on the screen. It was evident that the subject was deeply im-

planted in Mr. Gotch's brain, and the only complaint that he had to make was that the lecturer had not described more fully the insides of the buildings, which were, in some respects, more interesting than the exteriors. To many, the woodwork and interior fittings of that period were far more interesting than the exteriors. Few, if any, of the buildings they had seen that evening could really be regarded as very fine specimens of architecture, and that led him to the consideration of the point Mr. Gotch had brought forward, as to how they became designed. The first indication of the style came to England in the time of Henry VIII., who was an extravagant builder of palaces. There were records in the Bodleian Library that in particular the joiners engaged on works in the period under review had mostly Italian and French names, which proved conclusively that they were brought over to this country, and no doubt introduced the new style. The early woodwork and the mantel-pieces in the good houses were obviously the work of cultured and skilled people, and it was only in small things, and at later times, that rude copies were to be found. When those skilled workmen had died out their successors produced rude and rough carving, which was infinitely inferior to the early work. Although some of these looked nice enough, it was due to the colour which age had given them. At Kirby nobody could recommend the use of the plasters, nor other Classic features of the design, although the cornices and details were as exquisite as need be. It was left to the masons to carry out the details to the best of their ability, and these were men who were perfectly able by tradition to carry out the ornament, though they were not able to carry out any grander scheme. He believed that might account in some way for certain failures that were to be seen. Wherever buildings of a humbler aspect were to be found, and where there was a greater mixture of the old style, there would be found greater skill, as at Rushden and other Tudor outside. Mr. Gotch had spoken about the survival of masons, but in stone counties these had lived to an even later date than he had mentioned. He (the speaker) had seen them in Gloucestershire, and he was not sure, as a matter of fact, that they had ever died out, although the fashionable large houses had gone in entirely for sash windows. No doubt the style in Northamptonshire had been introduced by the great courtiers, who become possessors there, and that was the case everywhere. The proprietors throughout England in those days were nearly always non-resident, and where the court influence was not felt the old style lived on very much longer than where they had so thorough a disturbance as took place in the home counties, in which some of the new style of work was produced somewhat in advance of the date Mr. Gotch had given. It seemed to him in all these things that the workman's skill was considerably in advance of the general designer's, until at a later date, when such men as Inigo Jones went to Italy and really studied architecture at first hand. He thought that there were many other parts of England where the larger buildings, though not more important, were in a sense more graceful and correct than some of those that had been shown to them that evening. It was, however, a great boon to them all that such a work as Mr. Gotch had engaged in should be taken up, and the buildings commemorated while there was still time. As they had seen from the photographs, many of the structures were going fast to ruin, and if some of the enthusiastic architects scattered about the country turned their attention to this work they would be able to lay up a treasure which future generations would highly appreciate.

The Chairman suggested that Mr. Nevill himself should take a step in that direction, by preparing an appendix containing extracts from the archives of the Bodleian Library.

Mr. Nevill replied that he had not the time, but perhaps Mr. Brnton, of Oxford, who was present that evening, might be able to undertake the work.

Mr. E. G. Brnton, F.S.A., expressed the pleasure he had felt in listening to Mr. Gotch's lecture and in witnessing the views. He was afraid there was no chance of his being able to carry out what Mr. Nevill had suggested, as the work he had to do rendered it impossible. With regard to the similarity of the Northamptonshire buildings to those in Oxford, he could not find from his knowledge of the Oxford work

that they were familiar to him. There was a very different feeling to be found in the Oxford buildings from what they found in the buildings of Northamptonshire. It would be interesting to compare them, and if they could collect the names of the persons who did the work in those days, it might lead to some interesting discoveries.

Mr. S. Flint Clarkson suggested that the drawings known as "John Thorpe's" had been made by the actual designer of the buildings, as they showed the flues on the upper floors in several cases.

Mr. H. D. Appleton said that it had occurred to him whether the person who ordered the inscription "God save the King, 1560," quoted by Mr. Gotch, was not an old lawyer. Some two or three years ago, when Lord Coleridge took the chair at a King's College annual dinner, he took exception to the toast of "The Church and Queen," saying it should be "The Church and King." The head of the State, Lord Coleridge then maintained, was always a king, even if a woman were sitting on the throne. We always spoke of "the United Kingdom."

Mr. Brydon remarked that much of the work in Northamptonshire which had been referred to was the outcome of the revival of learning which made its way into England, bringing its architecture with it. At the same time, there was a vigor about the whole work, and a distinctive national character, which marked it out as worthy of study. The builders of those days were a most vigorous race, and the result was a strength of detail and character in the work. His only regret was that Mr. Gotch had not taken them inside some of the houses. The plaster-work was very fine all through that period, and there was an exuberance about the detail that was very characteristic. He often wondered why so many of the young men of the present day rushed off to foreign countries when they had at their own doors such excellent English work to study, and which was so full of suggestion to the architect.

Mr. Paul Waterhouse drew attention to the light that was thrown upon the architecture of the period by contemporary painting, and he instanced two pictures in the Tudor Exhibition among several containing architectural back-ground.

The vote of thanks was then put, and very heartily received.

Mr. Gotch, in reply, said that the reason he had not given more views of the insides of the houses was the difficulty of getting good photographs of interiors, and the fact that the houses he had referred to had not much inside them worth being photographed. At the same time, he agreed with the idea that inside the houses architects could get as many suggestions as from the outside. With regard to Oxford, it had been said that the work there was very like the work in Northamptonshire, but it had always struck him that the obliquity which was heaped on the work of the period by the advocates of the Gothic style some thirty years ago, and notably by the late Mr. J. H. Parker, was occasioned by the Renaissance work which that gentleman saw round him in Oxford. It certainly struck him (the speaker) that the Oxford work, on the whole, was not anything like so interesting and suggestive as the work in Northamptonshire, although there was a family likeness. The materials of Lyveden were in great part removed to Oundle. Some of these remained on the ground, and his attention was called to them last year, when, under a heap of nettles, a mass of stones was pointed out. These the agent caused to be turned over, and upon some of them were found details with the trefoil and the Tresham coat of arms, but no date. Mr. Clarkson's suggestion that what were called Thorpe's drawings must have been made by the designer of the buildings, because they showed the course of the flues, was ingenious, and a good deal of weight might be attached to it. One suggestion was that he was simply a surveyor measuring the buildings for the owners, and that might be the case in some respects, but the opinion he had come to from a very careful inspection of the plans was that they might see in it the work of the designer as it came from the mind. It was proposed that Oundle Market House should have a roof put upon it, but that was waiting for want of funds, and any gentleman who felt interested in the subject could not do better than contribute to the building fund. With regard to the Tudor

Exhibition, he thought it was discreditable to the promoters—that there was not a single reference to or illustration of architecture, as an art, to be found in it.

The Chairman intimated that the next meeting would be held on the 17th inst., when a paper will be read by Mr. John Slater on "Building Legislation."

The proceedings then terminated.

THE LONDON COUNTY COUNCIL.

The ordinary weekly meeting of this Council was held on Tuesday afternoon last, in the Council Chamber of the Corporation of London, Guildhall. Sir John Lubbock, Vice-Chairman, occupied the chair in the absence of the Chairman, Lord Rosebery, who was unable to be present.

Resignation of the newly-elected Chief Engineer.—The Chairman said he regretted to have to announce that he had received a letter from Mr. Clement Dunscombe, resigning the office of Chief Engineer, to which he was elected only a short time ago.* In answer to a question from the Chairman, the Chairman said that Mr. Dunscombe's letter could be read, if the Council wished, but the resignation was tendered entirely on the ground of ill-health. After some discussion, it was decided to refer to the Standing Committee, in conjunction with the Chairmen of those Committees which were concerned with engineering work (such as the Main Drainage Committee and the Bridges Committee), the question of selecting a successor. With so many candidates for the office recently before the Council, it was decided not to re-advertise for candidates.

Election of an Assistant Engineer.—The Standing Committee brought up the following report and recommendation:—"We have to report that, in accordance with the directions given by the Council on the 3rd of December, an advertisement was issued inviting applications for the appointment of Assistant Engineer, in the place of Mr. Lovick, at a salary of 600*l.* a year. These applications were referred in the first instance to the Main Drainage Committee, with a request that that Committee would advise us as to the three candidates who might appear to them the most suitable for the post. The total number of applications received was 67, but this number was reduced, by setting aside the applications of candidates who had had no experience in the drainage of towns and in the service of municipal bodies, to 44. Of this latter number, 12 were seen by the Main Drainage Committee, who selected Mr. W. S. Crimp, Mr. H. A. Roebing, and Mr. A. B. Allan, as in their opinion the most suitable. In submitting these candidates to us the Committee stated that they had put the names in the order of what appeared to them the relative suitability of the three candidates for the office. The three gentlemen thus selected have since appeared before us, and we have done our best, by inquiry into their previous experience and the work they have been engaged upon, to form a judgment as to their respective merits. In doing so we have paid great deference to the opinion of the Main Drainage Committee, but we have not found ourselves able to agree altogether with the conclusion arrived at by that Committee. We cannot help feeling that they have very naturally dwelt mainly upon the special requirements of their own department; and we are of opinion that we should most faithfully carry out our opinion in the matter, and best serve the general interests of the Council, by submitting the names of Messrs. Crimp and Allan, without indicating any preference between them. We accordingly recommend—

"That the Council do select either Mr. A. B. Allan or Mr. W. S. Crimp for the vacant office of Assistant Engineer, and that the appointment be made on the conditions set forth in the minutes of the Council of 3rd December, 1889."

This recommendation gave rise to some discussion on the merits of the two candidates named, and on a show of hands being taken the numbers were: For Mr. W. S. Crimp, 44; for Mr. Allan, 39. A division being demanded and taken, there were: For Mr. Crimp, 47; for Mr. Allan, 46. Mr. Crimp was therefore declared elected.

The Main Drainage Question.—The Main Drainage Committee reported as follows:—"In accordance with the resolution of the Council of December 17, 1889,† instructing the

Main Drainage Committee to secure the services of an eminent Civil Engineer to join the Engineer of the Council in a thorough examination of the whole sewage system; and that the Engineers desired to include in their report an approximate estimate of the cost of taking the whole of the sewage to sea, your Committee have obtained from Mr. Benjamin Baker his consent so to act with the Engineer of the Council, his fee to be a retaining-fee of fifty guineas, and fifteen guineas per day occupied, the whole not to exceed 500 guineas. Your Committee recommend that this arrangement be approved."

This was agreed to without discussion.

The Fishers' Wages.—On the recommendation of the same Committee it was agreed—

"That the wages of fishers at Barking be at the rate of 7*d.* an hour, the work to be arranged in shifts of eight hours, in consequence of the work having to be continued throughout the twenty-four hours, with half an hour allowed for refreshment, the men to be booked ready for work at the hour of starting; that the work be carried on, as far as practicable, continuously throughout the week, and that the number of men employed be no more than the number sufficient to deal with the amount of sludge which under existing circumstances can be carried out to sea."

After transacting some further business the Council adjourned, after sitting for more than four hours.

THE INSTITUTE OF BUILDERS.

The sixth annual general meeting of this Institute was held at the offices on the 4th instant, Mr. F. May, J.P., in the chair.

The Secretary, Mr. Richard S. Henshaw, read the following report:—

"1. In presenting their Sixth Annual Report, the Council are pleased to be able to state that there is an increase in the number of members of the Institute, though they regret to have to record the loss by death of Mr. H. C. Lansdown.

"2. Several Bills relating to the Building Trade came under consideration during the Session, and were carefully watched by the Parliamentary Committee, and where considered desirable, necessary action was taken.

"3. It will be remembered that the Council in their last Report had appointed a Committee to confer with the Surveyors' Institution, in consequence of the legal decision in the case of Priestley v. Stone. The Committee, consisting of Messrs. H. T. Ashby, S. G. Bird, and Frank May, after considerable correspondence, succeeded in obtaining an interview with an equal number of gentlemen representing the Surveyors' Institution, and after some discussion it was thought desirable by the representatives of both Societies that the number should be increased to nine on each side. The Representatives then consisted of—

Mr. H. T. Ashby.	Builders.	Mr. F. J. Dove.
" H. H. Bartlett.	"	" A. J. Mansfield.
" S. G. Bird.	"	" Frank May.
" J. T. Chappell.	"	" J. Randall.
" J. H. Colla.	"	

Mr. C. R. Ardling.	Surveyors.	Mr. C. J. Shoppee.
" T. C. Clarke.	"	" H. T. Steward.
" C. J. Mann.	"	" W. H. Strudwick.
" T. M. Rickman.	"	" F. G. Widnell.
" C. F. Selby.	"	

"4. The powers granted to the Committee by the Council of this Institute were:—

"To consider the responsibility of Quantity Surveyors for their quantities and matters incidental to the preparation and compilation of Bills and Quantities and Specifications, or arising thereout, especially as regards provisional amounts and work and the employment of specified firms for goods or work."

"5. The Committee placed their views before the representatives of the Surveyors' Institution, but after considerable discussion the representatives of the Surveyors did not see their way to recommend members of their Institution to accept any legal responsibility for their work, and after further discussion the subject was, on the proposition of the Surveyors, adjourned *sine die*.

"6. In the early part of the year Mr. G. S. Stevens, the Past-President, and Mr. G. Watson, a member of the Directorate of the National Association of Builders of America, visited this country. Several interviews took place between them and several members of this Institute, and it is hoped that the interchange of information and ideas may lead to the mutual benefit of both Societies and to a further extension of courtesies. They were entertained at dinner by some of the London builders.

"7. The Council have made a grant of 25*l.* to the Library Fund from the funds of the Institute, and they also have to express their thanks to the Royal Institute of British Architects and the National Association of Builders of America, and other friends, for the presentation of books, &c.

"8. In addition to the usual grants from the Benevolent Fund to the Builders' Benevolent Institution, the President Institution of Builders' Foremen and Clerks of works, the Council have also had the pleasure of granting some assistance to two private applicants.

"9. The Council have to announce that in future, instead of making an annual grant to the Builders' Benevolent Institution, they have made arrangements for the support of one pensioner to be selected by them from the list of candidates approved by the Builders' Benevolent Institution.

"10. Permission, during the pleasure of the Council, has been granted to the Home Counties Volunteer In-

stitution to use the rooms of this Institute for meetings, when not required for other purposes.

"11. The Council have to tender their thanks to Mr. Joseph Randall for the paper read by him at the Institute, which they considered of great interest and value.

"12. Under the Articles of Association, no provision is made for retaining Past Presidents upon the Council and benefiting by their experience and advice."

"13. Under these circumstances the Council wish the members to consider the desirability of altering the Articles of Association to the extent of making all Past Presidents Honorary Vice-Presidents.

"14. In accordance with the Articles of Association, the President, Mr. Frank May; one of the Vice-Presidents, Mr. R. J. Waller; the Treasurer, Mr. George Flucknott; one of the Auditors, Mr. H. I. Sanders; and four members of the Council, Mr. James Greenwood, Mr. Woodman Hill, Mr. Robert Neill, junr., Mr. J. H. Trollope, retire, but are eligible for re-election."

On the motion of the Chairman, the report was received and adopted, and

Mr. Thomas F. Rider was unanimously elected President for the ensuing year. Mr. R. J. Waller was elected, and Mr. A. J. Mansfield was re-elected Treasurer; Mr. Frank May was elected a Member of the Council, in the place of Mr. A. J. Mansfield; and the following members were elected and re-elected on the Council, viz.:—Mr. John M. Burt, Mr. Woodman Hill, Mr. Robert Neill, junr., and Mr. J. H. Trollope. Mr. H. J. Sanders was re-elected one of the auditors.

A vote of thanks to the Chairman concluded the proceedings.

THE SOCIETY OF ENGINEERS:

THE PRESIDENT'S ADDRESS.

The first ordinary meeting of the Society of Engineers for the present year was held on Monday evening, February 3, at the Town Hall, Westminster. Mr. Jonathan R. Baillie, the President for 1889, first occupied the chair, and presented the premiums of hooks awarded for papers read during his year of office, viz.:—

"The President's Premium to Mr. G. M. Lawford for his paper on "Fireproof Floors." The "Bessemer Premium" to Mr. Samuel Griffin for his paper on "Modern Gas-tight Practice." A "Society's Premium" to Mr. Henry Pajia for his paper on "Forced Filtration of Water through Concrete," and to Mr. George R. Stracian for his paper on "The Construction and Repair of Roads."

Mr. Baillie introduced the President for the present year, Mr. Henry Adams, to the meeting, and retired from the chair, receiving a hearty and unanimous vote of thanks for his services during the past year.

Mr. Adams then took the chair, and proceeded to deliver his inaugural address. He briefly alluded to the satisfactory position of the Society, which now numbers 417 members of all classes, and mentioned the loss by death of Mr. Percy, and the addition of Mr. Earl Granville, Lord Armstrong, Lord Brassey, Sir Wm. Thomson, Mr. Wm. Anderson, and Mr. Benjamin Baker to the roll of honorary members. He commented on the principal points of the papers read during the session, and described the features of interest in the works visited by the members during the vacation, which included the East London Waterworks, the Sewage Outfall Precipitation Works at Crossness, the Central Station of the London Electric Supply Corporation, and the Foreign Cattle Market, Deptford. The President then referred to the progress of technical education, noticing particularly the work of the Science and Art Department and that of the City and Guilds of London Institute, and incidentally gave some particulars of the City of London College, where he has been for twenty-one years the Professor of Engineering.

Remarking that a wider field of enterprise than that contained within the shores of the United Kingdom was necessary for engineers, he gave statistics showing that about 30 per cent. of the English engineers were now practising abroad. The extended use of mild steel and some of its disadvantages were noticed, and the President then passed on to a consideration of our fuel supply. He believed that the days of coal were surely numbered, and that it behoved us to seek other means of generating power, and in the meantime to practise the greatest economy in the use of the mainstay of England's prosperity. Under the head of railways some figures were given showing the vastness of the traffic upon them, and that, notwithstanding the rapidity of transit, according to the last statistics only one passenger was injured in

* Dec. 3 inst. See *Builder* for Dec. 7, p. 494.
† See *Builder*, Dec. 21 inst, p. 446.

13 millions, and not more than one in 80 millions was killed by causes beyond their own control. Several large bridges were described, the Forth Bridge, of course, occupying the place of honour, and references were made to many other engineering works and processes which have occupied public attention. In conclusion, attention was directed to the necessity for specialisation in the studies of engineers, the multifarious sub-divisions rendering it physically impossible for one man to thoroughly master more than one or two branches, and hence the necessity for the existence of such bodies as the Society of Engineers, where experiences could be freely exchanged.

NATIONAL ASSOCIATION OF MASTER BUILDERS OF GREAT BRITAIN.

THE twenty fourth half-yearly meeting of this Association was held on Wednesday, January 29, at the rooms of the Central Association of Master Builders of London, Bedford-street, Strand, London; Mr. J. Howard Colls, President, in the chair; and local Associations were represented by master builders from London, Manchester, Liverpool, Birmingham, Leeds, Hull, Bristol, Southampton, Gosport, and Bolton.

The report and accounts for the past half-year were discussed and adopted. The demands made by the operatives in Birmingham, Blackburn, Bradford, Dundee, Edinburgh and Leith, Glasgow, Hamilton, Leeds, Liverpool, Birkenhead, Norwich, Rochdale, and Southampton, were fully discussed.

From Bristol, the representative reported that the amicable relations there existing are maintained by meetings of the workmen with a committee of the Builders' Association, and that mutual concessions will conduce to the same end.

The question of any alterations in the Employers' Liability Bill was fully discussed, also insuring for any alteration that may be made in the Act. The Steam Engine and Boiler on Land (Person in Charge) Bill was also discussed.

The Council reported that the Association is keeping up correspondence with the National Association of Master Builders of the United States of America, which by a curious coincidence held its meeting on the same day, at St. Paul's, in Minnesota.

It was decided to hold the next meeting in Southampton.

In the evening the members of the Association dined together.

ASSOCIATION OF PUBLIC SANITARY INSPECTORS OF GREAT BRITAIN.

THE seventh annual dinner of this Association was held on Saturday evening last at the First Avenue Hotel, Holborn. Mr. Richardson presided, and among the company present, in all one hundred persons, were Dr. R. Farquharson, M.P., Surgeon-General C. A. Gordon, the Mayor of Leamington, Mr. E. C. Robins, Mr. Banister Fletcher (Master of the Carpenters' Company), Dr. Danford Thomas, Dr. Dudfield, Mr. Hugh Alexander (Chairman of the Council), Mr. Stanton Wm. Preston, Mr. C. W. Raymond, and Mr. S. C. Legg (hon. sec).

In giving the toast of "The Association and its President, Sir Edwin Chadwick," Dr. Richardson gave a sketch of the history of the society. When the Medical Officers of Health were first appointed, it was asked on all sides where the assistants of these medical officers would come from, and when they were found what would they be called. Assistants were found at last, though considerable difficulty was experienced in getting competent men for the work; and the name of sanitary inspectors was fixed upon. Though the first race of inspectors was largely untutored, now that a generation had passed away who had learned their duties and understood the importance of them, they were called. As for the subject of union in strength, the Association was formed in 1883. Its formation he considered to be the triumph of honest work, honourably conceived. The duties of the Association were to teach and protect its members—to teach them how their tasks should be carried out, and to protect them in the exercise of them; and having found by experience throughout the country, said the speaker, ought to belong to it; and he hoped that the apathy at present shown by too many of them would not last any longer. But there was something more to which the Association ought to turn its attention, and that was provision for the future. The British sanitary inspectors were decided to stand on the subject of pensions, and he believed that in a few years' time there would be no such things as pensions for officials holding public offices. The Association should now take upon itself the duties of a pro-

vident society, and insure its members against the evils of an unprovided old age. Referring to Sir Edwin Chadwick, who had been the President of the Association since its formation, Dr. Richardson said that the record of the work he had done was written in the history of the century. Though brought up for the Bar, with great abilities in that direction, he had lent himself to new and simpler work. For a period of over sixty years he had continued to spread sanitary light in England; and had made sanitation what it never could have been if he had not lived to be its guide, philosopher, and friend.

At the conclusion of his speech the chairman presented to Mr. S. C. Legg, the honorary secretary of the Association, an illuminated address and a purse of gold on behalf of the members, and in recognition of his ability and services. Other toasts followed, including that of "The Executive," proposed by Mr. S. F. Murphy, Medical Officer to the London County Council.

ROYAL ACADEMY LECTURES.

SIR,—In my first Royal Academy lecture, published in your issue of the 1st inst., I said, "The Koptic architect who built the brick mosque for Foulon in the ninth century, and possibly was the introducer of the small arches that take the place of pendentives in the dome." My friend, Mr. R. Pbené Spiers, has pointed out that these arches are not coeval with the original mosque.

Mr. Stanley Lane-Poole, in his "Art of the Saracens in Egypt," says of the brick dome, at page 64, "It was built, however, a century later than the mosque itself," and at page 64, "There is such a cupola over the niche in Ibn-Tuln, and though this is probably of the date of the restoration by Lagin in 1296, to judge by the wooden stalactites, which are found in no other part of this mosque." GEORGE AITCHISON. 150, Harley-street, W., Feb. 4, 1890.

THE LONDON SEWAGE QUESTION.

SIR,—In the discussion at the Society of Arts upon Sir Robert Rawlinson's paper, Mr. W. C. Sillar spoke to the effect that if the effluent or water from the A B C process was good enough to go into the Thames above Teddington Lock, it was surely good enough to go into the same river at Barking Creek, or into the Clyde at Glasgow. Now, as I understand Mr. Sillar to state, when here, that the amount of the Kingston-on-Thames sewage effluent in dry weather is only about a million and a quarter of gallons daily, while the flow of the Thames there amounted to about four hundred millions of gallons daily, it follows that the Kingston effluent only amounts to about one part in 325 of the Thames water. Moreover, the flow of the Thames is continually carrying away this effluent. The circumstances here are quite different from those either at London or Glasgow, for in the former the sewage effluent rises up to about one-third of the flow of the Thames, while at Glasgow in dry weather the effluent is equal to about half the amount of the flow of the Clyde. In dry weather, also, there is no sensible flow of the river towards from the harbour as the tide comes up past Glasgow. In these circumstances no proper comparison can be drawn between the effect of the small quantity of sewage effluent at Kingston and the large amount at both London and Glasgow,—in the latter case about 50,000,000 gallons daily, which we have been told would produce 44,000 tons of sludge a year, which sludge is calculated to realize (on paper at least) £22,000 a year, at 10s. a ton. I observe Mr. Clare Sewell Read stating that "the actual sludge, after it was dried, would not answer the purpose of any farmer to carry it four or five miles." The yearly Glasgow sewage revenue (if anything) might, therefore, really be only 22,000 farthings, not pounds sterling.

W. P. BUCHAN.

CARY'S GRAVE.

SIR,—In your interesting note on Hogarth House, Chiswick, occurs the sentence:—"In this same house died, in 1544, Cary, the translator of Dante; who, as also Hogarth and his wife, was buried in Chiswick churchyard." This statement is hardly correct as it stands, from the fact that Cary is not buried in Chiswick churchyard, but in Westminster Abbey.

As your journal is not the first publication wherein I have seen this erroneous assertion respecting Cary's place of sepulture, perhaps I may not be considered out of place if I ask the writer of the paragraph to state his authority in this instance.

The *Advertiser* of August 21, 1844, contained an obituary notice of Cary, from which I quote the following words:—"Mr. Cary well deserved a few lines in Poet's Corner in Westminster Abbey, which on Wednesday last was granted to his remains." His grave is next to that of the poet Campbell, and

from the slab which covers it I have copied the following inscription:—

UNDERNEATH
LIE THE REMAINS OF
HENRY FRANCIS CARY, M.A.
VICAR OF ABBOTS BRONLEY
FORMERLY VICAR OF KINGSBURY WARWICK
TRANSLATOR OF DANTE
BORN DEC. 6 1772
DIED AUG. 14 1814

I am, Sir, yours &c., JOHN T. PAGE.

* * * We are obliged to Mr. Page for preventing the further circulation of a mistake. Our authority was Thornbury & Valford's "Old and New London," vol. vi.—"Cary [*sic*], the translator of Dante, resided at Chiswick, in Hogarth's house, and lies buried in the churchyard, close under the south wall of the chancel. His monument was a few years ago rescued from oblivion, and restored at the expense of the vicar, who carefully enclosed it with iron railings."

THE SHEFFIELD MUNICIPAL BUILDINGS COMPETITION.

SIR,—Kindly correct a mistake which appeared in your issue of the 25th ult. In reviewing the plans exhibited at Sheffield of competitors for the Municipal Buildings you mention one by Messrs. Dunn, Hanson, & Dunn. This, as it stands, is incorrect, as my name should have been added, but through an oversight, probably of the clerk employed to label the designs, it has not appeared. The plans were drawn up by Messrs. Dunn, Hanson, and Dunn in conjunction with myself, and, I may add, were executed entirely in our Bristol office.

I shall be much obliged if you will let this letter appear, in order to remove misconceptions. FREDK. BUGH BOND. Liverpool Chambers, Corn-street, Bristol. February 3, 1890.

CHURCH BUILDING NEWS.

Eastham, Tenbury.—The Church of SS. Peter and Paul at Eastham, Tenbury, Worcestershire, in the diocese of Hereford, was re-opened on Thursday, Jan. 23rd, after undergoing a complete restoration of the nave. The fabric is of Norman work dating from 1080 to 1120, with some insertions in the north and south walls of the fourteenth and fifteenth centuries. The southern doorway, a beautiful specimen of Norman architecture, now opened for re-use, was blocked up in 1831, and the chancel arch, of similar design, was then destroyed, through some mistaken zeal. Above the southern doorway is some well-preserved wall arcading with intersecting arches, a rare example, in that position, of the change of style or period of transition. The restoration has been carried out as a memorial to the late George Browne, M.A., Q.C., formerly Recorder of Ludlow, by his widow, and his brother, the Rev. Henry Browne, rector of Eastham, Nash, in his History of Worcestershire, says:—"From the mention of a Presbyter in the Domesday survey of this Manor here was a church in the Saxon Age." The architect for the restoration was Mr. H. Hardwick Langston, of London; the works have been executed by local tradesmen, Mr. Hill and Mr. Hurds; Mr. John Kaye, of Camberwell, supplied the new stonework.

Fire Drill in Schools.—*Appropos* of the disaster at the Forest Gate Schools, upon which we commented a fortnight ago (see *Builder*, p. 55, *ante*), Messrs. Merryweather & Sons write to say that the Warehousemen and Clerks' Schools, at Russell Hill, Caterham, were two years ago fitted up by them with hydrants and other fire-extinguishing apparatus. With these appliances the boys are periodically drilled. The executive of the schools at Russell Hill were amongst the first to acknowledge the value of fire-drills, which, while assisting in the healthy development of muscle, is likely to be of service to the boys and to the country in after life. Many of these boys will go into city warehouses, and will take with them the knowledge which comparatively few people possess—viz., "how to act in case of fire," should necessity arise, much to the benefit of their employers. The question of fire-drill was mentioned at the inquest which was held on the lamentable disaster at Forest Gate, the jury strongly advising a periodical drill with the fire apparatus; and we trust that this recommendation will not be lost upon those who are interested in the management of our large schools.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—VI.

MAGNETISM.

IF a wire is wound into a spiral or helix, fig. 10, and a current sent through it, a set of lines of force is formed by the combination of the circular lines produced round every point in the wire; these resultant lines run through the helix parallel with its axis and curve back through the air outside. The coil or helix being closely wound with insulated wire, experiments show that the shape of the external field produced by the current is the same as it would be if the space occupied by the helix were filled by a piece of steel uniformly magnetised. A piece of soft iron, so made as to just fit the interior of the coil, inserted into it increases enormously the strength of the field, but does not alter its shape; the external effects are the same as they would be on increasing the strength of the current. It is, of course, impossible to map out the paths of the lines of force within the mass of metal, but there is no reason for supposing the shape of the field they form is essentially different from that traced out in the air within it by the helix alone.

It is a remarkable fact, and one of extreme importance, that if a piece of steel be taken and cut so that its edge follows exactly the curve or curves traced by a wire carrying an electric current, and if, furthermore, it be magnetised so that the direction of magnetisation at every point is the same as that of the line of force produced by the current alone; then the magnet so formed produces a field precisely similar to the one produced by the current; indeed, the magnet may be substituted for the voltaic circuit, and *vice versa*.

This interchangeability of magnet and circuit leads us at once to Ampère's theory of magnetism. In what has been said about magnets no attempt has been made to explain the magnetisation of the ultimate molecule of a piece of iron or steel. Ampère supposed that around every molecule of a magnet there flows an electric current. As a permanent magnet does not get hot nor require a constant supply of energy furnished to it in order that it may maintain its magnetised state, this theory also leads to the assumption that in each molecule there is at least one path that offers no resistance to the flow of electricity.

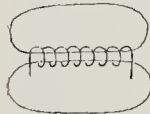


Fig 10.



Fig 11.

Suppose fig. 11 to represent a slice of steel, one molecule thick, cut from the north end of a steel magnet. The squares are individual molecules with their equal currents flowing round them. It will be seen from the figure that the external effect of each part of the current in an internal molecule must be neutralised by the current flowing in the opposite direction in that part of the neighbour with which it is in contact, although the direction of the current in each individual molecule is the same, *viz.*, opposite to that of the hands of a watch; this process of neutralisation goes on everywhere except at the periphery of the slice, that is at the surface of the magnet where there consequently exist unneutralised portions of molecular currents all flowing in the same direction.

This collection of currents in the surface of a steel magnet is equivalent to a current flowing in a wire similarly shaped, and hence it is that a suitably-shaped and magnetised piece of steel can produce the external effects of a voltaic circuit, or *vice versa*. Together with what has been written under "Magnets," the above completes the theory of magnetism as far as the magnet itself is concerned. Briefly, each molecule of a magnet has an electric current whirling round within it; when the metal composing the magnet is in a neutral or "unmagnetised" state, the axes of these whirls form closed curves within the mass of the metal; when the metal is magnetised, these whirls of current are

arranged so that their axes emerge from the metal into the surrounding medium.

But a magnet is of practical use only by virtue of the field of force in the air or other medium surrounding it, and the nature of the lines of force making up this field must be considered.

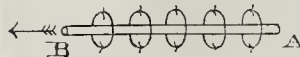


Fig. 12.

Fig. 12 has already been used to show the relative directions of an electric current AB, and the circular lines of force enveloping it. The electricity in the conductor can move bodily forward in the direction of the arrow; but the electricity outside is entangled or bound together so that it is incapable of such motion of translation. At the surface of the conductor the particles of electricity in the stream run against those outside, and the lines of force are due to this rubbing.

A rough idea of what is likely to happen may be got by standing on the bank of a river and looking at the water near the edge of the stream; the water is prevented by the friction of the banks from moving forward readily with the main current, and a number of little eddies or whirlpools are formed whose axes of rotation are at right-angles to the direction of flow of the main body of water.

In the case of the electric current, the electricity outside the conductor cannot move for-

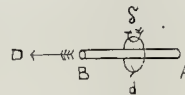


Fig 13

ward at all, it can only spin round; hence in fig. 13, if AB is the current, it will set the particles of electricity at its surface spinning round in the direction of the arrow δ , and these will cause the similar rotation of the particles beyond them, the axes of rotation of the particles forming closed rings round the conductor. A line of force, then, is simply an axis around which electricity is rotating. In fig. 13, D is the direction of the current, δ the direction of the line of force, θ the direction of rotation of the electricity surrounding the conductor.

Fig. 12 can, without any alteration, be made to show the relative directions of current and line of force in two distinct cases. (1) If AB is an electric current, then the circles show the shape and direction of lines of force. (2) If the circles represent conductors carrying currents of electricity, then AB shows in shape and direction a line of force passing through them. The diagram in the latter case is of use in connection with electro-magnets. Ampère's rule, already given, may be written so as to include both cases:—

If you stand in a current which goes from your feet to your head and look at a current it is directed towards your left hand."

Laborer and Wagee in China—According to some recent United States Consular reports, in Hong Kong, Chinese workmen get from 12s. 5s. per annum, with board and lodging. Mechanics without board are paid per day:—Blacksmiths, 1s. 8d. to 1s. 2d.; bricklayers, 1s. 3d. to 1s. 8d.; carpenters and joiners, 10d. to 2s. 1d.; masons, 1s. 3d. to 1s. 8d.; labourers, 10d. and upwards. In the district of Ningpo the rates of wages are, for

Blacksmiths	per month	£1 0 10
Bricklayers	per day	0 10
Carpenters	"	0 11
Coppersmiths	"	1 3
Gold and silver workers	"	19j to 1 8
Painters	"	0 10j
Plumbers	"	1 0

Wages have not increased here for years, and strikes never occur. Trouble is rarely experienced, as labourers are confined to the districts in which they are employed. No labourer is allowed to be employed outside of his district; he may by general consent join the labourers of another district—not otherwise.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

2,741, Door Springs and Checks. G. F. Newman.

By the apparatus which is the subject of this patent the door is closed by a pulling action, and the closing apparatus is fixed either on the door frame or on the inside of the door. Within an upright barrel is a volute or band spring, whose inner and outer ends are connected to the inside of the barrel part and to an adjustable plate. The plate, which is rigidly connected to the central axis, lies upon the top face of the lower bracket under the barrel, while the axis, which is threaded through the spring and body part, has its end passing and working through the middle of the brackets. An arm and link aid the movement of the spring by bringing it into direct purchase. The tension of the wound-up spring causes the arm to move back, when the door is liberated, to its usual position with a pulling action to the link, and through the link to the door.

2,817, Window Sash-fasteners. W. S. Laycock.

A rack and pinion is the actuating power of the fastener which is the subject of this patent, and the catch can be operated by throwing the same in or out of gear, which can be done from inside the window, the mechanism being mounted in a suitable framing.

2,946, Brick and Tile Machines. J. Morhard.

This invention relates to machines for cutting and pressing bricks from clay. The material is first subjected to suitable pressure in a two-part separable case and by means of a revolving cutting-tool, which is caused to pass transversely through the pressed mass of material at the line of separation of the form or mould. At the time of such separation, after the pressing operation, a portion of the pressed material of suitable size to form a brick or block is smoothly cut from the end portion of the material. After this cutting operation, an elevating and discharging device receives and raises the cut-off portion clear of the form, and brings it into position to be readily taken out of the machine, and at such time the two-part form is moved in such a manner as to uncover and leave the finished block entirely clear of the form.

16,209, Windows. A. Heinrich.

The unpleasant propensity of window panes subjected to the influence of the various states of the atmosphere to be transformed into a non-transparent sweating or frozen state is, it is claimed, obviated by this invention. Two panes of glass coated with an alkali space between them, and in the frame a channel is made for carrying away moisture.

17,199, Veneer Saws. D. P. A. Messing.

The object of this invention is to enable the veneer-saws to act in both upward and downward directions. For this purpose the teeth are made M shape, and set at different angles, as in most cross-cut or wood saws.

7,109, Fireproof Partitions. A. W. Rammage.

In order to provide a partition which is fireproof and rigid, partitions are, according to this invention, made with iron or steel rods of T, L, or round or square section, and at the point of intersection they are fixed by a rivet, and the interstices are filled in with concrete, &c. Channel iron is used when necessary to aid in a better foundation for the concrete.

1,262, Blocks of Artificial Stone. A. McLean.

The artificial stone which is the subject of this patent is made of granite clippings and Portland cement. These are mixed with water and submitted to very heavy pressure. The effect of the heavy pressure is to produce on the surface a thin skin of fine cement, which is removed by rubbing down, and a very good polish is obtained. Mechanical and hydraulic means of pressure are mentioned in the specification.

3,144, Bricks, Bell & Sons.

The object of this invention is to produce bricks for building so made as to receive plugs, so that when built into a wall, woodwork or other materials may be attached thereto. To this end recesses are formed in the faces of the bricks, which, after baking, may be filled in by wood or other porous substance. The bricks are built into the wall where it is desired to secure woodwork, as, for instance, they may be built into doorways, and the door-frames secured thereto by nails or screws driven into plugs in the bricks. By this invention the fastening is rendered more secure, and the objectionable practice of driving plugs between the mortar-courses is avoided.

3,355, Wall-Tiles and Lining. W. Hubbard and Others.

According to this invention tiles are made thin and of a uniform thickness, most of the nature of artificial stone or siliceous substances. They are made also with rebates, grooves, or recesses, and the joints are covered by bosses, strips, or other

ornamental forms. The leading point is the unshrinkable nature of the material of which the tiles are made.

3,371, Fireplaces. H. M. Ashley.

The jams and lintel of the fireplace are, according to this invention, made of metal, hollow, so that there is a cavity between their fronts and the wall against which they are fixed. A door is also provided, which can, when required, be turned up into a horizontal position, and a gas burner, which is usually accommodated within the chamber, can be turned down to receive over it, and under the turned-up door, a saucepan or other cooking utensil.

3,516, Windows and Window-Fastenings. A. Ferret.

In order to allow of the lower sash being drawn out, the beads are, by this invention, hung on butt hinges, and this, with a fastening by means of a spring bolt secured to the top rail of the lower sash, constitutes the novelty of the invention.

3,563, Improvements in Water-closets. H. Lord.

The improvements which are the subject of this patent consist chiefly in so arranging the cistern sideway in a line with the apparatus, with a passage between the two, that the water in the cistern will flow into the pan to the same level as that in the cistern, an ordinary ball-tap being used to regulate the height or level of water in the cistern. A flap or clack suitably arranged hermetically seals the lower portion of the pan when the closet is not in use, but when the contents of the cistern are desired to be flushed to the sewer, the flap or clack is lowered by pulling a handle.

NEW APPLICATIONS FOR PATENTS.

Jan. 13.—579, W. Reynor, Stanching Defective House-drains without taking up Floors or opening Ground in Basement. 586, A. Flint, Tasting House-drains. 608, J. Becker, Scaffolding.

Jan. 14.—610, A. Watson and J. Rastrick, Fire-grates. 671, A. Clark, Cutting Stone. 675, C. Stivell and A. Thayer, Adjustable Square and Level.

Jan. 15.—711, W. Greaves, Ventilator. 723, W. Thompson, Sash-locks or Window-fasteners. 734, W. & A. Rawlings, Flushing Apparatus for W.C.'s. 746, S. Fawthrop, Sash-bars and Glazing. 764, W. Barnes, Compositions to be used as Paints. 777, F. Stroeter, Water Waste Preventers. 791, R. Crowden and R. Fulton, Jan., Paperhangers' Roller.

Jan. 16.—802, J. Harding, Bakers' Ovens. 821, J. Bruce and others, Shop-window Fittings. 832, G. Higginson, Gasometer.

Jan. 17.—915, E. Noton, Paint-cans.—926, D. Nesbit, Radiators for Heating and Ventilating.—946, J. Radford, Securing Door-knobs to Spindles.—949, C. Saklaj, Arrangement of Door-bars.

Jan. 20.—974, E. Ingham, Draught-preventers for Doors.—985, H. Grinshaw, New White Pigment.—1,020, J. Hoare, Saws.

Jan. 21.—1,054, J. Cornell, Fastening for Window-sashes and Doors.—1,074, W. Ellis, Machinery for Cutting Laths, Veneers, &c.—1,095, E. Smith, Veneer-cutting Machines.—1,115, T. Haas, Locking Devices for Double or Folding Doors.—1,116, N. Proctor and Others, Brickmaking Machinery.

Jan. 22.—1,139, G. Hurdle, Self-lubricating Pulleys for Window-sashes, &c.—1,151, C. Denbigg, Window-sashes.—1,176, W. Sinclair, Compound for Cementing Iron Rails to Kerbing, Drain-pipes, &c.—1,178, W. Sinclair, Waterproofing and Preserving Composition for Stone, Bricks, Plaster, and Cement Surfaces.—1,185, C. Hunter, Extracting Cowl.—1,190, H. Lake, Valves for Flushing-tanks or cisterns.

Jan. 23.—1,194, J. Morton, Machinery for Making Bricks, Pipes, &c.—1,248, W. Hora, Building-block.

Jan. 24.—1,272, T. and H. Moorwood, Canopied Stone-grates and Fireplaces.—1,295, C. Saaw, Flushing Apparatus for Water-closets.

Jan. 25.—1,346, W. Sugg, Ventilating Apparatus.—1,363, W. Young, Securing Sash-lines to Sashes.—1,366, A. Boulé, Manufacture of Rough, Glazed, and Coloured Facing-stones.

PROVISIONAL SPECIFICATIONS ACCEPTED.

13,419, H. Lake, Saws.—14,396, C. Cavill and S. Lawrence, Window-fastener.—16,178, H. Hardy, Water-closets.—16,915, J. Margison, Door-knocker.—18,062, J. Bainforth, Securing Sash-cords.—19,782, H. Cowan, Exit-door for Theatres.—20,344, G. Rydill, Mason's Chisels, &c.—20,406, W. Lake, Cutting Veneer.—20,410, W. Cowling, Closing Doors.—20,510, R. Shapland, Twine Drying, &c.—20,833, W. May and E. Padmore, Window-fasteners.—20,845, F. Parker, Hinges.—20,848, A. Smith, Artificial Stone.—17,382, W. & J. Rhodes, Chimney Pot.—19,541, A. Palmer, Flooring, Grate, or Fire-place.—19,814, G. Pluckett, Ventilation, &c.—20,207, R. Painter, Raising and Lowering Windows.—20,303, C. Smith, Artificial Asphalt.—20,342, F. Wright and T. Gillott, Flooring for Bridges, &c.—20,454, D. Hunter, Fences and Gates.—20,460, E. Joachim, Plates

&c., for Floors.—20,467, W. Tattersall, Fans or Air-propellers for Ventilation.—20,707, R. Mullard, Paints and Varnishes.—20,786, R. Hirst, Counter Flaps and Doors.—653, E. Hesketh and A. Marcot, Cooling Air in Rooms, &c.—907, M. Walker, Ventilators.—246, W. Kuenen, Attaching Door-knobs to Spindles.—330, J. Dunmore and B. Priestley, Sash Fasteners.—363, N. Russell, Door Springs and Checks.—392, R. Brown, Nail.—451, E. Burtwell, Bracket for Shop-window Fittings.—610, A. Watson and H. Hooper, Fire-grates.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Specification for Two Months.

1,577, A. Youlten, Sliding Windows.—2,862, H. Lakowater, Closures, &c.—3,741, F. Marshall, Securing Knobs and Handles to Spindles.—3,970, E. Matheson, Tiles.—4,730, W. Townsend, Wind-guard Chimney-pots.—4,946, R. Clunes, Bricks.—4,947, R. Clunes, Pipes.—5,068, R. Blyth, Sash-fastener.—5,378, H. Leveus, Door Springs or Checks.—14,094, B. Nienhaus and J. Gaetcke, Controlling House Doors, &c.—19,259, W. Wheatley, Hesp-lock.—19,368, H. Horn and J. Effinger, Title and Protector.—19,427, E. Winchester, Door Latches.—19,744, G. Marsden, Tiles, &c.—20,097, C. Douglas and E. Smith, Saws.—20,294, O. Murray, Fireproof Structures.—2,134, H. Enoch, Water-closets.—4,524, C. Shewbrooks, Roof Covering.—4,835, J. Marks, Fasteners for Doors.—4,913, C. Elliott, Glazing Fixing Sheets of Sheet Metal, &c.—4,957, W. Lindsay, Bridges.—4,963, W. Lindsay, Sash-bars.—5,083, W. Dunn, Water-closets.—6,152, W. Williams, Ventilator.—6,507, R. Evers, Door Bolts.—16,201, W. Sayer, Air Propellers.—17,660, L. Adams, Cisterns.—18,911, P. De Kristoffovitch, Artificial Granite.—19,551, J. Crane and W. Windle, Bench-plane.—20,452, G. Hayes, Metallic Lathing.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

JAN. 27.—By J. JACOBS & SONS. Brompton—22, Michael's-grove, n.t. 37 yrs, g.r. £10, r. £100 p.a. 4,905 The lease of 24, Michael's-grove, n.t. 12 1/2 yrs, r. £10 110 41 and 46, Fulham-road, and 1a, Pelham-st., n.t. 23 yrs, g.r. £16. 1,150

By H. HOOPER.

Edmonton—34, Graham-rd., n.t. 89 yrs, g.r. £4, r. £28 12s. 110

JAN. 28.—By DEBENHAM, TENSON, & CO.

Holborn—29, Ely-pl., f., area 1,436 feet 3,560 Bishopsgate-st. Within—No. 18, area 1,860 ft., let for 51 years at £1,060 per annum.

By T. B. WESTACOTT.

Camden Town—78, Arlington-rd., f. 850 Kentish Town-rd.—No. 289, f., r. £80 p.a. 1,105

By W. J. NEWELL.

Peckham—46, Clarendon-rd., n.t. 60 yrs, g.r. £5, r. £26 210 Camberwell—50 and 52, Blake's-rd., n.t. 77 yrs, g.r. £7, r. £24 240

Rotherhithe—1 to 3, Fisher's-court, n.t. 63 yrs, g.r. £32, r. £93 12s. 20

By FURBER, PRICE, & FURBER.

Eastbourne—F.g.r. of £230, with Reversion in 70 yrs. 5,550

JAN. 30.—By E. ROBINS & HINE.

Notting-hill—9, Ludbrook-grove, n.t. 34 yrs, g.r. £4. 295

By NEWBON & HARDING.

Islington—8 and 10, Brooksbury-st., n.t. 19 yrs, g.r. £10, r. £108. 335 2, Bath-place, f., r. £23 8s. 153

3 to 6, and 9, 10, and 11, Bath-pl., f., r. £140 8s. 1,080

Camden-rd.—53, Hartham-rd., n.t. 66 yrs, g.r. £7. 370

Wood-green, Truro-rd.—"Belmont Villa," f. 340

By E. STIMSON.

Camberwell—45 to 51 (odd) Hollington-st., n.t. 70 yrs, g.r. £10. 290

6 to 79 (odd) Westminster-st., and 65, Brisbane-st., n.t. 94 yrs, g.r. £12, r. £260. 1,090

Walworth—36, Hyslop-st., n.t. 72 yrs, g.r. £5, r. £24 385

Bermonsey—10 and 12, Rother-rd., n.t. 34 yrs, g.r. £6 8s. 9d., r. £62 8s. 405

By A. H. TURNER & CO.

Outland-pk.—F. house and shop, r. £40 895 Two f. houses, with shops, r. £45 1,225

JAN. 31.—By R. REID.

Hanover-sq.—1, Princes-st., n.t. 30 yrs, g.r. £60, r. £170 p.a. 2,925

[Contractions used in these lists.—E.g.r. for freehold ground-rent; L.g.r. for leasehold ground-rent; I.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; s.t. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

New Harbours in Germany.—The German Government has decided upon constructing two new harbours in Schleswig-Holstein, viz., at Husum, on the south-west coast of Schleswig, and at Aaröund, in the Little Belt.

MEETINGS.

SATURDAY, FEBRUARY 8. Architectural Association.—Visit to Dr. Pojly Cart's Theatre, Shaftesbury-avenue.

MONDAY, FEBRUARY 10. Royal Academy.—Professor Altchison, A.R.A., on "The Private Houses and Palaces of the Romans." III. 8 p.m.

Surveyors' Institution.—Mr. G. M. Freeman on "Some Suggested Amendments in the Law and Practice of Compensation." 8 p.m. Society of Arts (Cantor Lectures).—Mr. Stivanus P. Thompson, D.Sc., on "The Electro-magnet." IV. 8 p.m. Clerks of Works' Association.—Seventh Annual Dinner, Holborn Restaurant. 6.30 p.m.

TUESDAY, FEBRUARY 11. Institution of Civil Engineers.—Further discussion on Mr. W. H. Wheeler's paper on "Bars at the Mouths of Tidal Estuaries." 8 p.m. Society of Arts (Applied Arts Section).—Mr. W. R. Leithy on "Cast Iron and its Treatment for Artistic Purposes." 8 p.m.

WEDNESDAY, FEBRUARY 12. Sanitary Institute.—Mr. Keith D. Young, F.R.I.B.A., on "Dwellings for the Labouring Classes." 8 p.m. Free Lectures to Artisans and others on Matters Connected with Building.—Professor T. Rogers Smith, on "Drawing: Geometrical and Perspective," Carpenters' Hall, London-wall. 8 p.m. Society of Arts.—Mr. G. Phindley (General Manager of the London and North-Western Railway) on "Modern Improvements in Facilities for Railway Travelling." 8 p.m.

THURSDAY, FEBRUARY 13. Royal Academy.—Professor Altchison, A.R.A., on "The Private Houses and Palaces of the Romans." IV. 8 p.m. Institute of Builders.—Mr. T. M. Rickman, F.S.A., on "An Edinburgh Contract." 8 p.m. Institution of Civil Engineers.—Students' visit to the Telegraph Department, General Post Office, St. Martin's-le-Grand.

Institution of Electrical Engineers.—Mr. J. Swinburne on "The Theory of Armature Reaction in Dynamos and Motors." 8 p.m.

FRIDAY, FEBRUARY 14. Architectural Association.—Mr. R. Elsey Smith on "Some Typical Greek Buildings." 7.30 p.m. Royal Institution.—Professor J. A. Fleming, M.A., D.Sc., on "Problems in the Physics of an Electric Lamp." 9 p.m.

SATURDAY, FEBRUARY 15. Royal Institution.—The Right Hon. Lord Rayleigh, M.A., F.R.S., on "Electricity and Magnetism." I. 8 p.m.

Miscellaneous.

Improvements in Rome.—According to a recent report of the British Consul at Rome, the Municipality of that city has, during the last seven years, undertaken an expenditure upon works of public improvement, governmental and municipal, of 11,000,000*l.*, the larger part, 9,500,000*l.*, being for works of a municipal character, comprising bridges, markets, new quarters, new streets, sewerage, water supply, &c. Of this expenditure 80 per cent. is represented by the indemnities paid for expropriation of houses and land. The demolition of old houses, and other works, have been proceeded with regularly. The works connected with the Tiber embankment proceed steadily, in accordance with the approved plans. The compressed air "caissons" are still made use of in laying down the foundations of the embankment, having proved very successful. The construction of the huge sewers proceeds in the same regular manner as the embankment. The sewers are to branch off in various directions, thus forming a general system of sewerage, placed at a considerable depth under the streets, and flushed by abundant streams of water. The Anglo-Roman Company for the illumination of Rome by gas and other systems, who have also undertaken the supply of electric light, intend utilising the hydraulic power which can be obtained at Tivoli, twenty miles from Rome, and to transmit the electric power thence, so as to illuminate Rome on a much larger scale than at present. The company will set up at Tivoli the necessary apparatus so as to obtain 1,700-horse power (electric). The current will be transmitted by overhead wires to a receiving station at Porta Pia. From there the electric light will be distributed by two systems—an overhead for public, and an underground for private illumination. The copper wires to be used for the overhead system are to be provided by the Società Metallurgica Italiana of Leghorn. The enterprise is to be completed within sixteen months, and is considered the most extensive application of the latest improvement for transmitting electric power to great distances.

Art Exhibition in Stockholm.—An art exhibition is to be opened in Stockholm, in March next, under the auspices of the Swedish Society of Arts.

St. Paul's Ecclesiological Society.—The eleventh annual report of this Society, which was presented to the annual meeting, held on Saturday last, says that the proceedings of the past year have been very satisfactory. The papers read at the evening meetings have been of great interest, and the visits, with one exception, have been very largely attended. During the year ten meetings have been held in the Chapter House, and the following papers have been read:—Two by Mr. A. Oliver, one on "Monumental Brasses and their Details," and one on "Flemish Brasses in England;" by the Rev. Ernest Geldart, on "Transepts;" by the Rev. E. S. Dewick, on "Christian Art on Coins from the time of Constantine the Great;" two, by Mr. G. H. Birch, on "Round Churches;" by the Rev. H. Hamilton Kelly, entitled, "A Study of Precedents for Liturgical Developments;" by Dr. J. Wickham Legg, on "The Divine Service in the Sixteenth Century, illustrated by the Reform of the Breviary of the Humiliati in 1548;" and by Mr. F. Hamilton Jackson, on "Mural Decoration in Churches;" and on one evening members were invited to bring for exhibition, and to describe, objects of ecclesiological interest. This was a new departure, but the result was so successful as to warrant a repetition of the experiment in the future. Afternoon visits were made to the churches of St. Mary Abbots, Kensington; St. Cuthbert Kensington, and Hammersmith; to All Saints, Fulham; to Chiswick Parish Church; to St. Alhans; to Bow and Stepey; to Wennington; and to Aveley. A whole-day visit was made to Norwich, but owing to the distance very few members attended. Part IV. of Volume II. of the "Transactions" has been issued during the year, and the Council venture to say that it is a publication of which the Society may well be proud. Attention is drawn to the fact (as shown in the balance-sheet) that the illustrations have been largely due to special contributions. The thanks of the Society are due to those who have thus contributed, and to the Rev. E. S. Dewick for the excellent service he renders the Society as honorary editor. The balance-sheet, although showing a deficit of about 12%, is regarded as satisfactory, the chief outlay being for the "Transactions," and as these are now published they will probably speedily repay their cost. Twenty-two new members have been elected during the year; the number on the register is now 274.

Liverpool Engineering Society.—The eighth ordinary meeting of the present session of this society was held on January 29 at the Royal Institution, Colquhoun-street, Mr. Henry H. West, M.Inst.C.E., President, in the chair. After the usual business, Mr. Charles H. Yeaman, A.I.C.E., &c., read a paper entitled "Notes on Central Station Electric Lighting." In giving an account of several stations at present supplying current on a commercial basis, he described the West Brompton High Tension, Glasgow High Tension, Hastings, Eastbourne, and Brighton Stations, Crompton's Battery System used at Kensington Court, and King's Subdivided Battery System in use at Chelsea, and illustrated his descriptions by mounted prints and diagrams. The history of the stations was traced, and the changes in the various systems employed noted. The author then compared and discussed the methods adopted to generate, measure, and distribute the electric energy, with regard to their general advantages, and drew conclusions therefrom as to the system of supply which will probably become general. Complete sets of junction and distributing boxes and samples of the mains employed and in use at Liverpool were shown. Samples of Fowler's cables, as used by the Horse-to-House Company in London and at Eastbourne, were also exhibited. In concluding, the author gave a short account of what is required of an Electric Supply Company under law and by the public demand, with special reference to the Board of Trade rules and to the curves of supply obtained from the various stations alluded to. The discussion upon the paper was adjourned till Feb. 26.

Art Applied to Cast-iron.—This will be the subject of a paper to be read on Tuesday evening next, at the Society of Arts, by Mr. W. R. Lethaby. The chair will be taken by Mr. H. H. Statham.

The "Herculea" Street-cleaning Machine.—We witnessed some trials of this machine last Saturday at Westminster, but want of space compels us to hold over what we have to say about it until next week.

New York Cathedral Competition.—When the choice of four plans was made by the Building Committee, of which the Rev. Dr. Morgan Dix is chairman, out of the large number of designs submitted for the proposed Protestant Episcopal Cathedral of St. John the Divine, it was decided to return these to the architects for elaboration and further competition. These plans, from which the final choice of a design was to have been made, were submitted by William A. Potter, Heins & Lafarge, J. Halsey Woods, and George Martin Huss. February 1, 1890, was set as the date of the final competition. No decision is likely, however, to be reached at that time, and from present indications it appears altogether probable that no decided steps will be taken in that direction for a year or two to come. The property upon which it is proposed to erect the cathedral is included in the site selected for the World's Fair, and pending the determination as to whether the exposition is to be held in this city, the Building Committee has decided to defer positive action in respect to plans for the proposed structure. Both Mr. Potter and Mr. Lafarge said that nothing had been done by them in the way of elaborating the plans on the part of the architects, and that the entire matter was *in statu quo*. The Board of Trustees had taken no formal action, but the architects had been unofficially notified that the requirement as to February 1 would be waived. Mr. Lafarge added that the delay was likely to prove of benefit to all parties in interest. The working out of the details of an undertaking of the magnitude of the proposed cathedral required a great deal of care and thought, and the additional time would be appreciated by the architects.—*New York Times.*

The English Iron Trade.—The stability of the English iron market has been disturbed this week by a further fall in warrants, and as a consequence *bonâ fide* business has been greatly hindered, if not entirely checked. Makers of pig-iron are holding still firmly to their quotations, because of the large amount of work they have yet before them; but the decline of warrants has been persistent. The Glasgow warrant market has almost entirely collapsed under the pressure of heavy selling. Scotch makers' prices are in consequence easier, inferior brands having been reduced as much as 5s. and 7s. a ton. There has been some selling by weak holders of Cleveland pig as low as 52s., which is a reduction of 5s. a ton since last week, but makers generally are not being frightened by this sudden drop. As a consequence, very little business is being done in the North of England as well as in Lancashire and Staffordshire, and prices in the Midlands are hardly as strong as they were. Bessemer iron has also felt the pinch, but none of the makers in the North-west have as yet made any alteration in their rates. In sympathy with crude iron, finished iron and steel are easier in tone. As, however, manufacturers of the finished products are placed as favourably with regard to orders as producers of pig-iron, and seeing that high prices of fuel and a high rate of wages will not permit them to give way much, the markets for manufactured iron and steel are pretty stable. The orders at present received for new ships are few in number and of small importance; but both shipbuilders and engineers are still as busy as they can be, and as they will be for some time to come.—*Iron.*

Competition. The Hull Branch of the York Union Bank.—The *Eastern Morning News* says that at a meeting of the directors of the York Union Bank, Limited, held in York, the plans of Messrs. Smith and Brodric, architects, of Hull, were selected from the designs submitted in a limited competition. The building will be stone, and in the Flemish Renaissance style, and will be erected at the corner of Lowgate and Bowalley-lane. The ground floor will be occupied by the banking premises of the York Union Bank, above which will be commodious offices for letting purposes. It is proposed to commence the building forthwith.

Free Lectures at Carpenters' Hall.—The first of a series of free lectures on matters connected with building was delivered in the Carpenters' Hall, London-wall, on Wednesday evening last, by Mr. Banister Fletcher, F.R.I.B.A., Master of the Company, his subject being "Architecture of the World in all Ages," illustrated by large drawings, expressly prepared, and photographs. Sir John Lubbock, Bart., M.P., presided, and there was a large attendance. We hope to be able to give a report next week.

The American Production of Pig-iron.—The output of pig-iron in the United States in 1889, as we learn from the statistics promptly issued by the American Iron and Steel Association, amounted to 7,604,625 tons, against 6,489,738 tons in 1888, which shows an increase for last year of 1,114,787 tons, or over 17 per cent. As the American production of pig-iron in 1888 was the largest, up to that year, in the history of the American iron trade, the increase of over 1,000,000 tons in 1889 is remarkable. The question as to when the United States will surpass Great Britain in the output of crude iron is illustrated by some figures which are given in the returns. In 1882 Great Britain produced 8,586,680 tons, against 4,623,323 tons turned out by the United States. In 1883 the production was 8,529,360 and 4,505,510 tons, respectively; in 1884, 7,811,727 and 4,097,868 tons; in 1885, 7,415,469 and 4,044,626 tons; in 1886, 7,009,751 and 3,683,223 tons; in 1887, 7,555,518 and 6,417,148 tons; in 1888, 7,998,967 tons. For 1889 the production of pig-iron of Great Britain is estimated at 8,300,000 tons, while the output of the United States, of which we have actual figures, reaches 7,604,625 tons, a total slightly higher than the production of Great Britain in 1887.

Application of Photography to Meteorology.—The Council of the Royal Meteorological Society have arranged to hold, at 25, Great George-street, Westminster (by permission of the Council of the Institution of Civil Engineers), on March 18 to 21 next, an exhibition of instruments and photographs illustrating the application of photography to meteorology. The Committee will also be glad to show any new meteorological instruments or apparatus invented, or first constructed, since last March; as well as photographs and drawings possessing meteorological interest.

PRICES CURRENT OF MATERIALS.

	£.	s.	d.	£.	s.	d.
Greenheart, B.G. ton	12	0	0	12	0	0
Teak, E.I. load	12	0	0	14	0	0
Sesquial, U.S. foot cube	0	2	3	0	3	0
Ash, Canada, load	3	0	0	4	5	0
Birch, do	3	0	0	4	5	0
Elm, do	3	0	0	4	5	0
Fir, Dantsic, &c. do	2	0	0	3	0	0
Oak, do	2	0	0	3	0	0
Canada, do	5	10	0	7	0	0
Pine, Canada red do	2	10	0	3	10	0
" yellow do	3	0	0	5	0	0
Lath, Dantsic, &c. do	1	4	0	10	0	0
St. Petersburg pig do	5	0	0	6	10	0
Waissoot, Riga, &c. do	0	0	0	0	0	0
Deals, Finland, 2nd and 1st. sta. 100	8	10	0	11	0	0
" 4th and 3rd	7	0	0	8	0	0
Deals—Riga	7	0	0	9	0	0
St. Petersburg, 1st yellow	11	0	0	10	0	0
" 2nd	9	0	0	10	0	0
" white	6	10	0	10	0	0
Swedish	7	10	0	14	0	0
White Spruce, 1st	9	0	0	10	0	0
Canada, Pine, 1st	16	0	0	26	0	0
" 2nd	11	0	0	17	0	0
" 3rd	8	0	0	10	0	0
" Spruce, 1st	9	0	0	11	0	0
" 2nd and 3rd	7	0	0	9	0	0
New Brunswick, &c. do	6	0	0	8	10	0
Battens, all kinds	6	0	0	17	0	0
Flooring Boards, 1 1/2 in. thick, prepared, 1st	0	11	0	0	14	0
Second	0	8	0	0	10	0
Other qualities	0	6	0	7	0	0
Cedar, China	0	4	0	0	5	0
Honduras, &c. do	0	4	0	0	4	0
Mahogany, Cuba,	0	0	0	0	0	0
St. Domingo, cargo average ..	0	5	0	0	0	0
Mexican, cargo average	0	4	0	0	0	0
Tobacco	0	0	54	0	0	63
Honduras	0	0	58	0	0	63
Bahia	14	0	0	18	0	0
Satin, St. Domingo, foot	0	0	0	8	1	3
Porto Rico	0	0	10	0	1	0
Walnut, Italian	0	4	0	0	0	0
IRON.—METALS.						
Bar, Welsh, in London	0	0	0	0	0	0
Cast-iron, in London	0	0	0	0	0	0
Copper—British, cast and ingot	56	0	0	0	0	0
Best selected	57	0	0	57	0	0
Sheets, strong	64	0	0	65	0	0
Cast-iron bars	45	15	0	0	0	0
YELLOW METAL, in lb.	0	5	0	0	6	0
LEAD—Pig, Spanish	12	17	0	0	0	0
Sheet, English	15	5	0	0	0	0
Pipe	15	0	0	15	0	0
TIN—Straits	94	0	0	0	0	0
Australian	94	0	0	0	0	0
English Ingots,	93	0	0	0	0	0
Lined	19	0	6	21	2	6
Cocoanut, Cochiti	26	0	0	26	10	0
Ceylon	23	10	0	0	0	0
Patil, Laos	21	0	0	24	10	0
Rappeseed, English pale	32	10	0	32	15	0
" brown	31	0	0	31	5	0
Cottonseed, refined	21	10	0	22	0	0
Tallow and Oleic	21	0	0	40	0	0
Lubricating, U.S. do	5	10	0	6	10	0
" refined	7	0	0	12	0	0
TAR—Stockholm, in barrel	1	6	0	0	0	0
Archangel	0	17	6	0	0	0

CONTRACTS & 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 entries for paving-up roads, water and other works, and various construction contracts.

PUBLIC APPOINTMENTS.

Table with 5 columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Lists appointments for various roles like Foreman, Surveyors, and Inspectors.

TENDERS.

Multiple sections of tender notices for various projects including alterations to schools, bridges, and public buildings in locations like Leytonstone, London, and Bristol.

LONDON.—For the removal of fifth at Barking-outfall works for the London County Council:— C. Abbott & Sons, Hertford road, Kingsland, £820 0 0

LONDON.—For altering, adapting and painting the University Hall, Gordon-square, for the trustees of the late Dr. Daniel Williams. Mr. T. Chatfield Clarke, architect, 25, Bishopsgate-street, E.C. Quantities by Messrs. Leonard & Clarke, 205, Bishopsgate-street, E.C.:

LONDON.—For rebuilding No. 50, Tottenham-court-road, for Mr. Frank Moss. Messrs. Edmeston & Gabriel, architects, 42, Old Broad-street, E.C. Quantities supplied by Mr. G. R. Tasker, 38, John-street, Bedford-row, W.C.:

LONDON.—For alterations to shop front, &c., at No. 85, Brompton-road, S.W. Mr. Morewood, architect. No quantities:—

LONDON.—For alterations at the "Ranelagh Arms," Ranelagh-road, Old Ford, E. Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within, E.C.:

LONDON.—For alterations, &c., at "The Manor House," Finsbury Park, for Mr. J. Swinayr. Mr. John E. Finley, architect and surveyor, Bridge House, South Tottenham:

LONDON.—For alterations to the "Brewery," Seans-street, Haggerston, for Messrs. Danell & Sons. Messrs. Jamieson, Mr. J. W. Start, surveyor, Cups Chambers, Colchester:

LONDON.—For further additions at 39, Red Cross-street, E.C., for Messrs. Capua & Co. Messrs. Edmeston & Gabriel, architects, 42, Old Broad-street, E.C.:

LONG EATON.—For works for water supply for the Long Eaton Local Board. Mr. Geo. Hodson, M.Inst.C.E., engineer, Loughborough:—

LONDON.—For certain alterations, painting, and decorating, for new dining-room at the "Criterion" Restaurant, Piccadilly, for Messrs. Spiers & Pond & Co. B. E. Nightingale (accepted) £200 0 0

The Builder.

Vol. LVIII. No. 245.

SATURDAY, FEBRUARY 15, 1890.

ILLUSTRATIONS.

Furniture and Decoration of "Greek Room" at 21, Gloucester-road, N.W.—Designed by Mr. H. A. Kennedy	Two Single-Page Typo-Gravures.
Stone Screen for a Large Town Mansion: The Prize Design.—By Mr. James C. Watt	Two Double-Page Photo-Litho's.
Plan of the House of Pansa, Pompeii	Single-Page Ink-Photo
Roman Capitals from Pompeii	Single-Page Ink-Photo.

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Art and Architecture in Browning's Poetry.



POETRY was defined by a great English critic, Matthew Arnold, as being essentially "a criticism of Life"; a definition which, if not the whole truth, at all events is one which applies with peculiar

fitness to the remarkable poet whose obsequies were celebrated a few weeks since in Westminster Abbey. The extent and variety of knowledge of and interest in all kinds of subjects which permeates Browning's poetry is extraordinary, and can only be fully realised by those who have been careful students of his works. Nothing seems to have escaped him: the most out-of-the-way events in history, the most curious phases of human character, the most minute incidents in nature, are referred to as passing illustrations, or dwelt upon with minute knowledge and insight—and among the subjects he knew best and delighted to discuss most were those connected with art, including music, architecture and painting. In the short poem entitled "How it Strikes a Contemporary," in which he gives a kind of ideal sketch of a poet as he appeared to the people about him, he represents him characteristically as a man who was remarked upon as taking note of everything around him, including the new buildings: the scene is laid in Spain—

"You saw go up and down Valladolid
A man of mark, to know next time you saw."

"You'd come upon his scrutinising hat,
Making a peaked shade blacker than itself
Against the single window spared some house
Intact yet with its mouldered Moorish work—
Or else surprise the ferrule of his stick
Trying the mortar's temper 'tween the chinks
Of some new shop a-building, French and fine."

The artist will not fail to note the truth of observation in the incident of the hat making a shadow "blacker than itself." In music Browning was one of the most acute and thoughtful of critics, with a wide range of knowledge of the art, the scientific basis of which he had systematically studied; and in regard to the history of painting and painters (Italian especially) he possessed such an amount of special knowledge that he would sometimes startle professed artists or art-critics by information in regard to some half-

forgotten painter whose name they hardly knew. In one of his later volumes, "Parleyings with Certain People," out of the seven persons of more or less *passé* reputations who are "parleyed" with, two are painters and one a musician; and of the two painters dealt with it would be interesting to know how many ordinary readers ever heard of "Francis Purini" or "Gerard de Lairese"; though both, as Browning leaves us in no doubt, were important persons in their day and in their artistic ambition.

In the main, however, the references to art in Browning's poems are not so much accessions to our knowledge as vivid side-lights, sometimes of criticism, sometimes of reminiscence and description, generally thrown out in passing, as illustrations of a thought, or as picturesque associations connected with the main subject in hand. There occasionally occurs a poem dedicated primarily to some artistic subject, but these are in the minority. In general, what we get from Browning are passing thoughts on the *raison d'être* of this or that form of art, or vivid touches of description which seem to flash a sudden light on some building or picture, and leave it in the memory with a new meaning for the future.

There are, however, two or three special poems which are definitely, though in a more or less indirect manner, studies in art criticism, or in the philosophy of art. One of the best and most characteristic of these is the semi-prose lyric, "Master Hugues of Saxe-Gotha," which however, being directly and mainly concerned with musical form, is out of our proper function here, though it has at the close a wider application to art generally as well as to the relation between life and nature, the conventional and the real. The two most important of the poems which are concerned with the philosophy of painting are entitled after the names of painters, "Fra Lippo Lippi" and "Andrea del Sarto," put probably not without intention next to each other in the old edition; the one the philosophy of the man who was content with a cheerful realism, the other that of the man who, if he did not truly aspire after idealism, at least regretted that he had not. "Lippo Lippi" contains things that come so appropriately into the modern art philosophy, that it has been quoted by writers and lecturers on art, if not *ad nauseam*, at least to the point of becoming somewhat hackneyed. The poem is, to begin with, a capital sketch of the jovial

but not very reputable painter who, as he complained, had been inducted with monkish vows when he was eight years old and knew no better, and who delivers his disjointed talk, intermixed with snatches of song, to a knot of men who catch him in a summer night in the streets of old Florence over some kind of escapade, and slips away with a "zooks!" as the dawn shows. Lippi was found by the monks, as he grew up, to be a good hand at painting; he was given a piece of cloister wall, and painted all sorts of people who came to the convent, to the delight of the crowd, who found the figures as real as life, but to the scandal of the Prior and the more learned brethren, who found this realism quite from the true mark of painting—

"Your business is not to catch men with show,
With homage to the perishable clay,
But lift them over it, ignore it all,
Make them forget there's such a thing as flesh;
Your business is to paint the souls of men"

Lippo wants to know how he is to do this without painting their bodies as well as possible first—

"Or say there's beauty with no soul at all
(I never saw it—put the case the same—)
If you get simple beauty and naught else,
You get about the best thing God invents:"

a distich not to be lightly forgotten. "Andrea del Sarto," a poem in a far more serious vein, may be taken as putting the other side of the question. Andrea is in the main pleased and satisfied with his reputation as the "perfect painter;" what he paints, as he boasts to his wife, he can do perfectly and with ease.—"No sketches first, no studies, that's long past,"—he can do with ease what many agonise to do and fail. But a revulsion comes over him; does not there perhaps burn a truer light of God in some of these unsuccessful ones, striving after an ideal they could not reach? Andrea is a man of art for Art's sake, as he admirably describes his abstraction in his own aim—

"I, painting from myself and to myself,
Know what I do, am unmoved by men's blame
Or their praise either. Somebody remarks
Morello's outline* there is wrongly traced,
His hue mistaken; what of that? or else,
Rightly traced and well ordered; what of that?
Speak as they please, what does the mountain care?
Ah, but a man's reach should exceed his grasp,
Or what's a heaven for? All is silver grey,
Placid and perfect with my art: the worse!"

* Apparently Morello was a hill visible from the window where the artist and his wife were supposed to be seated.

Truly Raphael was not equal to him as a draughtsman; Agnolo himself had said so; and there was a design of Raphael's on the wall which did not appear in all things correctly foreshortened—

"Indeed the arm is wrong;
I hardly dare . . . Yet, only you to see,
Give the chalk here—quick, thus the line should
go
Ay, but the soul! He's Raphael! rub it out!"

It was not without reason, either, that Browning placed in immediate juxtaposition with these two poems the one entitled "Pictor Ignotus: Florence, 15—": the soliloquy of the monk who felt he might have gained renown too as a painter—

"Nor will I say I have not dreamed (how well!)
Of going—I, in each new picture,—forth,
As, making new hearts beat and bosoms swell,
To Pope or Kaiser, East, West, South, or North,
Bound for the calmly satisfied great state
Or glad aspiring little burgh, it went,
Flowers cast upon the car which bore the freight
Through old streets named arch from the event."

lines which at once recall Sir F. Leighton's early picture of the procession of Cimabue's Madonna, the festival time when picture painting was a great discovery, a new power and glory among men. But alas! our speaker with prophetic eye sees another phase in the future—

"Who summoned those cold faces that hegun
To press on me and judge me? . . ."

These buy and sell our pictures, take and give,
Count them for furniture and household stuff,
And where they live needs must our pictures
live,

And see their faces, listen to their prate,
Partakers of their daily pettiness;
Disursed of—'Tis I love, and this I hate,
This likes me more, and this attracts me least,
Wherefore I choose my portion."

which was, to paint endless cloisters with virgins and saints, holy but monotonous, left to linger and decay there, but at least never to become the sport of the modern picture dealer and collector, to furnish the walls of some railway or commercial magnate, knowing in the market value of pictures, but as incapable of feeling the soul in them as the wall he hangs them on. Certainly it is not superfluous that the poet, the seer, should remind us in this dramatic manner of the gulf that lies between the popular view of painting in the early cinque-cento period and in the present day.

Following upon the three last-mentioned poems comes that remarkable sketch of the æsthetic worship characteristic of the Renaissance period, "The bishop orders his tomb in St. Praxed's Church: Rome, 15—": the Renaissance bishop, whose whole soul, as he felt death approaching was set upon having a truly artistic tomb built of the richest materials, such as would put to shame that of his predecessor—

"Old Gandolf with his paltry onion-stone."

Gandolf had indeed taken the best niche from him:—

"Shrewd was that snatch from out the corner
south

He graced his carrion with, God curse the same!
Yet still my niche is not so cramped but thence
One sees the pulp of 'the epistle-side,
And somewhat of the choir, those silent seats,
And up into the sky dome where live
The angels, and a sunbeam's sure to lurk:
And I shall fill my slab of basalt there,
And 'neath my tabernacle take my rest,
With those nine columns round me, two and two,
The odd one at my feet where Anselm stands:
Peach-blossom marble all, the rare, the ripe,
Like fresh poured red wine of a mighty pulse."

So did the bishop of the Renaissance muse as he lay dying on his bed—

"And let the bedclothes, for a mort-cloth, drop
Into great laps and folds of sculptor's work,"

and suggested to the hystanders the subjects which should compose the frieze, as Pans and nymphs, a tripod, thyrus, a vase or so, and the Saviour at his Sermon on the Mount, with the delightful illogical jumble of Pagan and Christian which seemed nowise incongruous in those days of the religion of art and

letters. This, like other touches here and there in Browning's poems, shows how remarkably he had penetrated and could express the very spirit of the art and the taste and feeling of a past age.

If we turn from sketches of former periods of art to our poet's teaching on art as it is, we shall not find him wanting there either. Lippo Lippi thought simple beauty and nought else about the best of God's inventions; but the poet, speaking his own feeling (as we may certainly conclude), in a passage from the poem entitled "James Lee's Wife," goes further than that and in a nobler strain, in showing the beauty that is to be found by the artist even where it may be missed by the careless observer. Is there nothing, do you say, in an ordinary hand?

"As like as a hand to another Hand?"
Who said that, never took his stand,
Found and followed, like me, an hour,
The beauty in this,—how free, how fine,
To fear, almost, of the limit-line!

'Art is dull and staidy void!
So sayest thou? So said not I,
Who threw the faulty pencil by,
And years instead of hours employed,
Learning the veritable use
Of flesh and bone and nerve beneath
Lines and hue of the outer sheath,
If haply I might reproduce
One motive of the mechanism,
Flesh and blood and nerve that make
The poorest coarsest human hand
An object worthy to be scanned
A whole life long for their sole sake."

Has anything better been said than that burst of enthusiasm over the sacredness, as it may be termed, of the conscientious study of the artist from nature? It is worthy to be copied and hung up, as a poet's sermon on art, in all the art-schools of the kingdom.

We referred above to the "Parleyings with certain people." "Gerard de Lairesse" is apropos of a painter who became blind in his latter days, and solaced himself by a treatise on the art of painting, and more especially of landscape painting and what might be expressed thereby, which gives Browning a cue for a splendid series of sketches of scenery in not too smooth verse; but the poem is rather a study in nature than in art. The one on "Francis Furini" has more special point in regard to art and to some questions of the present day, and might almost seem to have been written, or some parts of it, with sarcastic reference to the correspondence initiated some years ago in the *Times* by a correspondent who made herself unhappily proverbial as the "British Matron." Furini was an artist skilled in nude painting, whose pictures have still, we believe, an artistic value; concerning whom was circulated a tradition that on his death-bed he had begged that his works should be burned; a tradition which the poet in no wise accepts as probable. But it seems, at all events, that Furini was attacked by certain moral critics of his own day concerning his art, more especially as to his sources of study—

"For, whom had he to thank,
This self-appointed Nature-student? Whence
Ficked he up practice? By what evidence
Did he become unhandsonely adept
In simulating bodies? How except
By sight of such?"

"Unhandsonely adept" is good (to borrow Polonius's phrase). To which Furini makes the answer of the artist in all ages:—

"Did you but know, as I,
O scruple-splitting sickly-sensitive
Mild-moral-monger, what the agony
Of Art is ere Art satisfy herself
In imitating Nature!":—

And on the general subject of the mental and moral sense of "the Satyr masked as Matron" the poet has some remarks as strong as they are true, but which unfortunately are not likely to reach those who stand most in need of them.

In regard to architecture Browning is constantly throwing bright though momentary lights on the architecture of the past, often dropped in the most casual way in a sentence referring mainly to something else. He writes as if the old thing, now gone and forgotten,

were before his eyes. In "Sordello," for example, the Pope's Legate approaching Ferrara after the city had been sacked, is described as looking wistfully from outside the city ditch after "the flock of steeples" which were there in Este's time, and with which he used to be so familiar. These were by no means church steeples, but the tall narrow towers which were in the middle ages habitually attached to the houses of the principal families in Italian cities, for defence or as places of retreat in extremity. It may be doubted whether another poet of the day knew that; but Browning writes as if he had the old towns before his very eye. Another picturesque bit of old architecture brought into what is really a beautiful love-lyric, "By the Fireside," is interesting both as a picturesque addition to the scenery of the poem, and as illustrating Browning's loving eye for old bits of art-work wherever met with. The husband and wife are recalling their walk long ago as lovers:—

"And yonder, at foot of the fronting ridge
That takes the turn to a range beyond,
Is the chapel reached by the one-arched bridge
Where the water is stopped in a stagnant pool,
Danced over by the bridge.

The chapel and bridge are of stone alike,
Blackish grey and mostly wet;

It has some protension too, this front,

With its bit of fresco half-moon wise
Set over the porch, Art's early wont:
'Tis John in the Desert, I surmise,
But has borne the weather's brunt.

Not from the fault of the builder, though,
For a pent-house properly projects
Where three carved beams make a certain show,
Dating—good thought of our architect's—
'Fivo, six, nine, he lets you know."

If this means, as we presume, 1569, of course the reference to the fresco as "art's early wont" merely means that it is a survival of an older habitude. And if we turn to the poem called "Christmas Eve" we can see in section X. how Browning dwells with equal sympathy on the great basilica as on the little roadside chapel,—on the front of St. Peter's with its colonnades,—

"With arms wide open to embrace
The entry of the human race."

And Browning had prophecies for the future as well as love for the past of architecture. The main point and climax of his poem called "Old Pictures in Florence" lies in the suggestion of the enthusiasm with which the completion of the Florence campanile would be hailed; Browning being one of the few people who had eyes to see that the campanile is incomplete and requires a spire or lantern, and contemplating the day when the campanile

"Shall soar up in gold full fifty braccio
Completing Florence, as Florence Italy.
Shall I be alive that morning the sea-ford
Is broken away, and the long pent fire
Like the golden hope of the world, unbuffed
Springs from its sleep, and up goes the spire,
While, 'God and the people' plain for its motto,
Thence the new tricolor flaps at the sky?
At least to foresee that glory of Giotto
And Florence together, the first am I!"

Alas! the poet is no longer alive and the campanile not yet completed. The poem was written, as every reader will perceive, many years ago, when the idea was afloat that Florence was to take the lead as the capital of Italy, and when, as aforesaid, it first occurred to Browning, of modern writers, that

"Thy great campanile is still to finish."

The whole poem is full of vivid pictures, commencing with the City of Our Lady of the Flowers herself, as seen glorious in the morning sunlight

"In the valley beneath wher, white and wide,
And washed by the morning water-gold,
Florence lay out on the mountain side.
River and bridge and street and square
Lay mine, as much at my beck and call
Through the live translucent bath of air,
As the sights in a magic crystal ball."

But the fair Florence contains sights to mourn over, too; how the dear old frescoes

drop from the walls, and how the poet laments hopelessly over it, a sad spectator—

"Wherever a fresco peels and drops,
Wherever an outline weakens and wanes
Till the latest life in the painting stops,
Stands One whom each fainter pulse-tick pains;
One, wishful each scrap should clutch the brick,
Each thine not wholly escape the plaster
—A lion who bites of an ass's kick,
The wronged great soul of an ancient master.

Their ghosts still stand, as I said before,
Watching each fresco flaked and rasped,
Blocked up, knocked out, or whitewashed o'er
—No getting again what the Church has grasped.

The works on the wall must take their chance,
Works never conceded to England's thick
air.

(I hope they prefer their inheritance
Of a bucketful of Italian quicklime.)"

In some ways, unhappily, things seem to be almost worse in regard to the decaying remnants of early Italian art now than ever; there is a well-educated minority who regard them with reverence, but the desire to modernise (not altogether an unreasonable one, be it said) seems to be pervading Venice, Rome, and Florence one after another, and things are fading away or being removed which are among the last material links with the souls of wonderful generations of men gone before.

Among the touches of architectural details in landscape is an admirable one in "Pippa Passes," in the passage where Ottima leans out of the window of the villa in the morning—

"Ah! the clear morning! I can see St. Mark's;
That black streak is the belfry. Stop; Vicenza
Should lie . . . there's Padua, plain enough,
that blue!"

a bit of distance in which the "black streak" of the belfry stands out as clear as if we saw it. The fourth scene in "Pippa Passes," in the sculptor's studio, is full of fine suggestions as to style and subject in sculpture; interesting among other things as showing Browning's acute perception of the relation of material to design; when the sculptor's bride looks at the plaster model of one statue he checks her—

"Ah! do not mind that—better that will look
When cast in bronze—an Almain Kaiser, that,
Swart-green and gold, with truncheon based on
hip:"

the very thing to look best "when cast in bronze"; while for marble we have

—"Hippolyta
Naked upon her bright Numidian horse."

There follows a splendid description of a subject for a bas-relief panel—the minstrel singing the praise of Hipparchus, with face upturned and a background of eager listening faces behind him: a passage we really wonder that no sculptor has (as far as we know) thought it worth while to take up and try to realise; there is a splendid subject, as it were, going begging; but our artists (judging from the scraps of quotation we see appended to the titles in Royal Academy catalogues) seem to pay little attention to the suggestions they might find in high-class poetry and literature, and run mostly after literary commonplaces and hackneyed passages that suggest nothing but commonplace ideas. There is a fine passage further on in the same scene, on the same subject of the tools and materials of the sculptor's art—

"But of the stuffs one can be master of,
How I divined their capabilities!
From the soft-rinded smoothing facile chalk
That yields your outline to the air's embrace
Half-softened by a halo's poorly gloom;
Down to the crisp imperious steel, so sure
Do out its one confident thought clean out
Of all the world. But marble!—neath my tools
More pliant than jelly—as it were
Some clear primordially creature dug from depths
In the earth's heart, where itself breeds itself,
And whence all baser substance may be worked;
Refine it off to air, you may,—condense it
Down to the diamond!—is not metal there,
When o'er the sudden smelt my chisel trips?
Not flesh, as flake off flake I scale, approach,
Lay bare those bluish veins of blood asleep!"

Sculptors, at any rate, must admit that they have their poet in Browning.

To return, in conclusion, to architecture, the most remarkable passage certainly on that subject is in "Sordello," that supposed incomprehensible poem of which it has been said that "the foot of every page is marked by the tombstones of those who have perished in the attempt." The poem is not so obscure as is supposed, when the clue to its peculiar style is once obtained: we are not concerned, however, with expounding more than the special passage now referred to, at the commencement of the fifth book. This is really a rapid sketch of the development of architecture, suggested by a passing reference in the poem to the thought that "Rome was not built in a day." It might stand as a kind of brief poetic *résumé* of Viollet-le-Duc's "History of the Habitation"; the idea being that we follow the various aspects of architecture as if we had lived through all the ages, or revisited the world from time to time to see how building was getting on. The remarkable thing in Browning's passage is the amount that he contrives to suggest in a few words. We append one or two explanatory notes for those who find the poet's form of expression somewhat too cursory. We commence with the time when all that is wanted is mere shelter for this or that half-savage human creature:—

"Study mere shelter, now, for him, and him.
Nay, even the worst,—just house them! any cave
Suffices: throw out earth! A loophole! Brave!"
They ask to feel the sun shine, see the grass
Grow, hear the larks sing! Dead art thou, alas,
As I am dead! But here's our son excels
At hurdle-weaving any Scythian, fells
Oak and devises rafters, dreams and shapes
His dream into a doerpest, just escapes
The mystery of hinges. Lie we both
Perilous an' o'er age. The goodly growth
Of brick and stone! Our building-pelt was rough;
But that descendant's garb suits well enough
A portico contriver. Speed the years—
What's time to us? § At last a city rears
Itself! nay, enter—what's the grave to us?
Lo, our forlorn acquaintance carry thus
The head! † Successively sower, forum, cirque—
Last age, an aqueduct was counted work,
But now they are the artificer upon
Blank alabaster, black obsidian
—Careful, Jove's face be duly fulgurant,
And mother Venus' kiss-crested nipples pant
Back into pristine pulpiness, ere fixed
Above the baths."

Admitting the rather obscure wording here and there, it would be difficult to praise too highly the masterly manner in which the main characteristics of various ages of architecture are touched upon, from the time when to primitive man a hinge was a mystery just beyond the mental grasp, dimly foreshadowed perhaps in the still half brute intellect, down to the Roman sculpture decoration in marble and obsidian, the intellectual value of which is so accurately and half-sarcastically hinted at in reference to the care that Jove's face should be "fulgurant enough"; a sufficiently thunder-wielding sort of god the Roman sculptor could make him, but hardly soared beyond this accepted and conventional type, which answered well enough for decorative purposes, and was repeated with little other aim.

We have said and quoted enough, we hope, to suggest to artists and architects that it is worth their while to know their Browning, for congenial intellectual recreation if not for artistic suggestion and inspiration. We will conclude with one other short quotation in prose from the penultimate scene of "Pippa Passes," which has a peculiarly real application at a time when there is so much striving after originality in art, so much complaint that the old ideals are worn out, the old tracks beaten bare: a time too when there is rather a tendency among artists to try their hand at other branches of art than those which they have ostensibly and formally studied. The old church dignitary, referring to a determination of Jules, the sculptor (he of the previously-named

* The first rude idea of the window obtained.
† The cave generations pass away, to be succeeded by the hut-builders.
‡ "Felt," a raw hide; our hut-building men were clad only in a rough hide while at their work; our portico man has developed a civilised drapery.
§ It having been agreed that we are to be supposed to live from age to age to see the spectacle.

studio scene) to forsake sculpture and try to find a new path in painting, observes meditatively, "Foolish Jules! and yet, after all, why foolish? He may,—probably will, fail egregiously; but if there should arise a new painter, will it not be in some such way, by a poet now, or a musician (spirits who have conceived and perfected an ideal through some other channel) transferring it to this, and escaping our conventional roads by pure ignorance of them?"

NOTES.



MEMORIAL signed by a very large number of the leading artists of England, as well as by educated persons interested in art, was forwarded some time since to the Mayor and Corporation of Liverpool from the Committee of the National Art Association, expressing a hope that they would reconsider their decision to discontinue the decoration of St. George's Hall by Mr. Stirling Lee's sculpture panels, two of which are *in situ*, and have been the object of the most stupid and ignorant abuse by people who had too little idealism to understand their meaning. The letter was read at the last meeting of the Liverpool Town Council, and ordered to be referred to the Finance Committee; some opposition to this being withdrawn on the representation that it would be a want of courtesy to the artists of England to refuse to consider it. We are glad to hear that the Liverpool Town Council have got as far as that, at all events. A letter was read from Mr. P. H. Rathbone, offering to bear the sole cost of the execution of the four remaining panels, on condition that the whole should remain for public criticism for five years. This reasonable and liberal proposal was described by Alderman Livingston, who appears to be the leader of the Philistines in the Council, as "amounting to something like arrogance." Mr. Rathbone, in the course of some remarks, quoted a letter from Mr. Gilbert, the sculptor, stating that the panels already executed were the best things of their kind in England: in which we certainly believe he is right. Mr. Rathbone does not always show the wisdom of the serpent in his championship of art, but he understands thoroughly what he is talking about, and his proposition seems a most reasonable as well as liberal one. When the Liverpool public found, as they probably would find, that the completed series was a thing that visitors would come out of their way to see, they would possibly recognise the fact that they had made a serious blunder in their treatment of Mr. Lee and his work. Mr. Rathbone's offer also is at all events to have consideration, and we hope it will be accepted. The town ought to be very grateful to him for it.

THE first witness examined on behalf of the traders who have lodged objections to the proposed railway rates was Mr. Marshall Stevens, who has given much attention to this subject. He considers that the estimated loss to the companies owing to the rise in the price of coal has been exaggerated, seeing that the prices only went up in prosperous times when the railways were doing an increased business. The improving dividends in the face of the recent advances may be looked upon as supporting this contention, but at the same time it must be remembered that the greatest effect of the rise will be felt in the contracts for the current half-year. As a set-off against the array of figures brought forward by the railway companies, an interesting calculation which was given by Mr. Stevens is worthy of notice. Assuming the proportion of capital devoted to goods and mineral traffic to be 265,841,172*s.*, he estimates that an addition of 1*½*d. to the rates would yield one per cent. on the capital. Other calculations which were submitted would have been of more interest had not the correctness of the estimates been open to question, but in cross-examination by

Sir Henry James this part of the evidence was somewhat shaken. Sir H. James also scored a point on Monday with reference to the rates on French railways, which, the witness had asserted, could be "found at a glance." When furnished with a French rate-book, however, although assisted by a French witness, he unfortunately failed to find certain rates on a French line which Sir Henry called for,—the result of this challenge causing some amusement. Mr. Stevens expressed his readiness to prepare a revised classification if the Court would intimate their willingness to accept it,—which, of course, they were unable to do. It would appear that the proposals are based upon the Railway Clearing-house classification, but more classes would be added, and each article classed both at company's and owners' risk, and also in regard to the smallest and the largest quantity usually carried. It was also suggested, with respect to terminals, that the charge for actual services should be based upon the actual cost, with an addition of 10 per cent. as a margin. This is the course pursued by the Mersey Docks and Harbour Board; and, as Mr. Marshall Stevens is an official of the Manchester Ship Canal, we suppose that they will adopt it also.

THE Queen's Speech promises legislation on several matters of interest to the readers of this journal. Bills are to be brought forward for the consolidation and amendment of the laws with respect to public health in the metropolis and to the dwellings of the working-classes. Consolidation will probably be accompanied by some small improvement in the substance of the law. A Bill for the better regulation of savings banks and friendly societies, which is also promised, is much needed, and we hope some member may criticise the administration of the Post Office Savings Banks, which are not as popular as they might be. Having over and over again called attention to the bad state of the barracks all over the United Kingdom, it is satisfactory to find that the attention of Parliament will be directed to the making of better provision for barrack accommodation and the health of the troops. It is only to be regretted that measures with this object were not earlier taken—but at any rate, late is better than never. When these several subjects come in detail before the House of Commons they will, doubtless, be open to abundant criticism.

SO much has been said lately on the thorny question of assessment for "betterment" of private property by the carrying out of public improvements, and so much more is likely to be heard of it in the immediate future in connexion with the "betterment" clauses of the London County Council's Bill to authorise the Strand Improvement, that we quote from a letter in the *Speaker* for February 8 the following passages as to the practice of assessing for "betterment" in the United States. The writer, whose name does not appear, but who is stated to be an American, says:—

"I have asked several lawyers, and they report that they know of no State which does not assess property benefited by improvements. There is the mode in New York State, and, substantially, in Pennsylvania and Eastern States generally:—

1. General Tax, including Police, Lighting, and State Tax.

2. Water Tax.

3. Assessment for Local Improvements. The last is assessed by a Commission of three members appointed by the Supreme Court of the State, 'to appraise damages and assess benefits.' This Commission defines areas affected, to begin with. They can also place part of assessment upon the city as a whole. All their proceedings reported and subject to Supreme Court; but Court approves, except in very rare instances indeed.

Second Branch, Permanent Board of Assessors appointed by City authorities (Councils in some States), controls grading, sewerage, paving, &c., of streets, subject to confirmation of a 'Board of Revision,' composed of City Controller, City Recorder, and Corporation Counsel.

The principle is . . . universally recognised. . . . When States adopt new Constitutions it

may be inserted, and others pass general laws. Nevertheless, all cities practice assessments for benefits and damages for injuries to property affected within a defined area."

This is interesting, as showing that not only "betterment" but "worsement" (to use the barbarous words which figure in the controversy) is provided for. The question hitherto with difficulties. A course of procedure which may have been found to work well in a new country is not easy of application in an old country with old institutions. Nevertheless, it appears to be only just that owners whose property is clearly and permanently increased in value by public improvements should contribute *pro rata* to the cost of such improvements, and that the whole cost should not fall upon the temporary occupiers of the property.*

A HOUSEHOLDER (Mr. George Tonge) writes to the *Times* of Monday a letter with regard to the insanitary state of his house and the results which, if the facts are correctly given, is very significant. Various members of the family were attacked with diphtheria, and the doctor sent a notice to the local sanitary authority (the house was in West Hampstead) expressing an opinion that something must be wrong with the drainage. The house was visited by an Inspector of Nuisances, "who after a few inquiries and a cursory examination pronounced everything right." The tenant appealed twice for further examination and received a written certificate that nothing was wrong with the house. Diphtheria and sore throats continued to develop however. Mr. Tonge says:

"Our doctor gave immediate information to the authorities of the reappearance of the disease, adding, 'second outbreak in six months; something must be wrong.' My wife also wrote a strong letter asking prompt attention. After the lapse of three or four days the inspector came, having made an arrangement with the builder to meet him here. In reply to my wife's statement, he said after so thorough an examination as had been made no further inspection was necessary. He recommended us to change our milkman, and added he supposed we wanted the boards up, and suggested our having an independent surveyor."

The independent surveyor was called in, and on opening of the drains brought to light the fact that "the passage to the main drain was blocked, and the pipes under the house not water-tight, and the sewage had leaked, contaminating the basement." We suspect the statement that "the passage to the main drain was blocked" is an exaggeration, perhaps made under a misapprehension: if that had been the case it would have been impossible for any inspector (or tenant) not to know at once that something serious was wrong. But the defective jointing of drains under a house is common and probable enough, and quite sufficient in itself to account for the illness mentioned, and we should like to know whether the perfunctory pretence at examination which failed to discover this is typical of the manner in which Sanitary Inspectors perform their duties. If so, the sooner there is a reform the better. Defects of this kind cannot be diagnosed by asking questions and looking at the walls and floors of a house. The Inspector could probably have tested the drains even without having "the boards up," and ought to have done so in the first instance.

AGAIN German artists have an opportunity of showing their rival merits in designing a suitable memorial for the late Emperor William. This time it is the province of Westphalia that intends honouring the memory of the deceased monarch, and a site has been chosen on the famous Wittekind's-mount of the Porta Westphalia, near Minden, for a monument of mainly architectural structure. The official conditions tell the would-be competitor that he is required to make his design harmonise with the landscape surrounding it, and that his work

* We have, at the last moment, received a statement of reasons against the "betterment" principle, issued by the Council of the Surveyors' Institution, to which we may call further attention.

should be able to demonstrate to the stranger who views the erection from a distance that it is a memorial to an Emperor that he has in sight. A statue of the deceased has to be brought into the design, and suggestions for relief sculpture are desired. The cost, including sculpture, is not to exceed 30,000*l.*, and specifications have to be handed in to show that the design will not require a higher sum. Four premiums, two of 75*l.* and two of 50*l.*, have been offered, and if it were not for the great honour of coming out first in this patriotic competition, these premiums, so utterly out of proportion* to the amount of work required, would in themselves scarcely entice artists to compete. The names of the nine members of the jury have been published.

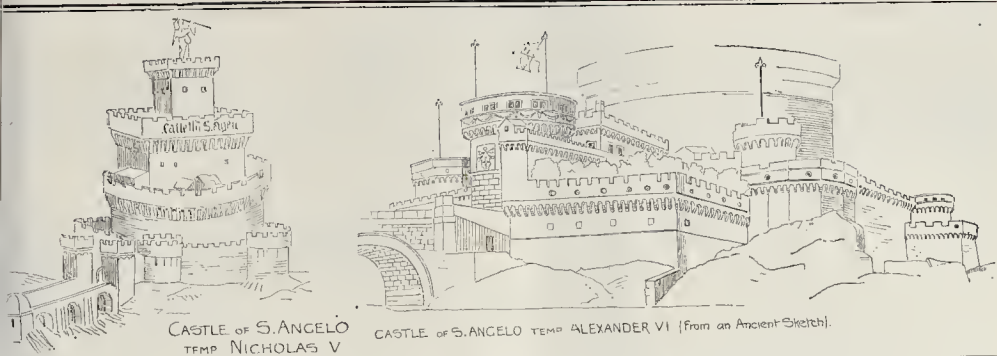
THERE seems to be some probability of the architectural profession being represented in the Imperial Reichstag. Among the candidates for the general elections, which take place this month, we find the names of Baurath Wallbrecht, Hanover; Baunsp. Zeidler, Stettin; and Herr Baumeister Anke, Chemnitz. Dr. Römer, who has up till now been the only member in any way associated with architecture, has been obliged to refuse his candidature on account of ill-health.

THE Prince Regent of Bavaria intends giving Munich a personal present, in form of a bridge over the river Isar. This bridge, which will be situated between the Maximilian and Bogenhauser crossings, is to be an iron-arch one, with a span of 46.60 m. The carriage-road will be 9.60 m. broad, and the two footpaths each 2.70 m. "Oberbaurdirektor" von Siebert, who has designed the bridge in conjunction with the Director of the South German Bridge-building Company, Herr Gerber, is to have the superintendence of the work, which is to be commenced as soon as possible. In order to have some decoration on the otherwise very plain elevation, four obelisks and sixteen very handsome candelabra will give the bridge a finish. The Crown Surveyor's estimate shows that the magnificent gift will cost Prince Luipold some 15,000*l.*

ON account of the continual stoppage of railway traffic during the winter months, caused by snow-drifts, the Prussian Government has asked the "Landtag" to grant 35,000*l.* for the purpose of erecting snow-shelters for those cuttings most liable to be blocked, and also for the acquisition of modern snow-ploughs constructed on the American system, which are to be kept in readiness at stations within reach of the aforesaid cuttings.

AT a recent meeting of the American Society of Mechanical Engineers, Prof. H. B. Gale, of St. Louis, presented a paper upon the construction of chimney-shafts, in which he criticises the formula hitherto followed by Pictet, Rankine, Morin, and Weisbach. Prof. Gale advocates a free access of the air to the fire-grate, and that the smoke canals from the boiler to the chimney be as circular as possible, smooth, and without sharp curves. There should also be a regulating valve in the chimney or fireplace, with an automatic regulator. As to the choice of material, Prof. Gale considers that this entirely depends upon the cost, duration, and the architectural appearance. It has no special effect upon the draught whether the shaft be of iron or bricks, inasmuch as the more rapid cooling of the former material is counterbalanced by the greater frictional resistance and lesser density of the latter. As the draught in a circular chimney is only one or two per cent. higher than in a square one of the same diameter, the Professor considers that the latter should be preferred on account of its cheapness. It may also without appreciable detriment be built equally wide at the top and bottom.

* See, for instance, Cologne competition (*Builder*, Jan. 25, 1890): five premiums, total value 600*l.* to a cost of 15,000*l.*



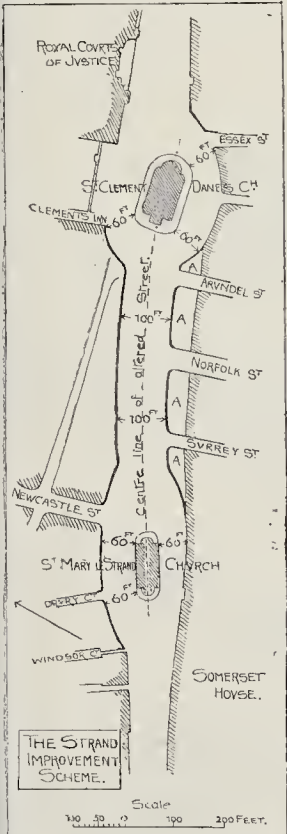
CASTLE OF S. ANGELO
TEMP NICHOLAS V

CASTLE OF S. ANGELO TEMP ALEXANDER VI (from an Ancient Sketch).

THE annexed plan shows a scheme, suggested by Mr. Arthur Cawston, for dealing with the Strand, by altering the line of the south side also, in order to lay out the street in a curve in direct architectural relation to the two churches. Mr. Cawston says:—"The land marked A.A.A.A. is proposed to be 'grabbed' by the County Council. It might be let in plots, at a

THE Academy says that Wadham College, Oxford, has recently acquired, for the chapel there, the old communion table of Ilminster Church. Our contemporary states that this is the table "at which Sir Nicholas and Dorothy Wadham must have been in the habit of communicating. It is of oak, handsomely carved, and undoubtedly good Elizabethan work." Mr. Nicholas Wadham, of Merefield, *obit* 1609, and his widow, Dorothy, were buried beneath an altar tomb, bearing their effigies inlaid in brass, in the north transept of St. Mary's Church, Ilminster. Dorothy carried out her husband's unaccomplished purpose at Oxford, where, on the site of an Augustinian Priory without Smyth-gate, was opened, on 20th April, 1613, a college which, like Clare, Cambridge, is conspicuous for the completeness of its design, and for the, as yet, little changed aspect of its buildings. She had bought the land for 600*l*. Mr. John Fulleylove's water-colour drawing of the Fellows' Garden, as lately exhibited in the gallery of the Fine Art Society, is reproduced in his "Oxford," which we reviewed on January 5th of last year. Other structural features of Wadham are cited in a notice which we printed of the Architectural Association's visit to Oxford in 1886.* Sir Christopher Wren entered Wadham in or about 1647, was there under the learned Dr. John Wilkins, and, receiving the degree of M.A. in 1653, was, four years later, elected Professor of Astronomy at Gresham College. For All Souls, whereof he was elected Fellow on February 5, 1660, he designed a dial which was set up outside the chapel; as we read in Gutch's edition of A. & Wood's work.

THE rooms of the Institute of Painters in Water Colours are occupied just now by one of the oddest-looking collections of work that has ever been seen in galleries usually devoted to picture exhibitions which aim at all events at being high-class artistic work. This is the outcome of the competition organized by Messrs. Raphael Tuck & Sons for prizes for copies made from the studies sold by them for copying in oil and water colours, and open to amateurs only. It seems to be almost entirely a ladies' exhibition, and nearly all the visitors as well as the exhibitors were ladies. Twenty thousand competitors entered their names for this, and many thousands of drawings were sent in, of which nearly 2,500 were accepted and hung. The judges were Sir John Millais, Mr. Marcus Stone, Mr. Boughton, and Mr. S. J. Solomon, who have spoken favourably of the amount of conscientious work done; and, from the standpoint of the exhibition, with reason. Nevertheless, the effect of these walls covered with repetitions, good, bad and indifferent, of various studies, painted in many cases rather too obviously from chromo-lithographs, is bewildering and not altogether cheerful. The most successful drawing we noticed among the prize drawings was not by a lady, being Mr. Alfred Rendell's "Getting under Weigh" (128), which, had it been an original work, would have stood high for its class of subject. In spite, however, of the respect naturally inspired by the names of the judges, we doubt very much whether the enterprise is in any way beneficial to art. When we received some time ago a notice announcing the intentions of the promoters of the exhibition, we formed the impression that they were about to organize an exhibition of amateur talent in original work. That would have been of some interest, and might have drawn the best class of amateur artists, who of course would not be likely to put into a competition in copied drawings.



THE Trustees of the British Institution Fund announce that they are prepared to elect, in July of the present year, five scholars,—two in painting, one in sculpture, one in architecture and one in engineering; the scholarships being of the value of £50 each, and tenable for two years.

THE Carpenters' Company has very commendably added to its other good and useful work in the promotion of technical education by the establishment of "The Carpenters' Company's School of Wood-Carving." The idea of the Company, as expressed in a letter which we have received from the Clerk, Mr. Stanton W. Preston, is that "there is plenty of talent in wood-carving in this country, but that it wants developing; and the Company, in conjunction with the Institute of British Wood-Carvers, which has been in existence some years, hope that it will be a successful movement. It is intended purely for the trade, and we have put the terms low, so that it may well be within the reach of all who would be likely to make use of the instruction to be given. We want to foster real talent, and not merely mechanical carving, and for that reason include Modelling and Drawing." Some further particulars were given in an advertisement which appeared in our last number.

THE CASTLE OF ST. ANGELO, ROME.

AN interesting discovery has been made in the course of recent excavations in Sangallo's bastion, called *di San Giovanni*, at the right of the mausoleum of Hadrian. A cylindrical tower has been found, well preserved, belonging to the fortification constructed between 1447-1455 A.D. under the pontificate of Nicolas V. There are in existence drawings representing the Castle of St. Angelo as it was at the time of Nicolas V. (see cents above), and especially two sketches contained in a volume (in the "Biblioteca Barberini"), in which are numerous drawings and plans of the ancient monuments of Rome by Giuliano da Sangallo (1465). Other representations of the Castle of St. Angelo at the same time are to be found in a sketch by Schedel, and in that of Mantova, and in a medal of Alexander VI. When Antonio da Sangallo, by order of this Pope, repaired and completed the fortification of the Castle, enclosed the cylindrical towers of Nicolas V. in a polygonal sloping bastion, as we have learnt through the recent discovery, the tower was entirely filled up with cannon-balls of Greek marble and granite, undoubtedly made with ancient statues or other ornaments.


L. B.

* See the *Builder*, 28th August, 1886.

moderate ground rent, to the occupiers of each house, to induce them to extend at once, to the new frontage line, all the shops on ground floor only. When it suited the occupiers to rebuild their whole premises, the ground might be sold to them. If the shops only are brought forward, they should possibly be built of uniform height, with parapet and balustrade, as approved." We do not adopt the suggestion, but we think it is worth publication, and the result, as a matter of architectural effect, would certainly be good.

LIMITS TO HEIGHTS OF BUILDINGS.

WITHOUT a table under headings comparison of the regulations in different cities is very difficult. We have, therefore, compiled the table given below as a specimen, and hope to furnish others. We have to thank the gentlemen who have kindly supplied information as to the regulations now actually in force; and shall be glad to have in the same form statements as to other cities. If such a clause as that proposed by the London County Council is made law, it will doubtless serve as a precedent for other parts of the country, so that the matter is one of much interest to all who have to do with buildings:—

	Width of Street.	Height.	Roofs.	Number of Stories.	Remarks.
PARIS. Décret du 23 Juillet, 1884. (The regulations for provincial towns are similar in principle, but varied in detail, to suit local circumstances, climate, &c.)	Ft. in. 25 6 or less,	Ft. in. 39 3	 <p>R = half the legal or actual width between the building frontages; but may not exceed 27 ft. 6 in. As a minimum 16 ft. 4 in. is permitted.</p>	Not more than seven stories above the street level, including mezzanine and attics.	Dormer and other windows may not project beyond the frontage-line, but may extend 1 ft. 7 in. beyond the perimeter of roof, provided their collective width does not exceed two-thirds of the width of the street-front.
	25 6 to 31 10	49 1			
	31 10 to 65 6	58 11			
	65 6 and upwards.	65 6			
	Measured between the authorised lines of building frontage.	Measured from the highest part of the footway along the facade to the top of the front wall.			

Authority:—

Francis Hooper, A.R.I.B.A.,
Holder of the Godwin Bursary,
1888.

These regulations do not apply to public buildings, and may be modified in the case of other buildings on the recommendation of the General Council for Buildings, with the sanction of the Minister of the Interior.

	Old quarters.				
SWEDEN. The building regulations for old towns are framed in accordance with the Royal Ordinance of 1875 by the Municipal Authorities, and necessarily vary much in matters of detail.	Ft. in. 32 0 and less to 44 0	Ft. in. 43 0	<p>Mean height from street to top of cornice or eaves.</p> <p>No Mansard roofs to dwelling-houses, but exceptions may be allowed by Building Committee in special cases or to suit architectural requirements.</p>	<p>3 stories.</p> <p>4 stories.</p> <p>5 stories.</p>	<p>In dwelling-houses not more than 5 stories, including the ground-floor. No dwelling-rooms in the roofs of houses of more than 4 stories. Rooms in roofs in houses of more than 2 stories to have fire-proof floors.</p>
	44 0 and upwards.	54 6 66 0			
	Minimum (m)	W + 4 10½			
	Maximum (M)	66 0			
	58 6	66 0			

Authority:—

A. Beazley, M. Inst. C.E.

W = width between the building lines. M may be exceeded for churches and other public buildings.
m in exceptional cases may be 39 ft.—if permission is granted.

	The City, and the town of St. Pauli.				
HAMBURG. (also St. Pauli adjoining and the suburbs).	Ft. in. 26 3 to 55 9	Ft. in. W + 19 8	<p>Highest portions of roofs kept under the maximum unless set back.</p> <p>Setting back regulated by an angle of 45 deg.—drawn upwards and inwards from top of front wall.</p>	<p>No dwelling-rooms higher than the fifth story above the footway.</p> <p>In dwelling-houses back buildings not more than three stories in height including the ground-floor, unless fronting another street, when the usual rules apply.</p>	<p>Heights thus regulated by widths of streets are for walls finished horizontally; but features (gables, pediments, &c.) may rise to greater height if a corresponding portion is lowered.</p>
	55 9 for long streets	Not more than W.			
	65 7 to 98 5	M (throughout) gable walls, 98 5			
	for lines of main traffic	Other enclosing walls, 78 8			
		W = width between front wall of building and boundary of ground plot opposite, or a building line or corrected line set back from it. M = the maximum for any part except architectural projections, projections above roofs, and chimney-shafts.			

Authority:—

Hugh McLachlan, A.R.I.B.A.,
Holder of the Godwin Bursary,
1883.
(Building Police Regulations, 1882.)

These regulations as to height may be modified by the Senate for public buildings, and in other special cases where a greater height is required.

	Old portions.				
BERLIN.	Ft. in. 24 7 to 74 2	<p>Old and new portions.</p> <p>Ft. in. 39 4 to 74 2</p>	<p>When above the height allowed for walls,—roofs not steeper than 45 deg.</p> <p>Special regulations for turrets, dormers, and architectural features.</p>	<p>No dwelling-rooms higher than the fifth story above the footway. Floor of topmost story of dwelling-rooms not more than 57 ft. 4 in. above the footway.</p>	<p>Building may be carried higher if set back; but must be lowered to allow for cornices if projecting more than 1 ft. 7½ in.</p> <p>Regulations for proportioning the height of back buildings according to the width of court-yards to allow sufficiency of light and air.</p>
	74 2 New portions.				
	62 4 (minimum)				
	to				
	93 5				

Authority:—

Hugh McLachlan, A.R.I.B.A.,
(Building Police Regulations, 1887.)

In streets with buildings on one side only the maximum 74 ft. 2 in. is allowed. In other cases height equals width between the street lines. Averages for corner buildings and streets of uneven width. Corrected street lines laid down by authority for new buildings in narrow streets,—streets widened gradually, as in the City of London. Large clearances are also made at times for widening, and new street lines laid down.

ROMAN ARCHITECTURE.*

BY PROFESSOR AITCHISON, A.R.A.

Private Houses.

The first step in the discovery of Pompeii was made in 1748 by a Spanish Colonel of Engineers named Don Rocca Alcubierre, who began his researches in the Street of the Fortuna, a continuation of the Street of the Discoveries was made in 1764, and the account of the discoveries was kept in Spanish until 1764, after which the Italian language was used. The name of Pompeii was first given it at the end of the year 1756, and any doubt of that being the real name of the town was set at rest by the discovery of an inscription near the tomb of Mammia in 1763. In 1817-19 Sir W. Gell and J. P. Gandy, R.A., published their celebrated book on Pompeii, called "Pompeiana," and subsequently a continuation in 1835, giving the excavations since 1819. John Goldie published his hand-coloured specimens of ancient decorations from Pompeii in 1825; and Mr. E. Falkener had two houses excavated at Pompeii, plans and accounts of which are given in his "Museum of Classical Antiquities."

Although a vast extent of Pompeii has been excavated since the year 1826, when Sir W. Gell gave his plan, I do not know that a more characteristic house has been excavated than that of Pansa. [See Lithograph.]

You all probably know that the names of the houses were given them either from the paintings or from the inscriptions found in the houses, or from some striking feature of the house or its adjuncts, and this house is so called from the words "Pansam Ed." being found painted in red near the door.

It seems to have been a common practice to invoke the Ædile by name, in this case to suggest that Pansa should be Ædile. This large house, with its dependent houses and shops, forms an island; i.e., is surrounded by streets. Its front is in the Street of the Baths, its back towards the north is in the little Alley of Mercury, its east flank is bounded by the Lane of the Fuller's Shop, and its west by the Alley of Modestus. The island is about 100 ft. wide by about 300 ft. long, which would be a large plot of ground for a house in London; but its front and flanks are decreased by rows of shops and houses, and these extend on the flanks up to the garden, which is about one-third of the whole depth of the island. The entrance itself is not more than about 10 ft. wide.

There is a shallow vestibule, then a Prothyrum, or entrance lobby, a Tuscan Atrium, Cavadium, or hall, with an Impluvium, or Compluvium, i.e., a space of the hall-floor open to the sky usually containing a rain-water tank; the Atrium has Alle, and whether these be the recesses only at the end of the Atrium, or include the three chambers on each side of the Atrium, we will discuss hereafter. Whether five of these rooms were guests' rooms, servants' rooms, or for other purposes, we do not know. One of these, nearest the entrance, was possibly devoted to the Atrianis, or slave of the hall; we don't know if the janitor, or Ostiarius, slept on the threshold, for he might have used one of the other rooms at the side of the Atrium for sleeping in. At the end of the Atrium is the Tablinum, or muniment-room, used also as the Hall of Audience, where clients were received. To the east of this there is only one of the Fances, or passages, to the private part of the house. To the east of this is a room about 16 ft. by 10 ft., while to the west of the Tablinum is another room about 16 ft. square. The passage leads us into the second hall, or Cavadium, which has a peristyle of sixteen columns, with a large tank in its open area. It is pretty clear, from Pliny's account of his Laurentine villa, that the second hall in his days was called the Cavadium (Pliny, Lib. II., 1st. 17). There are two recesses at the south end of the Cavadium—one on the east, from which a passage goes to the hack door, and in this passage is a staircase, and one on the west side. On the east, towards the north end, is a small room, supposed to be a library, entered from the cloister of the peristyle, and communicating with a big room beyond at the north-east end, supposed to be a Triclinium, or dining-room. At the north end of the Cavadium are two large rooms of different size; the smaller one is supposed to be another Triclinium, and the big one a hall (Œcus), possibly a modified Cyclicone one, and opening at the north end to

the garden cloister. At the side of this last hall is a passage leading to a Cryptoporticus, or cloister, running the whole width of the island, open towards the garden, and this had a story over it. At the back of the Triclinium is a little room, opening and looking into the cloister; beyond the garden-cloister is the garden, with a tank and reservoir in the north-east corner; to the left, or west of the passage from the Cavadium to the garden-cloister, and adjoining the Cavadium, is a kitchen and servants' hall and another room, both the latter opening into the Alley of Modestus. Beyond, to the south, is an open court and staircase; the court lights the north-west room in the Cavadium, and opens into the alley beyond. Stretching southward from the kitchen are four rooms, commonly called bedrooms, though it is believed that bedrooms were mostly above the ground-floor.

In front of the house are three shops on both sides of the entrance, the corner shops being bakers'; next to the west one on the south front is a shop connected with the house of Pansa by a door into the south-west room of the Atrium; in this shop the wine or country products of the owner were probably sold, as wine is still sold in noblemen's houses in Italy.

On the west flank, and forming part of the baker's premises, is a large bakehouse, with mills, a kneading-trough, a table, and an oven; beyond this are two small houses. On the east, next the Lane of the fuller's shop, are the baker's premises of the fuller's shop, at the angle. There is a bakehouse with a large oven beyond the shop, and another room, and then three houses of considerable size, each consisting of several rooms. In the one nearest the gardens of Pansa's house were found the skeletons of four women, whose ear and finger rings had engraved gems in them, showing, at any rate, that the inhabitants were not of the poorest sort.

The painted decorations of this house, which was one of the earliest excavated, have mostly perished.

The house itself, as regards its plan, is a typical one, and has some family resemblance to the house of Germanicus on the Palatine at Rome.

It may be well just to name the parts and rooms, and then to discuss each part. In quoting Vitruvius, I use the Leipzig edition of 1863, which is almost identical with Schneider of 1807:—

Vestibulum—a vestibule.

Prothyrum—an entrance lobby.

Impluvium or Compluvium—the opening in the roof, or the open space on the floor of the hall.

Impluvium—the rain-water tank.

Also—the wings.

Tablinum—the muniment-room.

Cubicula or Cubilia—rooms, sometimes bed-rooms.

Fances—passages.

Peristylum—a colonnaded court.

Bibliotheca—a library.

Pinaotheca—a picture gallery.

Triclinium—a dining-room.

Exhedra—a parlour, or room for conversation.

Œcus—a hall.

Basilica—a long hall, which seems first to have been used for political meetings, and afterwards for recitations.

Textrina plumarium—an embroidering-room.

Officina pictorum—a studio, or painter's shop.

Culina—the kitchen.

Cella Penuria—the pantry or larder, not mentioned by Vitruvius, but found in Suetonius, who tells us Augustus is reputed to have been born in one at Velltre.

Cryptoporticus—a cloister or gallery.

Posticum—the hack door.

Hortus—the garden.

Proceon—an ante-room.

Dieta—a room, sometimes a breakfast-room; or a suite of apartments; sometimes a summer-house.

Dieta hypocausta—a bathhouse.

Cocatio—a supper-room; also

Cocaculum—an upper room to sup in, but used afterwards merely as a garret.

Andron—a passage.

Horreum—a lumber-room or museum, though its original meaning was a barn.

Apotheca—a store-room.

Balneum or Balneum—a bath-room or rooms.

Spharisterium—a tennis-court.

Gymnasium—exercising-rooms, though when not done out of doors the exercises in private houses were mostly carried on in the tennis-court.

Crypta—a vault, sometimes a grotto.

Solaria—balconies, terraces, or flat roofs where the sun can be enjoyed.

The very first part, described by the word "Vestibulum," is still the subject of controversy. That it originally meant the place where the toga was put on is, I believe, acknowledged; but whether it was a bit of open fore-court; or of covered passage, no one knows. Vitruvius uses the word, and says:—"Becomingness, indeed, is thus expressed, according to custom, when in buildings with magnificent interiors the vestibules are made with convenience and elegance" (Vit., Lib. I., cap. 2, par. 6) In the well-known line of Virgil, "Vestibulum ante ipsum primisque in faucibus orci" (Æneid, 6, 273), he seems rather to speak of an avenue or approach, which Dryden translates as "Just in the gate, and in the jaws of hell" (Dryden's "Virgil," Lib. VI., l. 384).

Prothyrum, the entrance lobby, is thus mentioned in Vitruvius in his description of the buildings of the Greeks (VI., 7, 5):—"The vestibules which are before the doors are called prothyra in Greek."

Atrium, or Cavadium, the hall, is understood in different ways, because it did not mean the same thing in a Roman house in every country. In Italy, it was mostly a covered room with a hole in the middle of the roof, as you can see in the Roman house at the Crystal Palace; but sometimes it had no hole, and was called a roofed hall (Atrium Testudinatum), because there were rooms over it, as Vitruvius tells us (VI., 3, 2).

Such a hall, wholly roofed, could only be made when the span was small, and then we wonder how any light was got; but in England, when there was a courtyard with the house round three sides of it, sometimes with verandahs, next the court, the courtyard was possibly called the Atrium.* We know that in France the open square with porticoes round it, in front of a cathedral, was called the Atrium.

Vitruvius names five sorts of cavadia—the Tuscan, Corinthian, tetrastyle, displuviate, and roofed, or tortoise-shaped—and says:—"The Tuscan ones are those in which the girders thrown across the Atrium have trimmings between them, and valleys running from the angles of the wall to the angles of the rafters; likewise with eaves dripping into the middle Compluvium. In the Corinthian, the girders and opening are the same; but the girders receding from the walls are arranged in a circuit round the columns" (by this I understand on the columns). "The Tetrastyles are those which, by columns at the angles being put under the girders, afford firmness, because they are neither obliged to have long spans nor are loaded by the trimmings. But the Displuviate are those in which hips sustaining the trough gutter throw off the drippings. These offer great advantages for winter rooms, because the upright opening does not obstruct the window of the dining-rooms, but these cause great annoyance in the way of repairs; the pipes check the drippings flowing round the walls, which (pipes) do not rapidly receive the water flowing from the gutters; thus the redundant water overflows and rots the inside work and walls in these kinds of buildings. The roofed, or arched, made when the span is not great, and spacious rooms are got by means of joisting" (Lib. VI., 3, 1 and 2).

Some of these passages are supposed to be corrupt, so I am very far from asserting that this is a correct translation, but it is the best I can make of it.

Impluvium, or Compluvium, was used differently for the opening in the roof; but I think Impluvium only is used for the open space on the hall floor (the Patio of a Spanish house), and I think Impluvium is sometimes used for the rain-water tank. Vitruvius (Lib VI., cap. 3, par. 1 and 6) certainly speaks of the Compluvium as the opening in the roof, and this seems to be confirmed by Varro; but in Plautus ("Miles Gloriosus") the opening in the roof was called Impluvium. The Captain's slave looks through this hole when he has been following a strayed monkey of his master's on to the neighbour's roof. Our English translators call it a skylight, and the "Vestes impluviarum" of Plautus are translated "skylight dresses," whether from their shape or colour we do not know. The following passage in the "Epidicus" of Plautus speaks of these "Vestes Impluviarum."

Periphanes says to his slave:—"What was she dressed in? Was it a royal robe, or was it a plain dress?"

* I am indebted to Prof. Middleton for this illustration of the Roman Villa at Spoonley, Gloucestershire.

"Epidicus: A skylight one, according as these women coin names for garments.
"Periphanes: What! Was she dressed in a skylight?"

Terence also speaks of the Impluvium as the opening in the roof (Eun. A. III., s. 5, line 41); but without doubt Compluvium was the proper technical word.

Also, the wings. These are generally supposed to be the two recesses to the right and left of the Atrium, but I presume that they included also the chambers on either side of the Atrium. Vitruvius would hardly have devoted so much space to their proportion in relation to the length of the Atrium if they had been only two recesses, and say nothing about the rooms which are three times as wide. In these two recesses statues seem to have been placed, and I suppose that those were the statues in wax of the owner's ancestors, which were carried in procession at the funerals of the family, about which Polybius has written so enthusiastically.

The Tablinum, sometimes spelled Tabulinum, and supposed to be derived from Tabula, was the muniment-room, where the archives of the family were stored. It appears to have been situated at the end of the Atrium, opposite the front entrance. It was open at both ends, and enclosed with curtains, so far as shutting off light is concerned, for the back is believed to have been shut off by doors in open work of wood or metal, so that when it was not in use, and the curtains were open, there was a view from the entrance-lobby across the Atrium, and through the Tablinum to the Peristyle and garden. Vitruvius gives its width in proportion to the width of the Atrium, and describes it as having a coffered ceiling (Vit., Lib. VI., cap. 3, pp. 5 and 6). Pliny ("Nat. Hist.," 35, 2) says:—"Their muniment-rooms, too, were filled with archives and memoirs, stating what each had done when holding the magistracy."

Cubicula, or more rarely Cubilia (from Cumbo, to lie), means rooms where you could recline, even where they were not absolutely bedrooms. Vitruvius seems to use the word Cubiculum for a bedroom only (Lib. I., cap. 2, p. 7); he speaks of the propriety of making them so. In a warm country, and where candles are dear, people mostly get up at dawn. He says (Lib. VI., cap. 4, p. 1). "Bed-chambers and libraries should be towards the east, for their purposes require the morning light." Cubilia he only uses as the bed of a brick, a stone, or a beam (Vit., Lib. II., cap. 8, p. 1; Lib. IV., c. 2, p. 4). There were Cubicula Diurna and Nocturna, day and night rooms, as well as Estiva and Hiberna, summer and winter ones.

Young Pliny calls his bedroom "Cubiculum Noctis et Somni," the chamber of night and sleep. A hall of audience was sometimes called Cubile Saluatorium.

Fauces mean the passages on either side of the Tablinum to the Peristyle or private part of the house, though at Pompeii there is mostly only one passage on one side of the Tablinum, but the Latin word has no singular.

Peristylum, the Peristyle. Vitruvius in his third chap. of the sixth book, is mostly occupied with the description of the construction and proportion of the parts of a house, and in this case wholly with the proportions, and he says it should be one-third wider than its depth.

In the house of Pansa it is just the reverse, as its width is only three-fifths of its depth; but in many houses the peristyle nearly agrees with Vitruvius's description. In the open area of the peristyle a tank or basin of water was generally constructed. When the area was large a building was sometimes erected in the centre space. In Pliny's letter to Trajan (X. 75) he mentions a temple to Claudius being erected in the peristyle of a house.

Bibliotheca, the library. Probably the number of books was small in most private houses, and, from the fact of their being rolled, they took up but a small space. You recollect the description of Pliny's apsidal bedroom, with bookcases in the wall, in his Laurentine villa. The one found at Herculaneum was very small, not much above 6 or 7 ft. wide, with a bookcase down the centre. I believe books were also bound, as we bind them now, with parchment covers, coloured and ornamented with rosettes.

Triclinium, the dining or banqueting-hall. Vitruvius only mentions the ordinary oblong ones, and says they should be twice as long as they are wide, and their height should be half the sum of their length and breadth.

(Eons, a hall. Of these there were three sorts,—the Corinthian, the Egyptian, and the Cyclicone,—which were also used for banqueting-halls. Vitruvius says the Corinthian balls merely have columns on the ground, or on a Podium; are sometimes tetrastyle, and have an arched ceiling. The Egyptian had two ranges of columns, one over the other. From the entablature of the lower range of columns to the walls, these roofs were raised, and open to the sky, with windows between the upper columns, so that the hall was like a basilica. The Egyptian Hall at the Mansion House was originally said to be built in this fashion, and named accordingly.

The Cyclicone was a Greek fashion; it was placed mostly to the north, projected into the garden, and had sash doors of two leaves, at the end and sides, so that the garden could be seen from the couches, and these Cyclicone halls were big enough to have two dinner tables opposite each other, and space for the actors, musicians, rope-dancers, mountebanks, or buffoons to perform in.

As a rule, there were from three to nine persons at a table. When there were nine persons there were three couches, arranged on three sides of a square, with the table in the middle. When round tables were used, with curved couches, these latter were called Sigmas. How the guests were arranged when they were more numerous, I do not know.

Suetonius (Claud., cap. 32) says Claudius was fond of having large dinner-parties, and sometimes had as many as 600 guests. One would think that these dinners must have been in the open air, under marquees, or possibly in one of the large peristyles of the palace, covered with awnings.

I think the arrangement of the diners at table may be noticed here, for the width of a dining-room depends on the width of the table.

The Triclinium, or dining-room, was so called from having the three couches (Triclinia in it, each called Lectus Tricliniaris. Each couch, at a full dinner-party, held three persons. Looking at the arrangement from the open end, the couches formed three sides of a hollow square, with the table in the middle; the middle couch (Medias) was opposite you; the upper couch (Summus) on the right hand; and the lower one (Imus) on the left. At the top of each couch there was sometimes a railing for the guest next it to rest his left arm on, while the others on the couch used pillows. As each guest reclined on his left arm, the top of the lower couch was opposite the bottom of the upper one. In the upper and lower couches the place of honour was next the railing, but in the middle one it was at the bottom; and the cause of this is supposed to be that the principal guest was generally a consul, a general, or some other man in office, and looked to the vacant angle, so that he could see messengers who came to him, and hand papers to them, without turning his head, and at a pinch might go away without disturbing his fellow-guests.

The host, unless he had resigned his place to some one more fitted to do the honours, or the king of the feast had been chosen by throwing dice, was the first on the lower couch—i.e., nearest to the most honoured guest at the bottom of the middle couch—and, with the exception of the middle couch, the places ranked according to their number, first, second, and third, the first being the most honourable, and the third the least.

The places were named Summus, Medius, and Imus, and as the names of the couches were the same, a verbal description is apt to be puzzling.

Summus in Imo, or No. 1 on the lower couch, is the host's place; Imus in Medio, is the place of the most honoured guest. To take one couch only as an instance, say the upper table Summus, No. 1 was Summus in Summo; No. 2, Medias in Summo; No. 3, Imus in Summo.

There seems to be a divergence of opinion about the relative dignity of the places; for some are of opinion, from passages in the classics, that the second or middle place on each couch was the most honourable; it is possible that there were changes in course of time in the honour of the places.

In Horace's Satire (Lib. II., Sat. 8, line 20) there is the placing of the guests; and there is nothing to show that Mæcenas was not at the bottom of the middle table, Imus in Medio. The host, Nasidienus, had given up his place to Nomentanus to do the honours of the table, and Fundanius is speaking of the arrangement.

In his translation, Sir Theodore Martin makes Mæcenas in the middle; probably this arrangement was required by the exigencies of the verse, but there seems to me nothing in the Latin to show that Mæcenas was in the middle. Horace says, "With Servilius Balatro, Vibidius, whom Mæcenas brought along with him, unbidden guests (Umbras). Sir Theodore Martin gives the passage as follows:—

"I was at top, and next to me,
Viscus Thurinus; Varius, he—
Yes, it was he—came next below;
Then, with Servilius Balatro,
Vibidius—one at either end."
Each came there as Mæcenas' friend;
Next Nomentanus, who was put
At top, our host, and at the foot
Porcina."
Sir T. Martin's "Horace."

When round tables with round seats became fashionable, they usually held six, seven, or eight people, and the seats were called Sigmas or Stibadia (Mart. 14, 87).

The children mostly sat on stools at the bottom of the couches at the ordinary Triclinia. Suetonius says (Aug. 64), speaking of Augustus, that "he never stopped but he had them (his grandsons) sitting at the foot of his couch." A summer Triclinium under a Pergola was found at the house of Sallust, Pompeii. Here the couches appear to have been built, and there are no angles unfilled. The couches there are sloped up to the edge, next to the table, so forming hips at the intersections. I can only imagine that in this case the guests lay on their faces at right angles to the edge of the table. This Triclinium is shown in Mazois (F. Mazois's "Le Palais de Scaurus," 8vo, Paris, 1855).

At Trimalchio's feast, we read of him putting both elbows on the table, and of some of the guests also resting on both elbows.

Mercurialis gives two cuts of the ancient dining: one in which a man and two women are on one couch helping themselves from a round table; and the other in which a party of thirteen are drinking. The skin of wine is in front of the middle couch; seven are sitting on the middle couch, and three are lying on the upper, and three on the lower couch. He says the cut is from the Rhamsianum marble, which has almost perished through time and exposure (H. Mercurialis' "De Arte Gymnastica," 4to, Venice, 1573. Lib. I., cap. 11).

Vitruvius, in his description of the Greek house, speaks of square halls (Eci) (Vit. VI., 7, 3) of such ample size that four Triclinia could be laid and attended to, with plenty of space left for the acting; and we believe that his Greek house was the description of the houses built for those Romans who affected Greek habits. Vitruvius, in his description of the Roman house, also mentions square halls (Vit. VI., 3, 8).

Exhedra, a room for conversation, the original meaning of our word parlour. Vitruvius merely says that some are square, and all should be of ample size.

Pinacotheca, a picture gallery. Vitruvius shows by his silence how little was the weight of the importance of the proper lighting of them; he merely says that they are to be of ample size, and to the north, that the colours may not fade.

Textrina Plumbariorum, the embroidery-room. This is mainly of importance as showing that there might possibly be such a room in a house, and Vitruvius advises it being to the north, on account of the equality of the light.

Officina Pictorum. Whether this was a painter's shop or an artist's studio I do not know; but this also was to be to the north, on account of the light, and as it and the former one are mixed up with the rooms of houses, it may have been used in some houses. Caius Fabius Pictor probably had a studio in his house; possibly there was one in the house of Æmilius Paulus when his sons were studying painting and sculpture; and some of the Roman emperors employed some of their spare time in the practice of these fine arts.

It is of no use to go through a list of names twice over, if one can give no further information, so I shall only mention the following:—

Calina, the kitchen. In the house of Pansa, we find the kitchen is about 15 ft. square, has a row of brick stoves, very like those found in a modern house abroad, with a flat piece in front, on which a knife, a saucenpan-lid, and a pan for frying or poaching four eggs at once were found.

There is said to be an inscription mentioning a kitchen 148 ft. long, and if Claudius had his party of 600 guests fed with dishes cooked in

his own kitchen, it must have been pretty large.

In large houses, where they ground their own corn and made their own bread, there was probably a bakehouse; it is also probable that there were separate kitchens for the large roast and boiled meats. Trimalchio had a sow end calf boiled whole. Kitchens such as Pansa's were mainly for boiled, stewed, and fried meats, in small quantities, unless, indeed, they could roast on spits over several of the stoves at once. There was probably a still-room for the pastry, preserves, and confectionery.

Almost all the other parts of a large house are mentioned in Pliny's villas, and it is natural to suppose that the baths, private gymnasia, and tennis-courts were like the public ones, only on a small scale.

Solaria, balconies, terraces, or flat roofs for taking the sun. These were, when large, ornamented with shrubs and beds of flowers. Sometimes they had fish-ponds in them, and fruit-trees growing on them (Seneca). Claudius was said to have hidden behind the door-curtain of a balcony (Solarium) when he was taken by the guard to be made Emperor (Suet. "Claudius," 10); and Nero had porticoes built in the front of all the houses in Rome, with terraces on them (Solaria) to effect the opportunity of extinguishing fires (Suet. "Nero," 16).

The gardens of Roman houses, even in the capital, were often celebrated, and they naturally formed an important feature in the villas. Most of us have heard of the gardens of Lucullus, Sallust, Seneca, and others (Juv. Sat., 16). Like all aristocratic nations, the possession of land was one of the sources of the importance of the great Roman families, as it is the source of subsistence to all nations, aristocratic, democratic, or otherwise. So long as the right of voting was confined to the native freeholder, so long did the institutions of the city flourish; but so soon as the vote passed into the hands of the landless rabble, largely composed, too, of foreigners from the East as well as from the West, so soon did virtue decay and liberty expire. Up to the middle period of the Empire the old landed proprietors gave some thing of respectability to the government. The Roman landed gentry, like our own, were learned in the raising of stock, and in the means of improving the fertility of their fields, and probably took as much pride in their gardens as we do. The Laureate's description of Sir Walter Vivian would doubtless have applied equally well to many a Roman knight or noble.

"No little hly-handed Baronet he,
A great, broad-shouldered, genial Englishman,
A Lord of fat prize-oxen, and of sheep,
A raiser of huge melons and of pine."

Some of you may probably think, What has gardening to do with architecture? I think Le Nôtre, Sir William Chambers, and "Capability" Brown, were landscape gardeners as well as architects, and it is not uncommon, even in the present day, for the landscape gardener to recommend the architect to build a house that will set off his garden.

I have been led, however, to speak of gardens because they were so intimately connected with the houses and villas, and formed a feature in every house of the least pretension, for the area of the last peristyle was universally laid out as a garden. Greenhouses and hot-houses were common, if not so common as they are now, and window gardening was greatly in fashion.

Martial wishes to be his friend's apple-trees rather than his guest, as they are protected from the cold by glass or talc, while his bedroom window had none (Mart. VIII., 14), and he compares the grapes seen through the hot-house windows during a frost to a lady in gauze (Mart. VIII., 68). He also speaks of conservatories of lilies and roses (Mart. IV., 22), and he jokes a friend who has given him a small garden by saying that he has a bigger one on his window-sill (Mart. XI., 19).

Pliny also speaks of the window gardens of the poor in Rome (Pliny's "Natural History," Lib. XIX., cap. 19).

Although the Roman flowers were small in number as compared with our own, they had roses, violets, and lilies, the asphodel (corrupted by us into daffodil from the Old French *Asphodille* or *affrodille*), the crocus, narcissus, gladioli, the iris, and the hyacinth, the poppy, the amarantus, the anemone, the periwinkle, the convolvulus, the crane's-bill, and probably the chrysanthemum, not to speak of flowering shrubs, as the oleander, the flowering willow, the rhododendron, the mallow, and all the

flowering fruit trees, including the gorgeous pomegranate.

I may here mention a curious derivation of periwinkle I once met with in the hook of some etymologist: he said many flowers were introduced by the monks, and got their name from the church to which the monastery was attached, and so derived periwinkle from St. Peter ad Vincula, corrupted by the French into "Pervenche," whereas the Roman name for it was "Pervinea." If, too, it is remembered that the guests were often crowned with flowers at a dinner party, and always were at a drinking bout, flowers must have been in great request. We read of crowns of hot-house roses being presented to his guests by one of the Caesars in winter time, and they were also imported from Pæstum, and from Egypt, for the same purpose (Mart., Lib. VI., epig. 80).

The gardens were laid out very much as our gardens were in the last century, before Sir W. Chambers introduced the landscape gardening of China; the beds were bordered with clipped box, yew, cypress, and rosemary, and the trees and hedges were clipped into every kind of fanciful shape of animals, ships, obelisks, and letters.

Martial tells the story of a young boy thrusting his hand into the open mouth of a bear, cut in a plane tree, and being bitten by a serpent hidden there (Mart. III., 19).

Some of the beds in the garden seem to have been made cushion-shaped, and covered with acanthus or moss. A wall covered with trellises, over which vines were trained,—the modern Italian Pergola—was much in fashion, and ivy was trained round the trunks of trees, and made to hang from one tree to another.

Pliny, in his description of his Tuscan villa, describes this latter method. He says:—"It is set round with plane trees covered with ivy, so that, while their tops flourish with their own green, towards the roots their verdure is borrowed from the ivy that twines round the trunk and branches, spreads from tree to tree, and connects them together." And afterwards, speaking of the Hippodrome, he says:—"This straight boundary to the Hippodrome alters its shape at the farther end, bending into a semi-circle, which is planted round, snt in with cypresses, and casts a deeper and gloomier shade, while the inner circular walks,—for there are several,—enjoying an open exposure, are filled with plenty of roses, and correct, by a very pleasant contrast, the coolness of the shade with the warmth of the sun. Having passed through these several winding alleys, you enter a straight walk, which breaks out into a variety of others, partitioned off by box-wood hedges. In one place you have a little meadow, in another the box is cut into a thousand different forms, sometimes into letters, expressing the master's name, sometimes the artificer's, whilst here and there rise little obelisks with fruit-trees alternately intermixed" (Lib. V., let. 6).

In his description of his Laurentine villa, though it is mostly confined to the house, we get a glimpse or two of the garden. "The Gestatio is bordered round with box, and, where that is decayed, with rosemary: for the box, wherever sheltered by the buildings grows plentifully, but where it lies open and exposed to the weather and spray from the sea, though at some distance from this latter, it quite withers up. Next the Gestatio, and running along inside it, is a shady vine plantation, the path of which is so soft and easy to the tread that you may walk barefoot upon it."

Speaking of the Cryptoporticus, he says:—"Before this enclosed portico lies a terrace fragrant with the scent of violets."

The Romans were quite as fond of shrubs, flowers, and verdure as we are, and had probably flowers in pots or boxes round the Impluvium of the Atrium, as you see them in the Paros of Spain; and where there was a second area of a Peristyle this was bordered with moss and flowers round the basin, and probably pots of flowers were placed elsewhere, and ivy made to twine round the columns. The area of the D or O shaped portico of the Laurentine villa which Pliny calls gay, was doubtless gay with flowers.

The landscape gardeners, the gardeners, and water engineers were among the superior slaves: the first were called Topiarii, the second Viridarii, and the water engineers Aquarii; they were classed with the architects* (Architecti).

*It appears therefore that Mr. Ayrton's famous classification, "architects and market gardeners," had at all events a kind of precedent in Roman practice.—Ed.

itecti), the builders (Fabri), the ornamental plasterers (Tectores), the staturaries (Steturarii), the painters (Pictores), the inlayers (Cælatores), and the embroiderers (Pumarii).

In what relation this class of slaves stood to those who were grammarians (Grammatici or Literati), exponents of the poets (Lectores), readers (Lectores or Anagostæ), and librarians, including copyists, letter-writers (Librarii), and to those who were physicians (Medici), surgeons (Chirurgi or Vulerarii), and professional mblers (Iatraliptæ), I do not know. In a lower grade were the choristers (Symphoniaci), the pantomime players (Ludiones), the mimics (Mimi), the rope dancers (Funambuli or Schœnobatæ), the tumblers (Petanristæ), the dancers (Saltatores and Saltatrices), and the gladiators (Gladiatores). And still lower were the fools (Mortones), the idiots (Fæta), the dwarfs (Nani), and the pigmies (Pumiliones).

Now I am on the subject of the slaves I may as well finish with the household ones. At the end of the Republic and under the Empire the number kept was enormous, and what is said to be the Indian fashion, of having a servant for each separate duty, was pursued in Rome.

A rich and noble Roman only did these things himself: he thought, spoke, fought, exercised, bathed, and ate and drank—everything else was done by his slaves. Young Pliny mentions C. Cæcilius Claudius Isidorus, who left 4,116 slaves when he died, although he had lost much in the Civil War; and, even making the fullest allowance for husbandmen and herdsmen, we must consider that a large proportion of these were mere household servants.

When the news of what happened in one day on one of his estates is read to Trimalchio, he finds that thirty boys and forty girls were born on his estate at Cumæ, and he says that he does not believe a tenth part knew their master; and, though this book of Petronius is supposed to be a satire in which a little exaggeration may be allowed, we have no reason to suppose it was a mere burlesque.

The whole body of slaves belonging to one owner was called the family (familia), and each slave "Servus"; but they were divided into the bought (empti) and those born in the house (verna). The upper slaves (ordinarii) were allowed to have slaves of their own—vicars or deputies (vicarii), who often did their duties for them.

In the "Ass Dealer" of Plautus (act ii. sc. 4, lines 26 to 28) one of the slaves (Leonia), who personates the steward (Sæura), asks another slave (Lihanus) if he has been paid some money; Libanus says, "It has been paid." Leon: "To whom was it given?" "To Stichus himself, your deputy" (Sticho vicario ipso tuo). The steward was the head of the household, and seems to have been called the Procurator, or Procurator rationis. We must, of course, recollect that there may have been great alterations from the age of the first literature in the days of the Second Punic War (about 200 B.C.) to the sack of Rome by Genseric in 455 A.D.

Dispensator—the treasurer.
Promus, or Condus Promus—the butler.
Atriensis—the overseer of the Atrium; the major domo, and helow the butler.
Trichinarches—the overseer of the slaves of the table.
Archimagirus—the house steward; maître d'hôtel.
Supra Coquus—the head cook or chef.
Coquus and Offarius—the cook.
Focarius—the scullion.
Pistor—the baker.
Dulciarius—the pastry-cook.
Structor—who laid the tables.

The Structor was also called the maître d'hôtel, and designed the shapes of the fancy dishes. At Trimalchio's feast it was the Structor who ornamented the round tray with the gilded top, with the twelve signs of the zodiac, and had the meats proper to each sign placed behind them. I suppose the tray had a sort of projecting zone with twelve small dishes in it.

Scissor—the carver.
Ostiarus or Janitor—the doorkeeper or porter.
Velarius—who opened and drew the curtains to the doors.
Cubicularius—the groom of the bed-chamber.
Notarius—the shorthand writer, secretary.
Servus a manu—secretary.
Lector, or Anagostia—reader.
Nomenclator—the prompter, who told his master the names of the clients who

waited on him at his levee, and his consultants when he went out.
 Lictoratus—the chairman; one of the bearers of the litter.
 Precursor—a runner before the litter.
 Pædagogus—footman who walked behind his master, or the litter.
 Pædagogus—originally an upper slave who took the children to school. After the Empire, a page-boy.
 Nuncius—the errand-boy.
 Tabellarius—the letter-carrier or courier.
 Tonsor—the barber.
 Ciniflo—the hair-carrier.
 Vestiplicus—the clothes-folder and ironer.

One would have to give the names of all the servants in the most punctilious Court of Europe to find a tithe of the names of the legions of slaves employed, and when one had finished the list of slaves attendant on the master of the house, one would have to begin again with the more numerous slaves of the mistress. It is said that from ten to twenty thousand slaves were held by rich men, and after dividing the town from the country slaves, one would have to divide the former into house slaves and personal slaves, and divide these again into their several departments.

I have given you the names and duties of a few of the principal slaves of the household. I have not given more, because I thought it would only be wearisome to give a list of upwards of 300.

I presume that, with the exception of a few of the head slaves, the rest were housed in barracks, in the garrets, and cellars. People who thought it fashionable to have the unfortunate porter chained by the leg to his box, who mostly tilted their land with chain-gangs, and kept a professional torturer for the household, were not likely to have been very particular about the housing of their slaves.

Illustrations.

DESIGN FOR GREEK ROOM.

THOUGH, as Englishmen, we are very proud of the "home comforts" of our living-rooms, we shall find, if we look at the average dwelling-room of the present day, that it is furnished rather as a tent than as part of a residence held on lease for a term of seven, fourteen, or twenty-one years. Everything in it of the nature of furniture or adornment, except the wall-paper, could easily be moved out of it in half an hour. The heavy furniture that stands against the wall is kept an inch or so away from it by the skirting-board, leaving an unswEEPing space for the accumulation of dust and "flue." Dust also finds an asylum on the tops and at the backs of pictures, usually placed in heavy gold frames, and hung with a slight slant forwards.

The room I am about to describe is furnished on a contrary scheme, and is decorated in a free reading of the Greek style. As a collection of Greek pottery is its chief decorative feature, the pattern work has mostly been taken from Greek vases, care being taken to select those that have not been vulgarised by constant and inappropriate copying.

To a height of 6 ft. from the floor the walls are painted of a darkish green, this dado of colour being terminated at the top by a simple wooden moulding. Enclosed in panels, framed with a stencilled ivy-leaf pattern in delicate blue, I painted a series of little pictures, at the height of the spectator's eye. These paintings, which were not completed when the photographs were taken, represent sea nymphs, mermaids, and the like. Above the 6-ft. dado the walls are of a delicate ivory-white, variously decorated by figures of Bacchantes in relief, modelled by me in "gesso" and afterwards coloured, by pictures painted on the wall itself, by inscriptions, and by a tinted plaster frieze of ornament.

In the other plate is shown the overmantel, designed to carry several important pieces of Greek pottery. It is made of wood, decorated with Greek patterns in composition; painted ivory-white, and enriched in places with colour and stencilled ornament. The small recesses at its foot serve to contain flower-pots, so that the columns of the little shrine may be appropriately adorned with living vegetation.

On the opposite wall is a large cupboard carrying three great Greek vases, a collection of antique drinking-cups, &c., and some glass goblets for use. This piece of furniture is fitted

symmetrically and accurately into its place, and fastened firmly to the wall. In consequence of this the Greek pottery, though unprotected by glass, is in perfect security; as no shock can in any degree shake its resting-place. Being fixed to the wall, the depth of this piece of woodwork is not so great as is necessary in sideboards, &c., that support themselves; and, though its cupboards contain ample room for all they are required to hold, it takes up very little space compared with its importance; a distinct advantage in a small room. Furniture designed on this principle, it is needless to say, may be in any other style as well as Greek, which is by no means universally appropriate.

The plaster frieze and rosettes I selected from patterns kept in stock by Messrs. Jackson, of Bathbone-place. The four large drinking-goblets (shown in one of the plates) were made from my design, in crystal and green glass, by Messrs. Powell; and the overmantel and cupboard were executed from my full-sized drawings by Mr. W. Eglestone.

H. ARTHUR KENNEDY.

DESIGN FOR A SCREEN FOR A TOWN MANSION.

This design, by Mr. James C. Watt, is the one which obtained this year the Tite Prize at the Institute of Architects. We made some comment on it at the time the students' drawings were hung, and entirely concur in the award; though, as before observed, we do not think the upper portion of the gates very well joined to the rest of the structure.

The design has the merit of being really in the style which Sir William Tite intended to encourage by his bequest: occasionally designs have been submitted which were not Italian at all in the sense intended by the founder of the prize.

PLAN OF THE HOUSE OF PANSA, POMPEII.

THE restored plan of this well-known Pompeian house is given here as one of the illustrations to Mr. Aitchison's third Royal Academy lecture, which is printed in another column.

ROMAN CAPITALS FROM POMPEII.

THESE are also among the illustrations to Professor Aitchison's third lecture. They are enlarged, he tells us, from a drawing by Niccolini.

We are indebted to Professor Aitchison for this and the Pansa plan.

THE PLANNING OF FREE PUBLIC LIBRARIES:

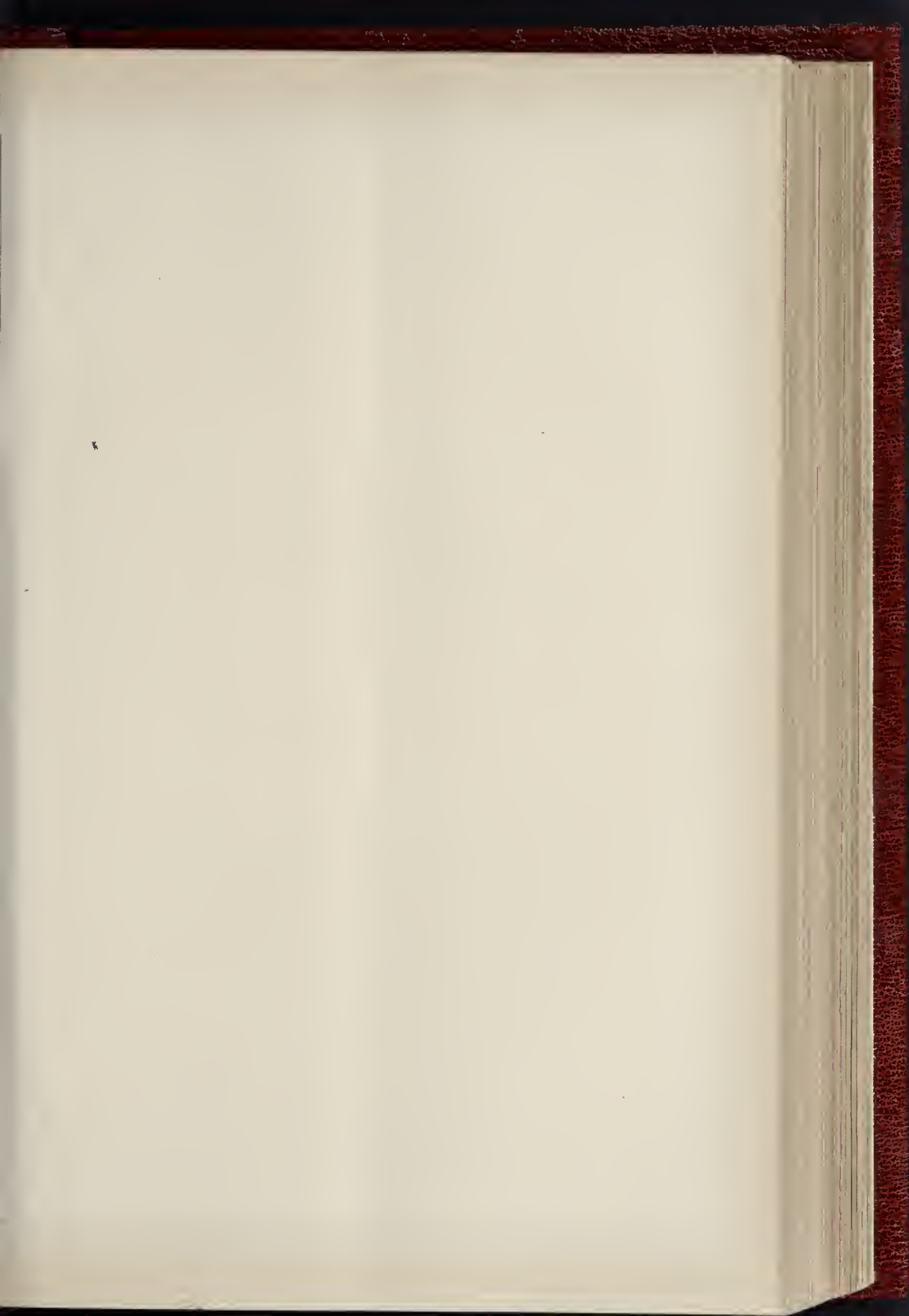
THE ARCHITECTURAL ASSOCIATION.

AT the meeting of this Association on the 31st ult., the following paper, by Mr. E. W. Mountford, was read, in the absence of its author through illness (as mentioned by us last week, p. 97 *ante*) by Mr. H. D. Appleton. Mr. Appleton, before proceeding to read the paper, said that, owing evidently to some unfortunate misunderstanding, which he regretted very much, Mr. Mountford's drawings in illustration of his paper had not been sent.* Mr. J. M. Brydon had very kindly sent his drawings of the Chelsea Free Public Library, now being erected under his superintendence.† Mr. Appleton then proceeded to read Mr. Mountford's paper, of which the following are the most salient portions:—

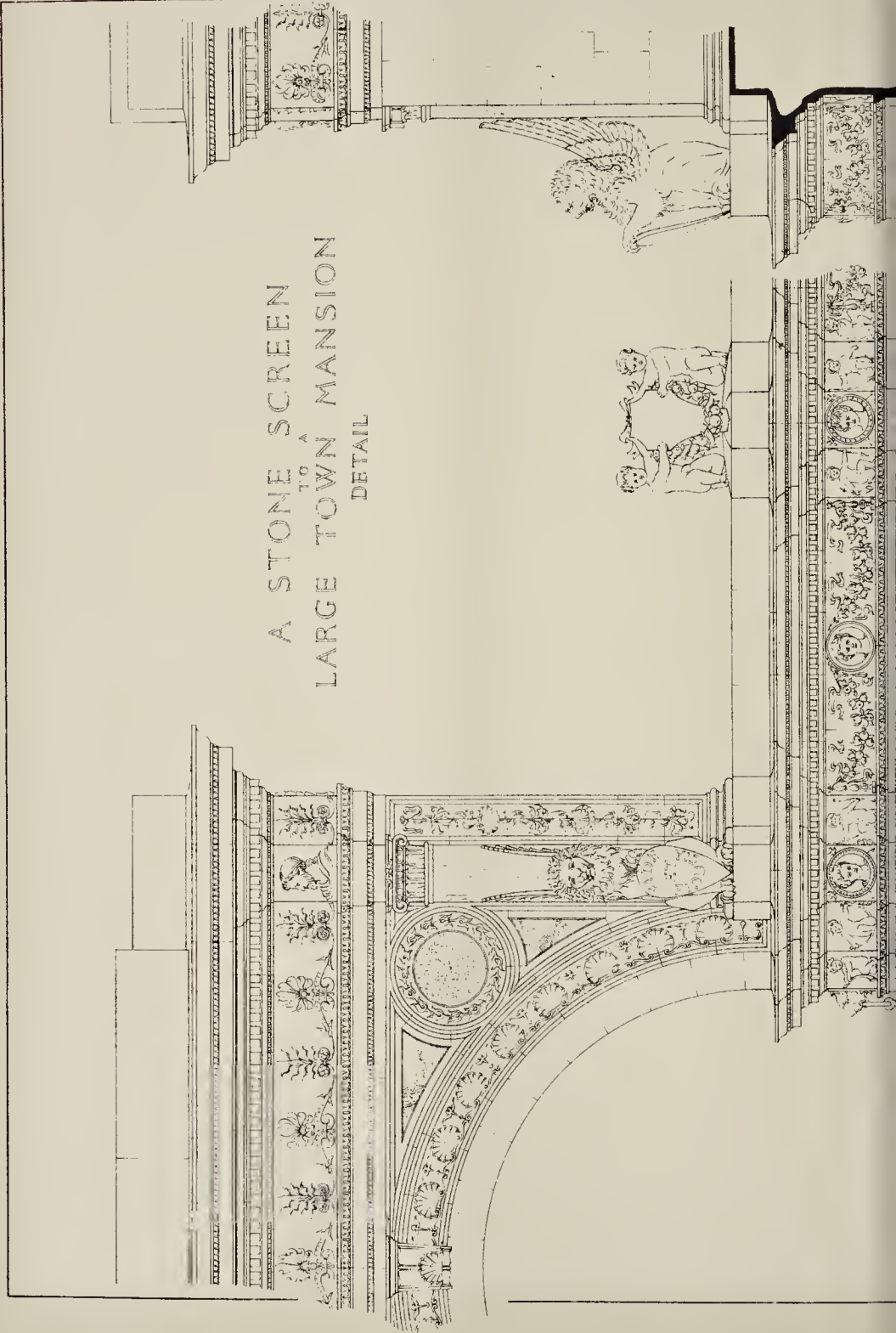
Mr. Mountford commenced by saying that he did not think he had anything original or new to say upon the subject, but his hope was that some good might arise from its discussion. It was exceedingly difficult for a young architect who was suddenly called upon to design a free library to obtain any information as to the requirements of such buildings. It was only within the last few years that the movement in their favour had come to the front, and no book had yet been written which was of much use to the architect, except the admirable little work, "Free Public Libraries," by Mr. Thomas Greenwood; and that, indeed, treated but slightly of the architectural question. Mr.

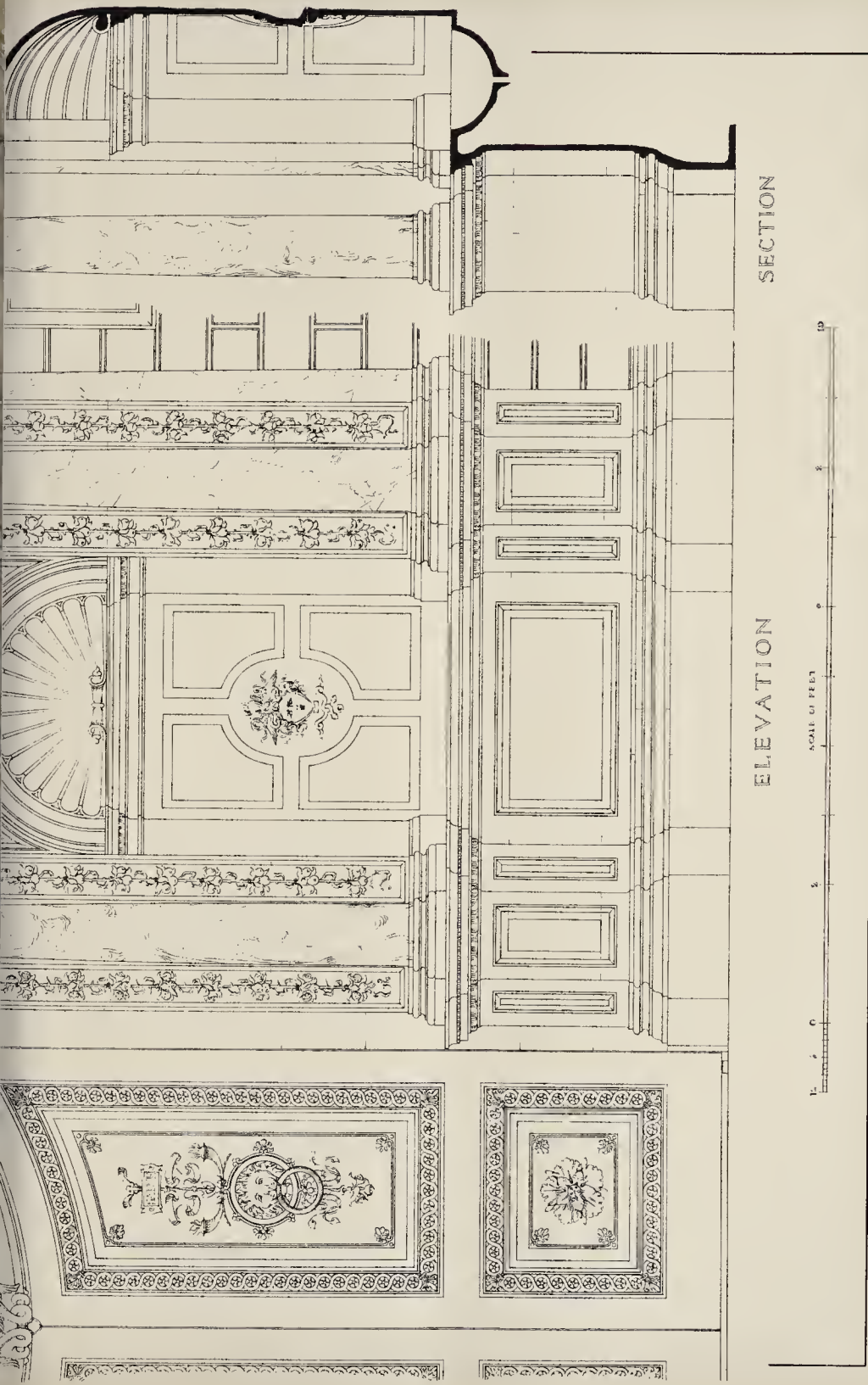
* We supply this omission, as far as possible, by stating that in the *Builder* for Dec. 8, 1888, will be found a view and plans of Mr. Mountford's first preliminary design for the Battersea Public Library, which has been carried out under his supervision. Also in the *Builder* for June 8, 1889, we gave an elevation and plan of the design submitted by Mr. Mountford in the Chelsea Library competition, for which he received the second premium. † Illustrated in the *Builder* for June 8, 1888.

E. C. Robins had made a list of very useful suggestions as to various points to be considered in designing a library. These suggestions were to be found in the "Proceedings" of the Royal Institute of British Architects for May 23, 1889. But the architect had necessarily to turn to the librarians for information, and very ready they were to impart it, although some of them complained that architects too often produced buildings handsome, certainly, but unsuited to their purpose: beautiful to look at, difficult to read in, with scant storage for books, and altogether inconvenient for those who had to work in them. Having briefly discussed the historical aspect of free libraries, in the course of which he quoted from a paper by Mr. John Taylor, Chief Librarian of the Bristol Free Libraries, claiming that Bristol established a free public library in 1613, forty years previous to that of Humphrey Chetham, in Manchester, Mr. Mountford gave a sketch of the present movement in favour of free libraries, which commenced in 1849, when Mr. William Ewart's Bill, empowering British municipalities to erect public libraries, and to levy a local rate for that purpose, was introduced into the House of Commons. The Bill was passed in 1850. Subsequent legislative measures followed, including the Public Libraries Act of 1856, and the amending Acts of 1866 and 1877. Coming to the consideration of the building itself, Mr. Mountford said that, in designing a new building for a public library, the chief points to be aimed at were plenty of storage room for books, sufficient light, room, and comfort for the readers, and facility of superintendence and management. A badly-arranged plan would not only increase the anxiety and labour of the librarian, who was responsible for keeping order in the building, but might necessitate the employment of one or more extra assistants, thus adding to the cost of maintenance. In the smallest library three distinct departments were essential, a reading library, a reference library, and a reading-room. Furthermore, there should be a fair-sized entrance hall, a private room for the librarian, and, where possible, separate reading-rooms for ladies and boys respectively, all rooms being in direct communication with the hall, so that no one of them need be used as a passage to another. The reading-room should be in two parts, divided by a screen: one for newspapers, the other for magazines, reviews, and such-like works; or, better still, there might be two distinct rooms. Store-rooms for books, in connexion with both reference and lending libraries, would probably be required, a work-room for bookbinding and repairing, and a receiving and unpacking room. Generally, a dwelling for the caretaker, consisting of sitting-room, two bedrooms, and a kitchen, would be asked for, and it was an advantage to provide a room for assistant librarians. If a librarian's residence be required it should contain two reception-rooms, kitchen, three or four bedrooms, and a bath-room. The desirability of providing lavatories and other conveniences for the public was questioned by some librarians of experience, who stated that such accommodation was likely to be abused and become a nuisance. It was certain that where provided they had, in some instances, afterwards been closed, but of course they must be provided for the officials. Although in some cases more rooms than were here enumerated might be required, these were sufficient for all ordinary purposes. Considering the various apartments separately, the entrance-hall naturally came first. It should be as roomy as possible. In arranging an economical plan the tendency was to reduce the hall to a minimum; but with people coming and going to and from all the rooms opening out of it, probably often stopping to chat, a small hall must at times become inconveniently crowded. It should have an outer porch, wherein, before the library itself was opened in the morning, copies of the daily papers might be posted for the benefit of men who, being out of employment, wanted to see the advertisements in good time. The lending library must always be on the ground-floor, as near as might be to the principal entrance. Abundance of light was essential; and should top-lighting be out of the question, there must be plenty of windows, with reference to the position of which the book-cases would have to be arranged. The room should not be less than 13 ft. high (Mr. Robins thought not less than 14 ft., and no doubt he was right if the money sufficed), the windows being kept up as high as possible in order to



A STONE SCREEN
TO A
LARGE TOWN MANSION
DETAIL





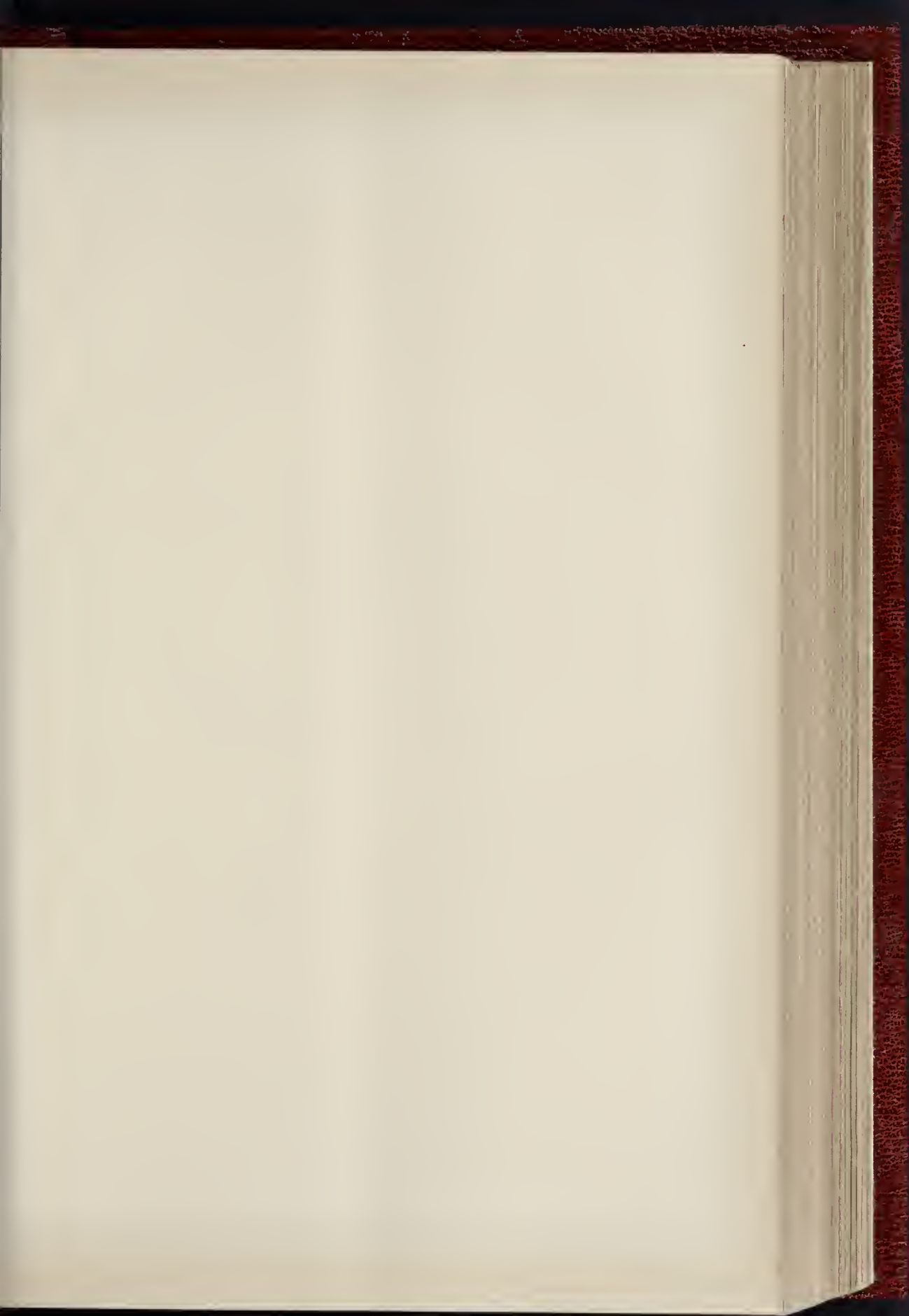
SECTION

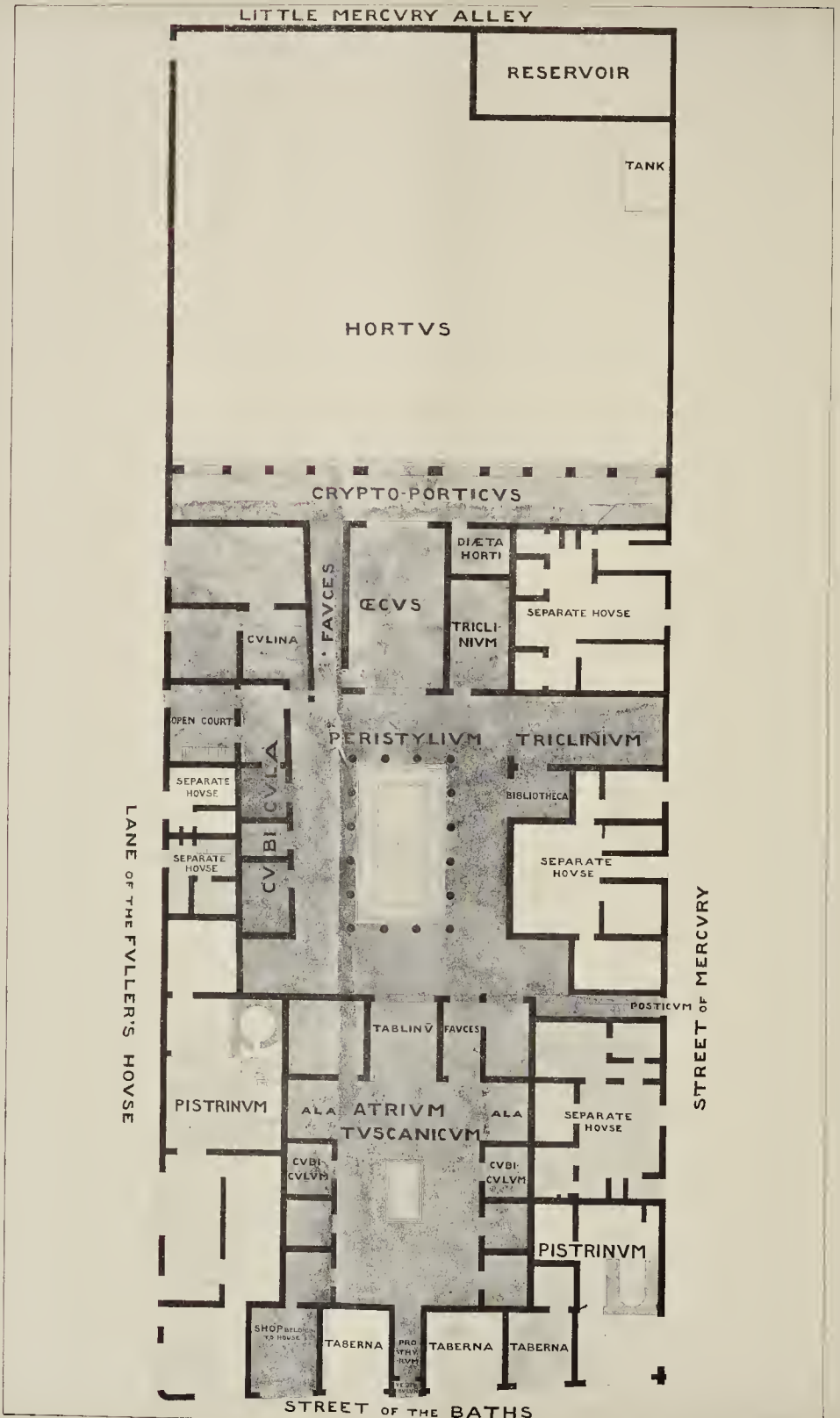
ELEVATION

SCALE OF FEET

PHOTOGRAPHED BY MESSRS. J. & C. WATTS, 47, MARK LANE, LONDON, E.C.

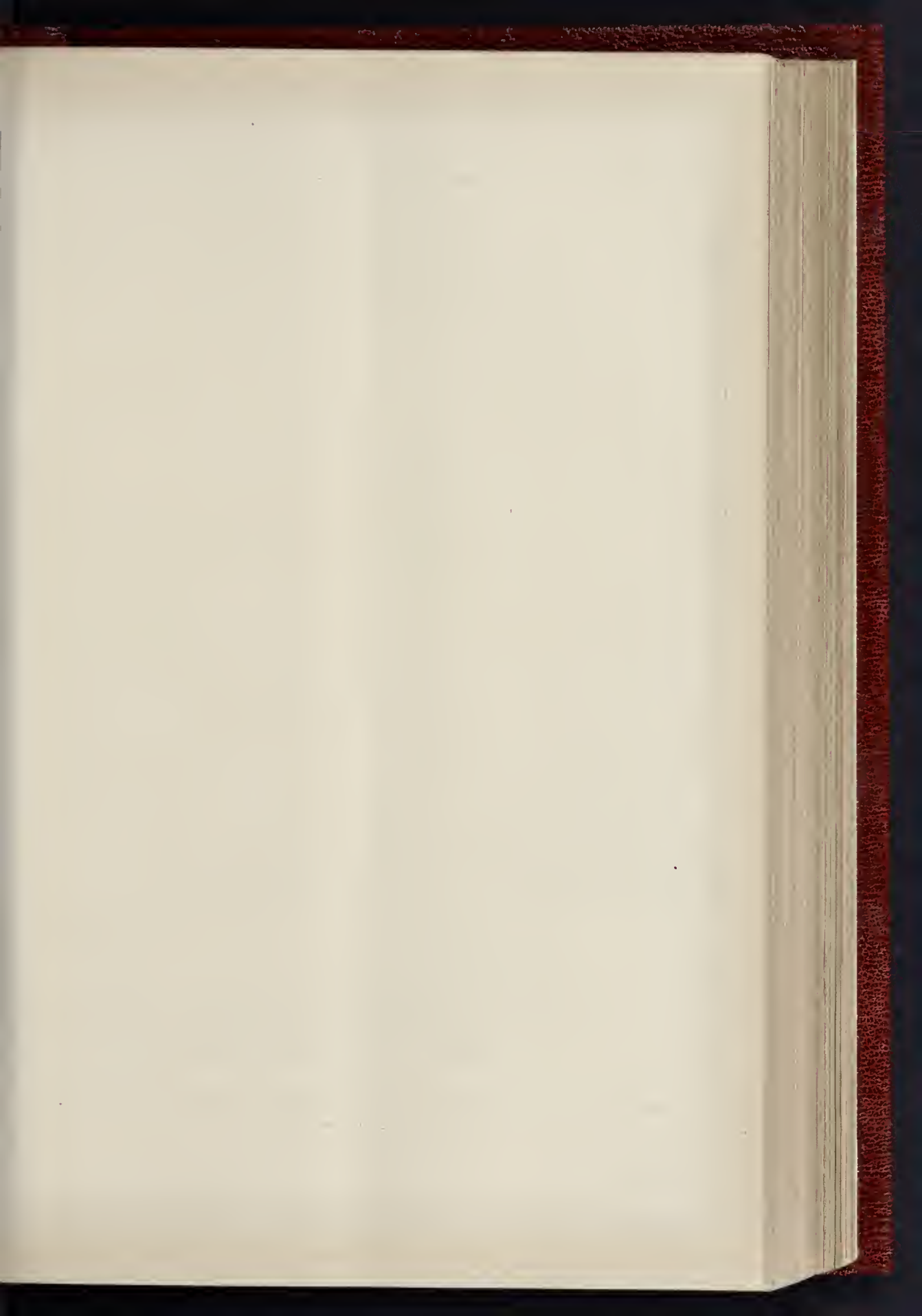
TITLE PRIZE DESIGN: ROYAL INSTITUTE OF BRITISH ARCHITECTS, 1890.—By MR. JAMES C. WATT.





AN PHOTO. COURTESY OF THE BRITISH LIBRARY, LONDON, UK. 1890.

PLAN OF THE HOUSE OF PANSA, POMPEII.
IN ILLUSTRATION OF PROFESSOR AITCHISON'S ROYAL ACADEMY LECTURES.

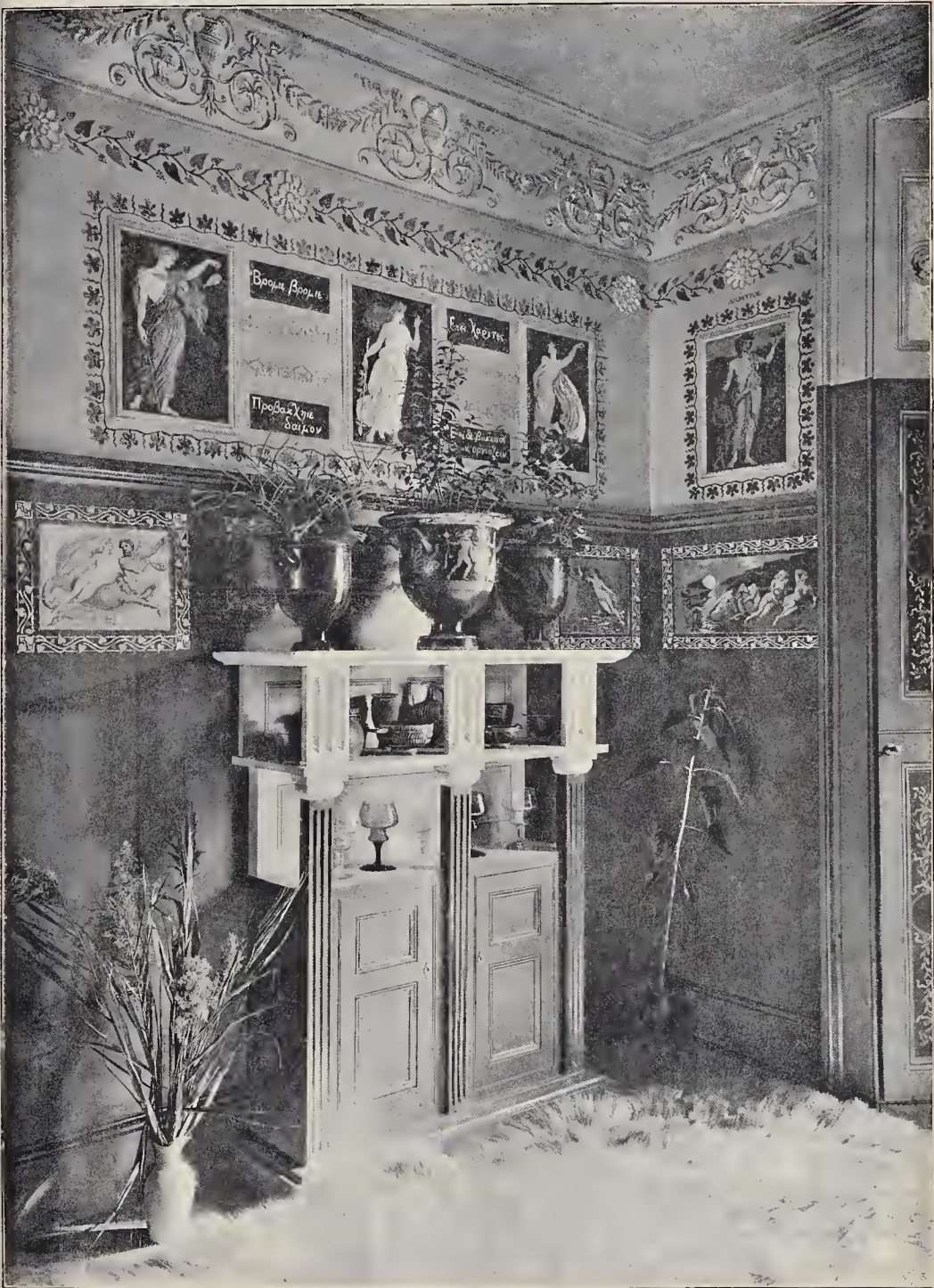




The Phototype Co., 303, Strand London.

FURNITURE AND DECORATION OF "THE GREEK ROOM," AT 21, GLOUCESTER ROAD, N.W.

DESIGNED BY MR. H. ARTHUR KENNEDY.



The Phototype Co., 303, Strand, London.

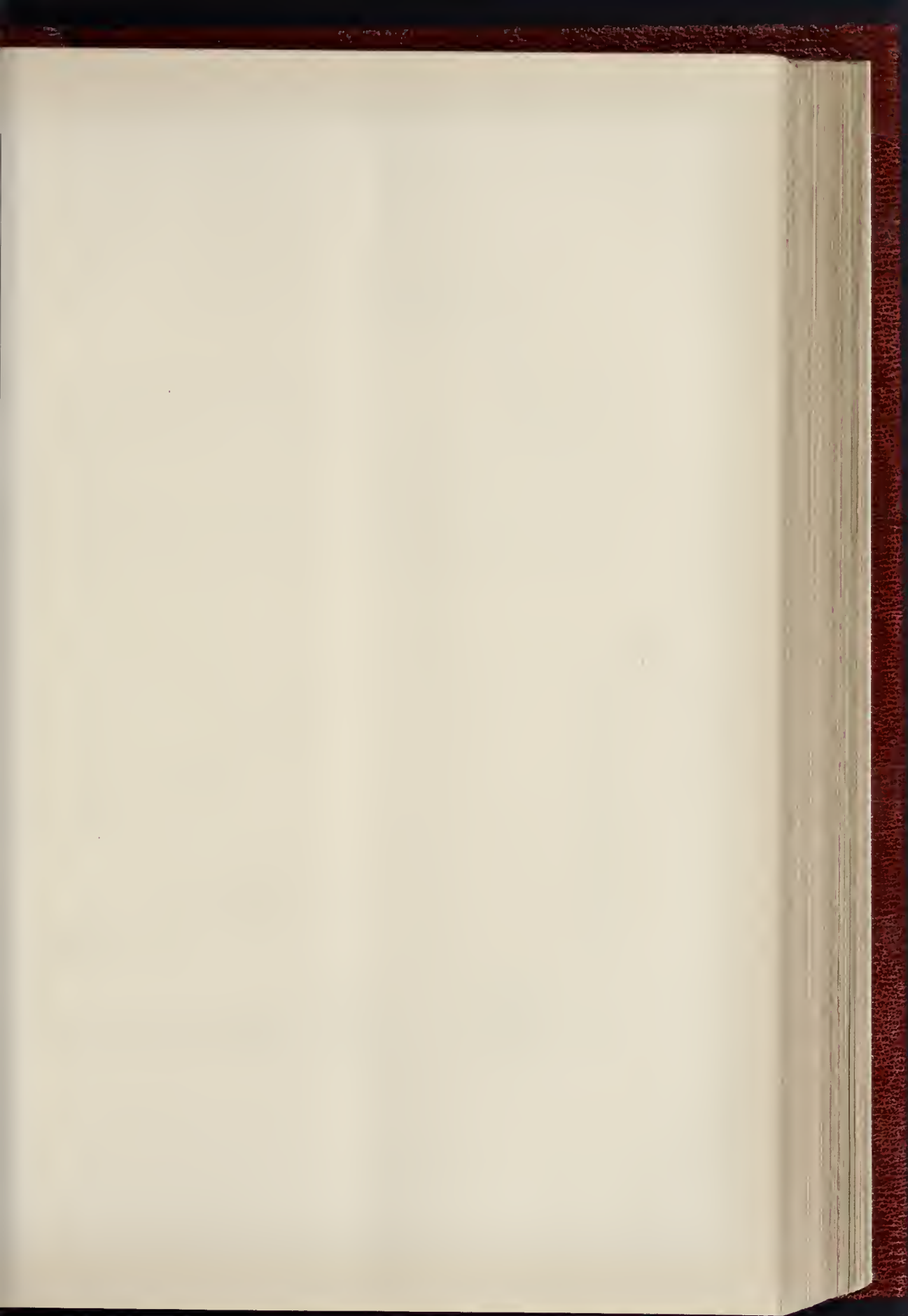
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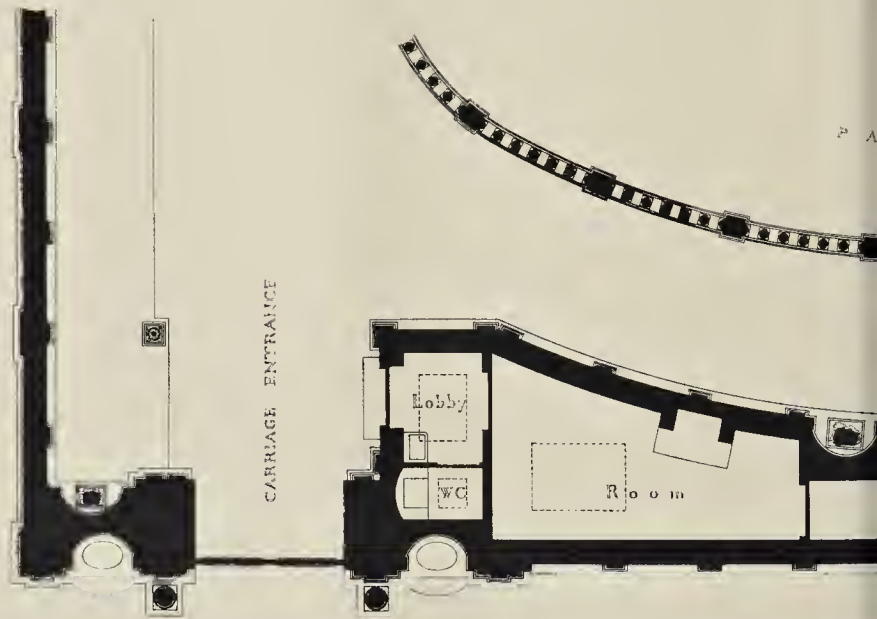
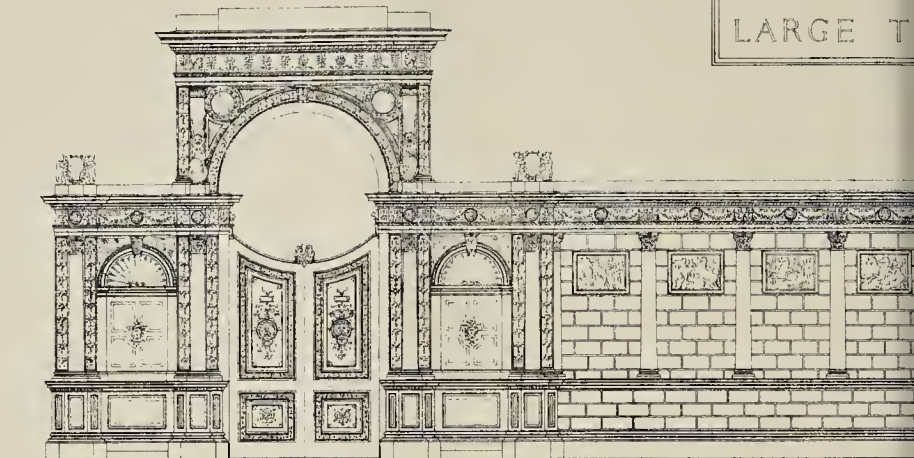


THE PHOTO. BRASS. E. AT. 22. MARTINS LANE. LONDON. E.

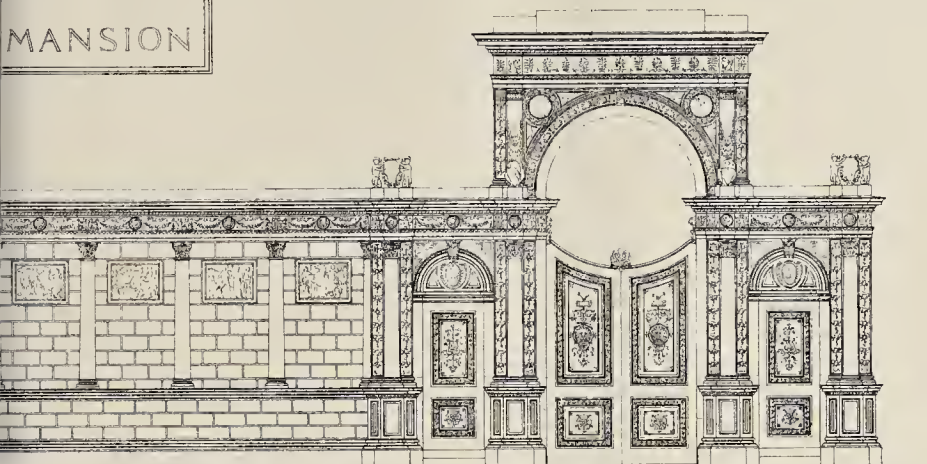
ROMAN CAPITALS FROM POMPEII.
IN ILLUSTRATION OF PROFESSOR AITCHISON'S ROYAL ACADEMY LECTURES.



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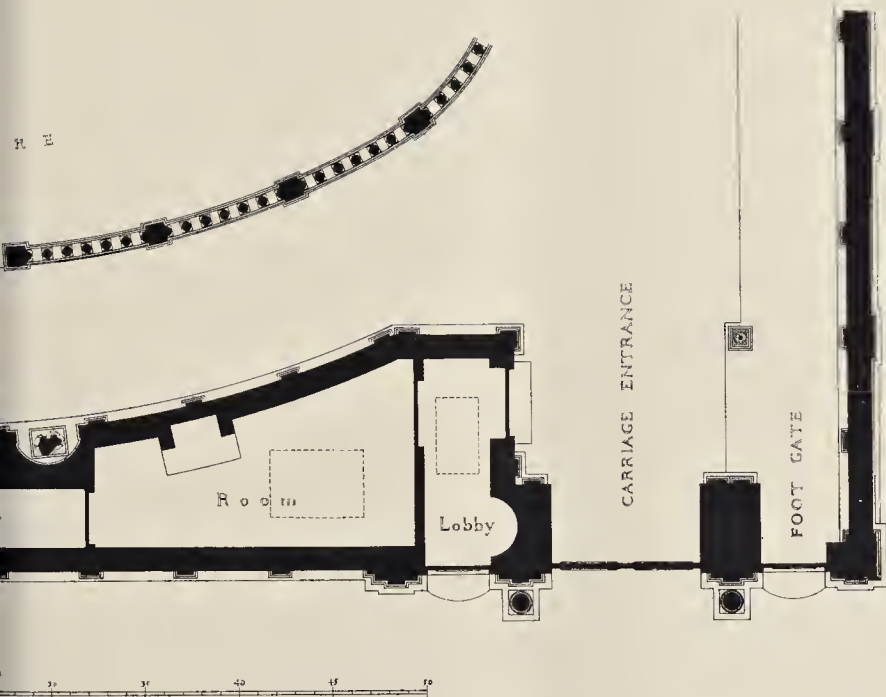
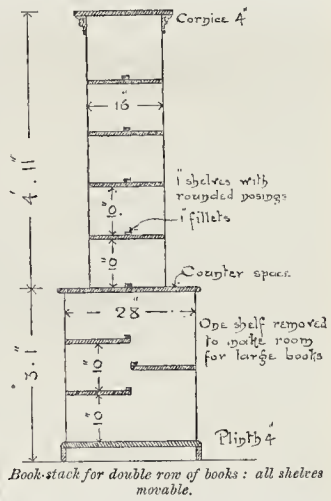


PHOTO LITHO GRAPHIC & OF 22 MARTIN LANE, LONDON, E.C.

row light over the tops of the book-cases and permit dwarf book-cases being placed against the wall beneath them. The old-fashioned stem of arranging the books in alcoves, while very pleasant and quite adequate for college and similar libraries, was quite out of the question for free libraries, where every inch of space was wanted for some purpose. The bookcases were before generally arranged, so far as the lending library and storerooms were concerned, in rows across the floor at right-angles to the counter, to save the steps of the assistants, and the principal windows, in order to get the light between the stacks upon the backs of all the books. As much counter-space should be provided as could be, not less than 30 ft. in length, in order to allow sufficient room for the "indicators" and the serving-desks. Two doorways should be provided for the public, as far from each other as space would permit, in order to facilitate the free circulation of borrowers. With one doorway for egress and ingress also, books must be placed on crowded occasions, such as Saturday nights. The doors here, as well as in the reading-rooms generally, must be on swing hinges, with the upper parts glazed. The Reference Library should be placed in the quietest part of the building, away from street noises, and "far from the madding crowd" of newspaper and novel-readers. In this room the readers occupied the whole of the centre; so the books required all the wall-space, thus necessitating top-lighting, which, however, was the best for other reasons. For all these reasons might with advantage be placed on the first floor,—the more so as a comparatively small number of people used it. In order to increase the storage capacity, a gallery might be provided about 10 ft. from the floor, which need not be more than 3 ft. 6 in. wide,—just sufficient for a hook-case against the wall and room to pass in front of it, the book-case it carried being 8 ft. high; that made the minimum height of the plate 18 ft. Round the room in front of the bookcases there would be a rail, and near the door a counter with desk for the assistant librarian. Probably the best way of arranging the tables used by the public was to have seats upon one side only, all the readers facing the counter, partly to check conversation and partly to protect the books, which in this room were often valuable, and liable to mutilation or theft by unscrupulous persons. Under that arrangement the tables need only be 2 ft. wide, but they must be 4 ft. if readers occupied both sides. Two feet in the length of the table should be allowed for each reader. Long tables were the most economical of space, but for other reasons short ones were preferable. With readers upon both sides, 6 ft. should be allowed between the tables; with the single arrangement 5 ft., or a trifle less, would suffice. In the News-room,—where there was another reading-room in the building,—was devoted entirely to newspapers, which were placed upon upright stands, just as in a club. To economise space the stands were made double, to allow of readers upon each side, and they should, of course, be placed at right-angles to the windows. The spacing out of the windows and size of the room should be regulated by the reading-desks. Experience showed that the desks might conveniently be placed about 6 ft. 6 in., or 7 ft. apart from centre to centre, and being a foot wide, that allowed room for two rows of readers, and the necessary passing and repassing between. The windows might be 4 ft., or even more, above the floor, as no benefit was derived from their coming lower, and looking out of them was distinctly to be discouraged. In the Magazine-room, tables would be required, and here readers would be placed upon both sides, but, of course, not at the ends. A width of 3 ft. was enough for these tables, and they should be at least 6 ft. apart. Allowing for everything, 14 square feet is the minimum allowance to be recommended for each reader. The position of the librarian's room needed to be very carefully considered. Without being overlooked himself, he should be able to see all that went on. It should adjoin and communicate with the lending library, and at the same time command the News-room and staircase,—in fact all the building, if possible. By means of speaking-tubes, the librarian should be in communication with his assistants in all the other rooms, without rising from his table. The room might possibly be used for the meetings of the Commissioners, which would, of course, necessitate its being of a good size, there being always nine of those gentlemen. But it was much better

to provide a separate room for them in a quiet part of the building, not too far from the librarian's room, and they liked to have a long table with a separate lock-up drawer for each. A lavatory should be provided for the use of the Commissioners and librarians. Of the Ladies' reading-room and the Boys' reading-room nothing need be said, excepting that the latter must be placed where it was constantly under the eye of some official. If a retiring-room for ladies were provided, it should lead out of their reading-room; but nearly all librarians agreed that such accommodation was better dispensed with. The number and size of book-stores would be regulated by the number of hooks the Commissioners proposed that the library should contain. For the reference library and its stores six volumes might be calculated to the lineal foot of shelving. For the lending library eight volumes to the foot. Mr Robins said nine and ten volumes respectively, but Mr. Mountford thought his own figures were nearer the mark. The height of cases being fixed generally at 8 ft., and containing eight shelves, the requisite length for any given number of hooks might easily be calculated. If the library consisted of two or more stories there must be a lift for hooks communicating with the various rooms, and there should be a private stair for the use of the officials. Nothing spoilt the binding of hooks more than gas; therefore, until the use of the electric light became general, plenty of outlet ventilators should be provided by means of flues formed in the walls or chimney shafts, by openings in the roof, or the use of ventilating lights, and the burners should be kept as far above the level of the books as possible. The heating should be by means of hot water or steam, and coils were to be preferred to rows of pipes. The rooms for librarian and Commissioners should have open fireplaces. That seemed to be all that need be said about the internal arrangements of the building. Of the exterior, everyone would probably have his own idea. The author had hitherto thought that the elevations should be rather of a domestic than of a municipal type, but events had considerably modified his views upon that point. The great thing was to have plenty of windows, kept well up from the floor, and all made to open. The building should be of fire-proof construction if funds would permit, and wood-block flooring was very preferable to any other, because of its noiselessness. Plate glass was desirable for the windows, for the better shutting-out of external sounds. The first and most important of the fittings were the book-cases. As had been said, those in the Reference Library were placed round the walls, being protected from the general public by a rail placed about 3 ft. from them. But in the Lending Library and book stores, where the public had no access to them, the cases were placed in rows across the floor, with narrow aisles between, and were made double,—i.e. with books facing both ways. These double cases were better without a central partition between the books, although sometimes a small fillet was nailed along the centre of the shelves to prevent the books in one row from actually touching those in the other. The omission of the central partition allowed of freer access of air to all the books, did away with any corners for the accumulation of dust, and facilitated the dusting or washing of the shelves. A few general principles should be borne in mind in planning the shelves of a room. First, full capacity required that, up to 7 ft. 8 in. or 8 ft., all wall space and both sides of all aisles be covered with hook backs. Except doors, windows, and the narrow ends of double book-cases, there should be nothing in sight but the backs of hooks and the occasional narrow edges of the uprights. Any scheme falling thus was wasting shelving capacity. Every aisle was equally valuable for reaching hooks on either side; every face of books must have half an aisle vacant in front of it. If a face had a whole aisle, there was obvious waste in planning; 8 in. more space would give an entire extra face of hooks. An individual shelf should not be more than 3 ft. 6 in. long, nor less than 8 in. broad. Wood shelves were almost universally 1 in. thick,—that was to say, 1 in. Long shelves were awkward in use, because they did not afford enough uprights to support the hooks properly, but we were helped to the selection of the golden mean by the experience that shelves over 3 ft. 6 in. long sagged in the centre when full of books. The shorter the shelves the less the danger of warping, and the greater convenience

of the frequent uprights which served as book supports. The only objections were the extra cost of the uprights and the slight space lost. On the whole, 30 in. was about the best length for a shelf. Iron shelves had been used, but wood-shelving was superior to iron, because it was cheaper, admitted of a better finish, looked better, and was less harsh and abrading to the binding of books. When used in the British Museum the iron shelves had to be covered with leather. The reason given for the use of iron shelving was that it was incombustible; but, unless the whole building was absolutely fireproof, it was obvious that iron shelves were useless for this purpose. In America, gaspipe frames for bookshelves were advocated by the superintendent of Buffalo Library, who claimed to secure by their use—first, economy of material and light-



Book-stack for double row of books: all shelves movable.

ness; second, economy of room (the divisions between the sections of shelves being of light sheet-iron, no appreciable space was taken up by anything but the books themselves); third, the least possible obstruction of light; fourth, the freest circulation of air among the books, to the benefit of the bindings; fifth, cleanliness. There are different kinds of indicators in use; the two most commonly used being the "Cotgreave" and the "Elliot." The Cotgreave might be described in general terms as consisting of an iron frame, fitted with as many thousand small zinc shelves as there were books to be recorded; upon each of these shelves was placed a small metallic-cased ledger, numbered alike at both ends, but in different colours,—blue one end, red the other. If the blue end of the little ledger was turned towards the public the volume was available; if the red end, the book was "out." This indicator occupied a space of 4 ft. by 6 ft. for every 5,000 volumes. The Elliot indicator had no little books, the borrowers' ticket being placed in the numbered space when a book was issued. Its size was 3 ft. square for every 1,000 volumes. There were many other systems in use, but generally they took much more counter-space than the Cotgreave. The counters must be 2 ft. wide at least, the inner side being fitted up with shelves and drawers, of which each librarian had his own views. That in the reference library might contain a row of drawers on the outer or public side, to contain the card catalogue, each drawer being 11 or 12 in. wide, some 24 in. long, and 5 in. deep. A thin partition divided the drawer into two compartments longitudinally, and they had double fronts, the outer ones being hinged and locked. In the inner front were two small holes, in which were placed the ends of two brass rods, one to each compartment of drawers, which ran through perforations in the cards contained in the drawers. The outer front being secured, it was impossible to withdraw the rods or remove one of the cards. All counter-tops should be of polished hard wood. In conclusion, Mr. Mountford said his object in writing this paper had been to raise a discussion upon this important subject, which had hitherto received but little attention from architects as a body.

In the discussion which followed, Mr J. M. Brydon said that he had listened with much pleasure to the paper, for he knew that Mr. Mountford had given a great deal of consideration to the subject. Mr. Mountford had very justly summed up the essential points in the planning of a free public library, viz., plenty of space for books, abundance of light, adequate means of ventilation, and ease and economy of supervision. Free libraries, as we now understood them, were almost a new problem in architecture, at any rate so far as the provision of district libraries, such as were now being erected in various parishes in London, was concerned. One point which it was very essential to bear in mind was that these local libraries had to be supervised by very limited staffs. It was, therefore, desirable that in planning these libraries the rooms should be so arranged that the attendants in passing to and fro should be able to see into all the rooms which were accessible to the public; it was highly desirable that the arrangement of the rooms themselves should be as simple as possible. Another important point for consideration was the amount of space that should be allotted to the readers, for that would determine the size of the building. His own opinion was that nothing under 15 square ft. should be allowed for each reader in every large reading-room; a smaller amount of space per reader would be found inconvenient. The question of ventilation was also one of very great importance. These libraries were used by all sorts of people, and when the rooms were very crowded, especially on Saturday nights and in wet and damp weather, the atmosphere became almost unbearable unless there was efficient ventilation. Another important point was that of the lighting of these rooms. He was of opinion that the windows should be as high in the walls as possible,—at any rate, above the level of the eye, for low windows, looking out into the street, attracted little knots of loungers, who were not wanted, in free libraries. It was also most desirable, in view of the fluctuating numbers of readers in these libraries, that the heating arrangements should be under such control that the temperature of the apartments could be lowered or increased, according as the number of readers increased or diminished. He would not go into the intricate question of fittings, the nature of which would be largely dependent upon circumstances. It would, however, be a desirable thing if they could get a chair which should be noiseless; the pushing forward of chairs of the ordinary type, even on wood block floors, was very annoying to readers. With regard to the reference library, of course that was the part of the library which ought to be the study, and it should therefore be kept the quietest portion of the building, and not made a means of communication with other rooms, nor should it be a large book-store; it was better and more economical of space to keep the books in a book-store rather than in the reference library itself. In conclusion, he begged to move a vote of thanks to Mr. Mountford for his excellent paper.

Mr. Karlake, called upon by the Chairman to make a few remarks, said that Mr. Brydon had touched upon almost all the points about which he had anything to say. But there was one comment he wished to make. Mr. Mountford recommended that the reference-library should be top-lighted, with the book-shelves running round it, separated by a barrier or rail to keep the public from touching the books. In his (the speaker's) opinion, however, a top-lighted room was not a good one, either for sitting or reading in, and the suggested mode of arranging the books round the room was certainly most wasteful of space. Books could be stored in book-stores with much greater advantage and economy of space.

Mr. C. T. Davis, Librarian of the Wandsworth Public Library, said that architects who were called upon to design free libraries should strenuously endeavour to bear in mind that the available income from the rate for supporting such libraries in many cases was so small that economy of maintenance and supervision was most essential. It should be borne in mind, too, that whereas in London the free libraries were managed by boards of Commissioners, not more than nine in number for each parish where the Acts were adopted, in the provinces there were sometimes library committees, numerically much stronger than the board of Commissioners; and it was desirable in such cases to give ample accommoda-

tion for them in the shape of a sufficiently large committee or board-room. There should be as few angles, nooks, and crannies as possible, for such often caused nuisance by harbouring dirt. A few good large, light rooms were better than a great number of little rooms. Architects should keep the walls of the rooms as flat as possible, avoiding the use of projections such as pilasters, whether real or sham, as much as possible, for such projections interfered with the hanging-up of maps or large prints from the illustrated papers. He would strongly urge architects who had to design free libraries to keep the ventilation as good as possible; they wanted ample extractive power for the ventilation of these buildings, and plenty of fresh air. As to gas-lights, he did not like the open burners at all, and he thought that in all cases the fumes of the gas should be carried off by means of ventilating hoods over the burners. It was of importance to place the "indicator" with a good light on both sides,—on the attendants' side as well as on the side which was seen by the public. As to the provision of separate reading-rooms for ladies, it was his opinion that they were not needed; but certain tables in the large general reading-room might be allotted to ladies. If a boys' room is wanted, put it close to the lending library, so that it might be well supervised. The suggested way of keeping the books in the reference library, with an enclosed space in front of them, was wasteful of room. A better way was to keep the books in locked and glazed cases, so that the public could see the backs of the books, but not get at them without the intervention of an attendant. It was a moot question whether sanitary conveniences should be provided in free libraries, except for the use of the staff. It was his experience that conveniences of that kind were greatly abused by the public. If supplied, a check on their improper use might perhaps be provided by means of spring-doors and automatic locks, which could only be opened by dropping a penny in the slit. One important point had been overlooked, viz., the provision of fire-extinguishing apparatus. On every floor should be a good supply of water; if possible, a hydrant. Librarian-ship is a profession, and if the librarian is to live at the library let his rooms be such as would suit a professional man. They should be so sited that the noise from his children,—as all librarians are not bachelors,—may not disturb the readers.

Mr. Quinn, Librarian of the Chelsea Free Library, made some remarks substantially to the same effect as those of Mr. Davis.

Mr. E. R. Farrow said he had much pleasure in seconding the vote of thanks to Mr. Mountford for his excellent paper, as well as to Mr. Appleton for reading it, and to Mr. Brydon and Mr. Karlake for so kindly sending plans in illustration of the subject. From what he had been able to learn in conversation with the librarians of similar public libraries, he thought it was now recognised that separate rooms for women and boys were not necessary or desirable; separate tables for them in the large rooms would suffice.

Mr. A. O. Collard, in supporting the motion, spoke in commendation of the British Museum Reading-room fittings and appliances, although he admitted that things there were done on too costly a scale to be applicable to small local or parish libraries. He thought, however, that top-lighting, as there carried out, was most satisfactory, and was at a loss to understand the objections which had been made to such a mode of lighting. There was no more painful room to read in than that of the Library of the Royal Institute of British Architects, for there one was obliged to sit either facing a strong light, or with his back to the light and his book in shadow.

The Chairman, in putting the vote of thanks to the meeting, said that, as was remarked in the paper, architects had been often severely criticised by librarians for defective arrangements in their buildings; but the librarians seemed to be unaware of the fact that the architects were not always to blame for those defects, which were as often as not due to compliance with the instructions of the Commissioners who built the libraries. With regard to the means of ventilating public reading-rooms, it was, as had been said, a most important matter. He was strongly of opinion that mechanical ventilation was necessary to cope with the state of things sometimes met with in crowded reading-rooms on Saturday evenings,—especially on wet, damp, and steamy Saturday evenings. With the vote of thanks he begged

to couple the names of the librarians, Messrs. Davies and Quinn, who had so kindly attended to give the meeting the benefit of their views on the subject.

The vote of thanks was then put and carried very heartily, and the proceedings terminated.

ARCHITECTURAL ASSOCIATION VISITS:

MR. D'O'LY CARTÉ'S NEW THEATRE.

A LARGE number of members attended the first Seasonal visit of the Architectural Association, on Saturday afternoon, to the new theatre in Cambridge-circus, Shaftesbury-avenue.

Mr. D'O'ly Carté in this case, as previously, has dispensed with the services of a contractor, and partially with those of an architect, for having with Mr. Holloway and his assistants arranged the plan and interior of the new building, he resorted to Mr. T. E. Colcott for the design of the elevations and internal decorations.

The state of the building at present is favourable to an examination of the construction, and its fireproof nature is apparent. It is stated that the auditorium will be constructed and fitted in every part of fireproof material, so that insurance of the building will become unnecessary; but whether the entire absence of wood in the construction and decoration will affect the acoustic properties of the building remains to be seen.

A specimen of a light fireproof door for use in the boxes and elsewhere was shown, the frame being formed of light steel, across which was strained asbestos canvas.

Steel has, with few exceptions, been used throughout. The partitions to boxes, balconies, stairs, have been formed of coke breeze and cement concrete, strengthened, where necessary, with steel bars.

The construction of the roof of the auditorium is peculiar in many respects. The trusses and other members are of steel, the spaces being filled in with coke-breeze concrete. The outside is rendered in Portland cement. It remains to be seen whether this roof will withstand variations of temperature and still remain watertight.

Those roofs which are exposed to view have had lattice nailed to the coke breeze, with a tile covering in the ordinary way.

Each circle is provided with a separate entrance and exit, the former of which can be used as an exit in case of emergency. There are but four boxes to each circle, as at present, a preference is shown by the public for stalls. The theatre is designed to seat about 2,000 people.

The orchestra has been designed to meet the views of Sir Arthur Sullivan, and for this purpose every musician will be placed well in front of the stage, and not underneath it, as has been often done recently.

The width of the proscenium is 34 ft. 6 in., and the depth of the stage 47 ft. 6 in. Sufficient height has been provided over the stage for scenes and curtains to be hoisted entirely above the proscenium, opening without either rolling or folding.

Mr. Holloway and his assistants kindly met the party, and explained the drawings and other matters referring to the structure.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held in the Council Chamber of the Corporation of London, Guildhall, on Tuesday last, Lord Rosebery in the chair.

The Annual Budget and Report.—The Chairman suggested that it should be referred to the Finance Committee to consider the question of preparing the annual budget of the Council, and that the chairman of the various "spending committees" should be asked to draw up estimates of the money they would require during the coming year. If the expenditure of the Council was to be methodised, such a course was absolutely necessary. This was agreed to. The Chairman added that, though they were not required by statute to do so, it would probably be expected, and it would certainly be desirable, that the Council should produce an annual report of their proceedings. He took it that the proper date up to which that report ought to be made was the 31st of March, because the day on which they began, or were supposed to begin, their work was the 1st of April, though accidentally that date was antic-

pated by a few days. Their recognised year began on the 1st of April, both financially and legally, and he therefore suggested that the Council should prepare an annual report, and, as a preliminary to that, that a circular should be sent to the chairmen of the different committees to ask them to forward to the Clerk of the Council statements of the work done by their committees upon which such a report might be based. He hoped that that report would be ready for presentation to the Council at their first meeting in the enlarged Council-chamber at Spring Gardens, on or about the 14th of April. This suggestion was also agreed to.

The Proposed Blackwall Tunnel.—Several members announced that they had petitions to present in reference to the proposed tunnel beneath the Thames at Blackwall, as to which the Bridges Committee presented the following important report:—

"The Thames Tunnel (Blackwall) Act, 1857, and the report of Mr. Wolfe Barry, have had the most anxious and careful consideration of your Committee. For many years the people of the east and south-east of London pressed upon the Metropolitan Board of Works their claim to have provided by the central authority some means of permanent inter-communication commensurate with the important interests on both sides of the river. As far back as August, 1852, Sir Joseph Bazalgette prepared, by order of the Board, a report which deals with the whole subject, going very fully into the question of ferries, bridges, and tunnels; this report concludes with the statement that a tunnel is the only suitable means of effecting a permanent crossing at Blackwall. After much consideration, the Board took the same view. Much time was spent in preparing the details necessary before going to Parliament, and a Bill was promoted in the session of 1857. It was referred to a Committee, when the scheme, which was opposed by railway companies and other owners of property, was supported by some of the ablest engineers of the day, viz. Sir J. Bazalgette, Sir F. Bramwell, and Mr. B. Baker. The Committee reported in favour of the Bill, and it was in due course passed. Specifications were prepared and tenders advertised for, and the action of the Metropolitan Board of Works in accepting in the last month of its existence a contract for this important work, instead of leaving the Council unfettered, will be fresh in the recollection of the Council. Your Committee, on taking up the matter, were placed in considerable difficulty, the Council being without a Chief Engineer, and the advantage of having the same engineer to prepare the specification and carry out a work of this character will be obvious. The technical aspect of the questions arising as to size, boring or borings, practicability of scheme, &c., were, by order of the Council referred to Mr. J. Wolfe Barry, and a copy of his report has been forwarded to each member. Mr. Barry, though suggesting certain modifications, considers a tunnel practicable, but suggests a high-level bridge. Your Committee are of opinion that, as a bridge at this point would have to be of such a height as to admit of all ships passing under it without any alterations in their masts, and as ships with masts 200 ft. above the water are stated to pass at this point, the road of the bridge would have to be at least 210 ft. above Trinity High Water Mark. When the low level of the land on both sides of the river is considered, a bridge of this height is, in the opinion of your Committee, out of the question. They therefore recommend—

"That the Council do proceed with the formation of the tunnel authorised by the Thames Tunnel (Blackwall) Act, 1857,—namely, by three lines of borings, one being for foot-passengers and the other two for vehicular traffic.

The consideration of this report was adjourned for a fortnight, and, on the motion of Councilor Longstaff, it was agreed that in the meantime the Bridges Committee should prepare certain returns as to the cost and results of working of the Woolwich Ferry.

Election of a Chief Engineer.—The Standing Committee presented the following report:—

"We have, in accordance with the resolution of the Council on Tuesday last, the 4th inst., considered, in conference with the other Committees concerned, the best course to be taken for the appointment of a Chief Engineer. It will probably be within the recollection of the Council that, when we recommended the appointment of Mr. Dunscombe, the loss of whose services we greatly regret, we mentioned the names of two other candidates for the office,—viz., Mr. A. R. Binnie and Mr. J. Allison. We

formed at the time a high opinion of Mr. Binnie's qualifications, whilst deeming Mr. Dunscombe to be, on the whole, more fitted, owing to his previous long and general experience in Liverpool, for the position that had to be filled in London. The Council being now under the necessity of making a fresh choice cannot, we think, do better than appoint Mr. Binnie to the office. We accordingly recommend—

"That Mr. A. R. Binnie be appointed Chief Engineer of the Council, at a salary of 1,500*l.* a year, upon the following conditions:—That he do hold his office during the pleasure of the Council; that he be required to give his whole time to the duties of his office, and be not allowed to take any private practice, and that on retirement he shall not be entitled to any superannuation or pension."

On the motion of the Deputy-Chairman (Councilor Haggis), this recommendation was unanimously agreed to. Mr. Binnie shortly afterwards appeared on the dais, and thanked the Council for his appointment.

Mr. Dunscombe.—The Standing Committee also recommended,—

"That the Clerk be instructed to convey to Mr. Dunscombe an expression of regret on the part of the Council that the temporary failure of his health has deprived the Council of services from which it had reason to anticipate much advantage, and the hope that his health may soon be sufficiently restored to enable him to enter upon some fresh sphere of duty."

One over-cautious member of the Council, whose name we forbear to mention, wanted to know "whether it would not be going too far" to pass this recommendation. The Chairman promptly replied that he certainly did not think so, for he thought that Mr. Dunscombe, who had given up a good appointment to enter their service, and was now without any appointment, was entitled to some expression of their sympathy. After this, the recommendation was unanimously carried.

The Architect's Department.—The Standing Committee also presented a report on the re-organisation of the Architect's Department. They recommended its division into two departments,—viz., the "Estates and Valuation Department," of which the Valuer, Mr. A. Young, would be the head; and "The Architect's Department," of which Mr. Blashill, the Superintending Architect, would be the head. In this department, the Committee recommended the formation of a "Parks and Open Spaces Sub-Department." The consideration of this report was postponed.

A Board of Works' Scandal.—The Housing of the Working Classes Committee brought up a long report, stating that they had proceeded upon the resolution of the Council of July 16 last instructing them to institute an inquiry into the rights of the present owners of certain land in Whitecross-street. The history of the matter was as follows:—In 1877 a scheme was undertaken by the Peabody Trustees, under the authority of the Metropolitan Board of Works, known as "The Whitecross-street Improvement Scheme." The costermongers in the district, especially those displaced by the carrying out of the scheme, asked the Board that buildings might be erected which made provision for their goods and barrows. The Board promised that that should be done, in a letter dated March 15, 1877, but that promise was not fulfilled. When the costers discovered this, great discontent was expressed, but it was not until 1887 that an organised agitation commenced. Certain costermongers then met every Wednesday at the coffee-house of Mr. Wells; and Mr. Patrick Lamb, a general dealer, and Mr. Church, a bootmaker, took the lead. Mr. Lamb seemed to have been tacitly accepted as chairman, and a Committee was formed, at the suggestion of Mr. Wells, on the 31st August, but the proceedings were, however, never of a very regular character. After one or two meetings Mr. Wells introduced Mr. Hibbert, a local tobacconist, to act as Secretary to what was called "The Watch Committee of Costermongers," this name being taken from an old committee which had existed in 1877, and of which Lamb and Church had been members. Mr. Hibbert's services were readily accepted, as the members of the Committee were of an uneducated class. A deputation, introduced by Mr. Hibbert, then waited upon Mr. Berry, the representative of their Vestry on the Metropolitan Board of Works, to request his good offices on their behalf; and afterwards deputations waited upon the Board, in order to claim a fulfilment of the promise given in 1877. Mr. Berry took up the matter very energetically, and owing to his action the Board decided on December 23, 1887, to sell to

the Watch Committee a piece of land in Dufferin and Errol-streets for 65*l.*, or twenty-one years' purchase at one penny a foot rental. The value of this land had been variously estimated at 3,000*l.* and upwards. The land, it appeared, was subsequently made over absolutely by the Board to Messrs. Hibbert, Wells, Lamb, and Church, but, it is alleged, without the knowledge or consent of the costermongers on whose behalf those persons professed to be acting. Dwellings of an unsatisfactory character structurally (according to the report of the Council's Valuer), and not giving the requisite accommodation for the costers, had since been erected on the land in question, but the four persons named were now willing to convey the land and buildings to the Council, subject to the mortgage. The cost upon which the Council could acquire the property was stated to be not less than about 10,000*l.*, although the Valuer's report stated that the approximate value of the buildings is only 5,533*l.* 10*s.* 5*d.* The Valuer further reported that he could not advise the Council in any terms to acquire the buildings, as, "owing to their defective quality, a large expenditure would have to be incurred in constant repairs, and nothing could be done to make them satisfactory." The Committee, while expressing their condemnation of the carelessness which had taken place, and by which the property of the ratepayers had been sacrificed, concluded by expressing the hope that opportunity at no distant date might be offered for providing for the costers of the neighbourhood the accommodation of which they stood in need, and which was promised to them. The Committee recommended:—

"That the Standing Committee be instructed to investigate the facts appearing from this report, as affecting the Solicitor's and Architect's departments, and the District Surveyor."

This was agreed to; and subsequently, on the motion of Councilor Benn, it was resolved—

"That, in the opinion of this Council, the claims of the Whitecross-street costermongers, as to re-housing, have never been satisfied, and that it be an instruction to the Housing of the Working Classes Committee to inquire and report to the Council in what way their claims can best be met."

Water Assessments.—After some discussion, it was resolved—

"That in view of the quinquennial re-assessment of property in London which will come into force next year (1891), and the resulting effect which will give the water companies power to exact an increased charge for their supply, this Council instructs its Special Water Committee to immediately take the question into consideration, and report thereon."

Mortuaries and Coroners' Courts.—It was also resolved—

"That all Coroners having jurisdiction within the Administrative County of London be requested to furnish the Council with the number and position of existing Mortuaries and Coroners' Courts in their respective districts, and to inform the Council what further accommodation, either as to Mortuaries or Coroners' Courts, they consider necessary in their districts."

District Surveyors and Cellar Dwellings.—Councilor Davies moved—

"That, as District Surveyors fall in many cases to report to the Council and the local authorities the occupation of underground dwellings, it be an instruction to the Building Act Committee to report to the Council what steps can be taken to ensure the District Surveyors carrying out with greater efficiency their duties with respect to these dwellings."

In the course of the discussion which ensued upon this, Councilor Beachcroft expressed a hope that these duties would ultimately be transferred to the sanitary inspectors. Unfortunately, there were at present only 111 sanitary inspectors throughout the metropolitan area. He hoped to see that number increased three-fold.

The motion was carried, and the Council shortly afterwards adjourned.

Swedish Villas in Brazil.—Last summer the Ekman Snickeri factory, of Stockholm, forwarded four wooden villas to Brazil, and they have attracted so much notice that large orders for others have been received, to be executed during the present winter. This factory has also manufactured the wooden structures for the Swedish section of the great agricultural exhibition to be held in Buenos Ayres, as well as that to contain the Danish dairy, both being Scandinavian in style.

Industrial Exhibition in Constantinople.—An industrial exhibition,—the first ever held in Turkey,—will be opened in Constantinople next spring.

CLERKS OF WORKS' ASSOCIATION OF
GREAT BRITAIN:
ANNUAL DINNER.

The seventh annual dinner of this Association was held on Monday evening last in the Venetian Room of the Holborn Restaurant. Mr. J. Macvicar Anderson, Vice-President of the Royal Institute of British Architects, occupied the chair, and there was a large attendance of the members and friends of the Association.

The usual loyal and patriotic toasts having been disposed of (Mr. W. Baker, of Portsmouth, responding on behalf of "The Army, Navy, and Reserve Forces").

Mr. J. H. Smith proposed "The Architects and Surveyors," coupled with the names of Mr. Ralph Nevill, F.S.A., and Mr. J. Gandy.

Mr. Ralph Nevill, in responding, expressed his sense of the value of the services of clerks of works, a body of men, however, whom he had not employed so largely as he could have wished, for a great deal of his practice had been in the country, where, with the help of a good horse, an architect was able to do a good deal in the way of inspecting the progress of his works. During his early experiences of the profession he had acted as clerk of works under his old master, Sir Gilbert Scott, and on another occasion he had also, for the same master, taken upon himself the work of a builder as well, paying the men in addition to supervising their work. No work that he had ever done taught him so much as he learnt in following those occupations. Young architects must not esteem such work too lightly; let them by all means be prepared to do it, and first make themselves masters of the principles of construction, and learn how to take out quantities; men who mastered all such practical matters as these would have all the more satisfaction in turning to the art-side of their profession, which they would feel themselves able to do when they had able lieutenants in the shape of clerks of works, on whom they could lean, and lean heavily. He recollected the thorough coincidence which Sir Gilbert Scott reposed in his clerks of works, and the cordial friendship which Sir Gilbert always felt towards them. Speaking of quantities, he hoped the day would come, and before very long, when the bill of quantities would be made the basis of the contract. When that wished-for time arrived, the importance and value of the services of the clerk of works would be somewhat enhanced, for in many works the final measuring-up of the work, with a view to the settlement of accounts, might very well and very properly be done by the clerk of works. In conclusion, Mr. Nevill said he thought that there was a brilliant future for English architecture. Year by year young men, having received their professional education in London, distributed themselves over the country and settled down to practice, helping to build up what he thought would prove to be one of the finest schools of architecture that had ever been seen.

Mr. J. Gandy also briefly responded to the toast, speaking very highly of his experiences of the courtesy and ability of clerks of works.

The Chairman, in proposing the toast of the evening, "The Clerks of Works' Association of Great Britain," said that it was with very great pleasure indeed that he occupied the chair that evening, for he felt that architects were very largely dependent upon clerks of works. Now, inasmuch as he saw by the constitution of the Association that its objects were to advance the general knowledge and capabilities of its members, and to maintain their respectability and integrity, it followed that architects ought to take the greatest possible interest in encouraging the Association, and in doing all they could to promote its success and efficiency. Time was when the clerk of works, as we now understood the term, was little known or little required. In what were called by some people "the good old times" the architect, if he attained repute at all, only attained a local repute, owing to the slightness of the means of communication between one part of the country and another. The venerable shrines which had come down to our days in the shape of those grand old cathedrals and parish churches which constituted the greatest legacy which could have been left to us, and for which we felt such deep and natural affection, were in many cases the work of a single architect, and clerk of works concentrated in one individual. What a grand occupation it must have been to have had the whole control of the erection of such buildings, without being troubled by the crochets of clients, and without having one's ideas limited on the score of expense,—to have been able to have resided always upon one's building, and to have been able to design its mouldings on the spot, with special reference to the positions they were to occupy! What a contrast with the rush and bustle and excitement of the nineteenth century! "Tempora mutantur, et nos mutamur in illis." Times had indeed changed; steam, electricity, and the means of rapid communication had completely banished the old order of things. The architect who now attained any celebrity was not allowed to repose in one neighbourhood; he had to rush north, south, east, and west at the call of his clients. That was a state of things which made it necessary that the

architect should have on each of his works a responsible and capable representative, and hence the necessity for the modern clerk of works. The modern clerk of works, to be of any use, must be efficient and honest, and hence the necessity of an Association membership in which was some guarantee of the possession of those necessary qualifications. To be an efficient clerk of works in the present day meant a great deal. It implied the possession of a not inconsiderable amount of scientific knowledge, and it therefore behoved every clerk of work to avail himself of every opportunity of improving his general and special knowledge. Their success was largely dependent upon their own efforts to improve the facilities with which they were endowed. The really stupid people in the world were not so much those who were innately stupid as those who, not being innately stupid, were unmindful of the importance of cultivating their natural faculties. In illustration of this and other points in his speech, the Chairman narrated very pleasantly one or two legends of Classic mythology. Although, he said, it might have been supposed that he had a hundred eyes, would have made a remarkably efficient clerk of works, the story showed that he was eventually caught napping. In conclusion, the Chairman coupled with the toast the name of Mr. Linn Dillon, the President of the Association, who made a very able speech in responding.

The other toasts were "The Honorary Treasurer (Mr. John Oldrid Scott)," proposed by Mr. J. Brady, Editor of the Association's *Journal*, and replied to, in the absence of Mr. Scott, by Mr. P. J. King; "The Worshipful Company of Carpenters," proposed by Mr. F. Dashwood, the Hon. Secretary of the Association, in a characteristically racy speech, and responded to by Mr. Banister Fletcher, Master of the Carpenters' Company; "The President, Vice-President, and Committee," proposed by Mr. Alexander Ritchie, and responded to by Mr. R. Wheeler; "The Press," proposed by Mr. G. Dalton, and coupled with the name of the representative of the *Builder*; "The Visitors," proposed by Mr. J. Atkinson, and replied to by Mr. H. Studby-Gordon, A.R.I.B.A.; "The Chairman," proposed by Mr. T. Ganang; and "New Members of the Association," proposed by an old member whose name was not announced.

COMPETITIONS.

Dorset County Lunatic Asylum.—We are informed that sixteen designs have been submitted in competition for the enlargement of this Asylum. The Committee of Visitors have appointed Mr. C. H. Howell their professional assessor to advise in the selection. Mr. Howell is the consulting architect to the Commissioners in Lunacy.

Germany.—Among the competitions decided during the last few weeks, the one at Frankfurt-on-the-Maine, for a new extension of the Town Library, intended to hold 300,000 volumes, has been won by Herr Wilhelm Mueller, of that town.—The competition for a garrison church at Straßburg, with sitting room for two thousand soldiers and standing room for another thousand, only enticed twenty-five architects to compete. Several very fair designs were sent in, but the jury did not consider any one of them worth the first prize; two second prizes were won by Messrs. L. Mueller, of Frankfurt, and L. Klincksberg, of Oldenburg; and a third prize by C. Doffen, of Berlin.—The designs for the new Arts and Science Museum at Düsseldorf will be placed before a competent jury on March 15, and it is generally expected in architectural circles that the competition will show some very interesting planning.

ARCHITECTURAL SOCIETIES.

Birmingham Architectural Association.—At a well-attended meeting of this Association, held on the 4th inst., Mr. J. Cotton being in the chair, a paper was read by Mr. Charles E. Bateman, entitled "A Saturday Afternoon in London," in which he showed how it is possible in the time afforded by a Saturday half-holiday to visit and examine examples of every period of architecture, from the earliest Egyptian to English work of the eighteenth century. Mr. Bateman described a number of examples, all within a small area, and pointed out that by a series of visits such as he described a student could readily grasp the sequence of the historical styles of architecture.

* The Carpenters' Company, as Mr. Dashwood explained, allow the Association the use of meeting-rooms at their Hall. On the other hand, as Mr. Banister Fletcher pointed out, Mr. Dillon, Mr. Dashwood, and other members of the Association have co-operated very cordially with the Carpenters' Company in its various efforts for the promotion of technical education in the building trades.

Among the examples described, all of which were illustrated by photographs and engravings, were the Egyptian, Babylonian, Assyrian, Lycian, Greek, and Roman work in the British Museum; the Churches of St. Bartholomew, The Temple, St. Ebbwvalde, Anstin Friars, St. Helen, and St. Sepulchre; and Crosby Hall, Middle Temple Hall, Somerset House, and Whitehall, in each of which were excellent examples of the work of the various periods at which they were erected.—A paper was also read by Mr. Herbert R. Lloyd, A.R.I.B.A., on "Methods of Calculating Strains," in which he pointed out the advantages of the graphic method of calculating strains, and by means of diagrams of girders and roof trusses carrying loads such as have to be frequently supported in modern buildings, demonstrated the readiness with which the strains upon such supports could be calculated, and the accuracy with which the necessary strength of their various parts could be ascertained. At the conclusion of the papers, a hearty vote of thanks was accorded to Messrs. Bateman and Lloyd for the papers they had read, and a resolution was passed asking Mr. Lloyd to take steps for the formation of a class for the study of graphic statics.

Edinburgh Architectural Association.—A meeting of this Association was held on the 6th inst.—Professor G. Baldwin Brown, the President, in the chair. Mr. John Kinross read a paper entitled "Some remarks on the chapter introductory to Ferguson's History of Architecture." The various subjects treated of were uniformity, mass, proportion, and colour in architecture, and the prospects of advance in modern work. With regard to uniformity, the lecturer referred to Princes-street as an example of individuality carried to excess, and while of opinion that in certain streets there could not be too much variety, a street like Princes-street demanded some uniformity in its architecture, if it was to be worthy of its magnificent natural situation. Size was stated to be the first element in architectural grandeur, and one that the system of building commonly adopted in Edinburgh naturally gave; but proportion was insisted on as necessary to give a large building any permanent value. The various attempts by English architects to introduce colour into buildings were referred to, and the fact stated that at least one of the most eminent of them had entirely changed his views on this subject, and had latterly used only such colour as the local stone afforded. Violent contrasts of colour were deprecated, such as the introduction of large masses of red stone amongst grey, or grey amongst red, and various towns referred to where this had been done with an injurious result. The local colour of towns like Aberdeen and Galashiels was referred to, and suggestions made about other methods of using their local stones. The lecturer considered that these plans. The lecturer considered that advance could only be made in course of time after great individual effort, as at present architects could not be got to work on the same lines, but he hoped that in the future there might be greater unity in general work, and consequent advance. Some discussion followed, and at the close the customary vote of thanks was passed.—*Sootsman.*

Sheffield Society of Architects and Surveyors.—The monthly meeting of this Society was held at the School of Art on Tuesday night, Mr. F. P. Fowler, President, presided, and about forty-five members were present. The President read an interesting paper on "The Valuation of Property." He pointed out that, although many people professed to be familiar with the subject in the abstract, it was matter of wonder that there were such wide divergences of opinion amongst surveyors. His own professional life had been spent in mastering the intricacies of the subject, and in dealing with property, especially undeveloped land, he endorsed the wisdom of the old adage, "Never prophesy if you are not sure." He divided his paper into eight separate headings:—1. Agricultural estates; 2. Building land; 3. Town property; 4. Sale shops, &c.; 4. Ground rents; 5. Manufacturing and trade premises, breweries, &c.; 6. Collieries, ironstone and other mines; 7. Reserve interests and advowsons; and, 8. Sale of properties under compulsory powers. A hearty vote of thanks to the President, moved by Mr. Flockton, seconded by Mr. Innocent and supported by Mr. Winder, sen., Mr. C. Hadfield, and Mr. J. B. Mitchell-Withers, was passed with applause, and it was agreed that the paper should be printed and circulated.

The Secretary announced that papers were forthcoming from Mr. Wike, the Borough Surveyor, and Mr. T. M. Rickman, F.S.S., of London.

ARCHAEOLOGICAL SOCIETIES.

British Archaeological Association.—At the meeting of this Association held on Wednesday, the 6th inst., Mr. Geo. L. Wright, F.S.A., in the chair, it was announced that the Right Hon. the Earl of Carnarvon had, on the invitation of the Council, accepted the office of President for the congress to be held in the autumn at Oxford, and for the following year. It was announced that the office of honorary correspondent had been revived, and the names of a goodly number of correspondents who had been elected were recorded. The Rev. Canon Skelton described a fine coped tomb-head covered with waxon interlaced work, which was found several years ago at Hicking Church, Notts, where it is carefully preserved. Mr. Earle Way exhibited various articles worked in stone, supposed to be weights, found in the bed of a stream at Templeton, near Tavistock. The top stone of a quern found at Belvoir, Notts, was described by the Chairman. Mr. Loftus Brock, F.S.A., exhibited several silver coins of Roman empresses, in fine condition, illustrative of the head-dresses of Roman times. The Rev. Canon Collier, of Chilholton, Hants, exhibited a portion of a massive stone howl found in the locality, and pronounced to be of Romano-British date. The Rev. Mr. Lach-Szymka read a paper on "The Study of the Past in the Present," and referred to various old-world customs, such as the blowing of horns, the waving of torches, passing through or around the fire, &c., which still survive in Cornwall. He also read notes on the recent discovery of a menhir, found built up as old material in the wall of Galval Church, Cornwall. It has a key pattern, and two letters in Roman character, worked in the granite of the county. A paper was then read by Mr. M. Drury, on a supposed Roman causeway at Lincoln. This consists of a deep concrete mass which has been traced beneath the course of the Roman road which still forms the southern approach to Lincoln. The positions of a vast number of Roman discoveries were indicated on a large map, and the finds were described at length.

Royal Archaeological Institute.—On Thursday, the 6th inst., a meeting of this Institute, under the presidency of Mr. T. H. Baylis, Q.C., was held, when Mr. J. L. André read a paper on the antiquities contained in the church at Burton, Sussex. The structure itself is almost devoid of interest, but the church is rich in monumental and other antiquarian features. Mr. André exhibited drawings and rubbings in illustration of his paper. Among the sepulchral monuments, the most interesting were a diminutive effigy of a lady of the latter portion of the fifteenth century, and a brass to Dame Goring, showing her clad in a tabard. This lady was an ancestor of the Goring, father and son, who took part in the seventeenth-century civil wars. Another interesting feature was a wall painting of a female saint attached to a cross saltire, head downwards. Mr. André considered this painting as belonging to the latter half of the fifteenth century.—The Rev. J. C. Cox, LL.D., read a paper on a private seal engraved on amber from old Malton Priory. The seal was found some years ago in a stone coffin in the chancel of old Malton church. The date of this relic was probably of the early part of the thirteenth century. Dr. Cox also exhibited some recent finds from a cave near Buxton.

LECTURES FOR SANITARY INSPECTORS AT THE SANITARY INSTITUTE.

Sir,—The above forthcoming course of lectures, previously announced in your columns, will, no doubt, prove to be an instructive one; although, I for one, consider that the course should not have been restricted to the instruction, and for the special benefit of Sanitary Inspectors alone.

The course should, in my opinion, have had a more extended application, so as to include Medical Officers of Health, and others of our co-workers who play such an important part in the sanitary welfare of the urban and rural sanitary districts.

FREDERIC BOOKER, Sanitary Inspector.

Cowentry, February 10th, 1890.

The "Hercules" Street Cleansing Machine.—Our description of this machine is again unavoidably held over.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—VI.
MAGNETISM (continued).

THE conception that a line of force is a row of electrical particles spinning round with the line as axis, affords simple explanations of the actions of magnets on magnets, magnets on currents, and currents on currents, including the production of electro-motive force in a conductor which is being cut by lines of force.

Let A, B, C (Fig. 14) represent three particles of electricity at rest under whatever the pressure or absolute potential may be in space; if they are now made to revolve about an axis P Q, that is, if they become a portion of a line of force, P, Q, they will, owing to centrifugal force, contract along P Q, and expand in every direction at right-angles to it. Since electricity is elastic, though incompressible, this change of shape and consequent change of pressure in different directions accounts for magnetic force.

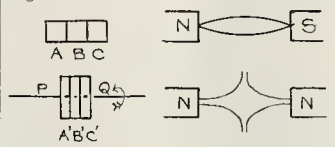


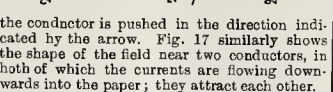
Fig. 14.

Fig. 15.

Fig. 15 shows the two cases of attraction and repulsion between the poles of two magnets; in the first case the lines run from one face of a magnet to the other, and the pressure at the points P and Q being diminished, owing to the straining of the electricity between them outwards and sideways, the magnets attract each other; in the second case the lines of force bend outwards so as to present their sides to each other, and in this case the pressure between the faces of the magnets is increased, so that they are pushed away from or repel each other.

A mere inspection of the magnetic field in proximity to a magnet or conductor carrying a current will show whether there is any resultant force tending to move it in one direction more than another.

Fig. 16 shows the section of a conductor passing through the plane of the paper with a current flowing downwards into the paper; its own lines of force combine with those coming from the N-pole of the magnet near it so as to crowd them together on the lower side, hence



the conductor is pushed in the direction indicated by the arrow. Fig. 17 similarly shows the shape of the field near two conductors, in both of which the currents are flowing downwards into the paper; they attract each other.

In fig. 18 the current is reversed in the right-hand wire, with the result that mutual repulsion ensues. These figures explain the well-known facts that parallel currents flowing in the same direction attract and in opposite directions repel one another.

In the year 1831 Faraday discovered the principle of magneto-electric induction—that



Fig. 19.

Fig. 20.

is, the production of electro-motive force when a conductor cuts lines of force. Modern dynamo-electric machinery is the outcome of this discovery, and we have finally to consider how lines of force, by cutting a conductor, can drive electricity along it.

Let C, fig. 19, represent a particle of electricity between two others, M and N; the gear-

ing between them is represented by two driving-hands, and, to help the analogy, the particles may be supposed cylindrical in shape. If M and N become parts of two lines of force, and rotate as indicated by the arrows, the only effect on C will be that it, too, is made to rotate in the same direction. In fig. 20, M is removed. Now if N begins to rotate, or C is brought under the influence of N, already supposed to be in a state of rotation, C has a tendency to move in the direction of the feathered arrow as well as to rotate.

Finally, suppose C to be electricity within a conductor, the hands are destroyed, and we may regard the electricity as in a kind of liquid state within it. If the conductor is constantly moved to the right, so as to be moved into the influence of lines in the position of N and out of the influence of those in the position of M, the N's will have the preponderating effect and will act like paddle-wheels paddling along a current in the direction shown. Clearly, if the motion ceases, the M's will have as much effect as the N's, and the electricity in the conductor will simply spin round without moving bodily forward in a current.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

3,428, Fire-escapes. W. Cooper.

In connexion with a previous patent, this specification describes the use of a brake or bars to control the progress of a chair in which the person is seated, and which is lowered from a bracket near the window in case of fire. The invention is chiefly designed for use in large institutions, hospitals, asylums, &c., or for very lofty buildings. A chair with bars which protect the person seated therein is lowered by means of tackle and controlled by the brake.

4,347, Fireproof Bricks and Structures. J. Homan.

The bricks which are the subject of this patent are supported on main girders, projecting so as to cover the under side of the main girder. These bricks are of exceptional length,—say, 18 in.,—and the ends are notched so that they embrace the lower flange of the girders. Their under surface is by preference made with dove-tailed grooves, so as to form a key for the plaster, and the two sides may be made to incline toward each other so as to form V-shaped grooves to receive and key the concrete. The bricks are perforated, and are laid in the V position and pushed along the girders until each brick touches the last one put in. Floors, walls, and all kinds of structures are made in the same way.

10,070, Door Handles. J. Atherton.

This invention relates to some modification of the ordinary way of fitting the door-knobs to the spindles. The appliance is in two parts, one fitting over the other, after the manner of a collar and a nut. In revolving, the collar causes the nut to revolve with it, but at the same time allows for longitudinal motion. The nut being made to revolve on a conical piece the sections are contracted, and firmly clip the spindle, rendering unnecessary any further fastening of the knob to the handle or spindle.

10,397, Composition or Plaster for Walls. J. B. King.

According to this invention, mineral or calcareous substances are mixed with gelatinous or vegetable substances in a pasty mass which is dried by heat, powdered, and mixed with plaster and with asbestos, and put on as a finishing coat to plaster walls.

13,764, Sash-frames, &c. J. Tall.

The sash-frames which are the subject of this patent are hollowed out in a way specified, and the balance-weights are hollow and weighted with shot or lead. The frame is hinged, and carries sliding-sashes on an outside frame to enable the window to be cleaned, glazed, or painted from the inside of the room, and a bar is provided for supporting the same when open.

13,792, Whitewash and Water-colour Paints. J. J. Carr.

This invention relates to a composition of whitening or colours, mixed or ground together with size, and then dried by heat and again ground, so that when it is to be used it is only mixed with water instead of—as in the usual way—with size.

NEW APPLICATIONS FOR PATENTS.

Jan. 27.—1,379, J. Jenson, Automatic Locks for Gates and Doors.—1,382, H. Sparks, T Squares, &c.—1,418, A. Hammage, Metal Framing for Fireproof Floors and Walls.

Jan. 28.—1,458, B. Marshall, Sash-balances and Locks.—1,474, J. Griffiths and others, Fittings for Gates and Heavy Doors.—1,525, J. Button and others, Kilns for Bricks, &c.—1,527, T. Jones, Gas-fitters' Blow-pipe.

Jan. 29.—1,544, G. Newman, Indicating Bolts or Fasteners.—1,565, J. Timm, Preventing the Growth of Wood Fungus in Parquetry.—1,578, R. Jewell, Fire-grates.—1,594, R. Wilding, Flushing and Ventilation of Water-closet Basins, &c.
 Jan. 30.—1,619, L. Shilton, Electric-bells or Gongs.—1,628, J. Macdonald, Ventilating Coal.—1,633, J. & H. Knesch, Shotting Saws.—1,639, A. Dayton, Stove.—1,654, M. Parrington, Manufacture of Linoleum.
 Jan. 31.—1,671, W. Curtis, Window-fasteners, &c.—1,678, C. Sansom, Fire-grates or Stoves.—1,683, G. Bayley, Window-etch.—1,684, A. Boulton, Paints.—1,687, J. Nagel, Door-locks.—1,694, W. Nash, Sash-fasteners.
 Feb. 1.—1,730, J. Merrill, Automatic-flushing Cistern for Water-closets.—1,755, A. Tonkins, Slow-combustion Stoves.—1,759, J. Jones and S. Edwards, Automatically-raising Water-closet Seats.—1,760, J. Taylor, Ventilating Cows.

PROVISIONAL SPECIFICATIONS ACCEPTED.

13,618, J. Leco, Ventilators.—19,461, W. Franklin, Lead Stench Trap.—20,604, C. Waddington and H. Butterfield, Drain-pipes, &c.—85, W. Beale, Paving.—436, S. Hill and R. Rodgers, Door-catches and Fasteners.—432, R. Burwell, Sash-fasteners.—437, J. Gignez, Closing-doors.—704, W. Barnes, Paints.—929, D. Nesbit, Radiators for Heating and Ventilating.—985, H. Grimshaw, White Pigment.

COMPLETE SPECIFICATIONS ACCEPTED.

Overt to Opposition for Two Months.

2,039, F. Self, Window-fastener.—2,155, N. Sorenson, Doorlocks, &c.—3,851, H. Hellewell, Chimney-top or Cowl.—5,157, J. James, Cement.—5,384, W. Heathman, Bands and Machines.—5,835, J. Shanks, Flushing Apparatus for Water-closets.—5,967, C. Gardner, Fence.—13,951, J. Peirce and F. Lutton, Plates for Hoath and Floor.—16,885, H. Lake, Bridges.—17,904, J. Buschke and others, Windows, &c.—20,279, A. Chorley, Hinge.—20,316, G. MacLaurin and J. Crankshaw, Scaffolds.—20,349, M. Calin, Removing Broken Screws.

RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

Feb. 4.—By TOPPIS & ROBERTS. Vauxhall Bridge-rd.—No. 241, ut. 34 yrs, gr. 42 p.a.	4210
Feb. 5.—By FRANK JOLLY & Co. Mile-end—6, Cannon-pl., r. 231. 48. p.a. Clapton—53, Rushmore-rd., ut. 71 yrs, gr. 45. 8s, r. 233 p.a.	290
Feb. 6.—By FARRINGTON, ELIAS CLARK & Co. Marylebone—8, Gray-st., ut. 12 yrs, gr. 44s, r. 265 p.a. Soho—13, Bateman-st. f. building site.	500
Feb. 7.—By BAKER & SONS. Regent-st.—L.g. of 375, ut. 6. 59 yrs, gr. 2134. 10s. Regent's Pk., York-ter.—1 gr. of 483, ut. 31 yrs, gr. 24. Cambridge-ter.—L.g. of 4199, ut. 34 yrs, gr. 416. Albany-st.—L.g. of 430, ut. 34 yrs, gr. 24. Tottenham, Minor-rd.—F.g. of 418, with reversion in 87 yrs. Kensal-green—F.g. of 215, with reversion in 97 yrs. F.g. of 45, with reversion in 80 yrs. Willesden—F.g. of 421, with reversion in 98 yrs.	3,610 890 1,365 415 390 355 115 440

(Contracts used in these lists.—F.g. for freehold ground-rent; L.g. for leasehold ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.g. for estimated rental; ut. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.)

MEETINGS.

SATURDAY, FEBRUARY 15.
 Royal Institution.—The Right Hon. Lord Rayleigh, M.A., F.R.S., on "Electricity and Magnetism." 11.3 p.m.
 MONDAY, FEBRUARY 17.
 Royal Institute of British Architects.—Mr. John Slater on "Building Legislation." 8 p.m.
 Royal Academy.—Mr. A. S. Murray on "Sculpture in Greek Temples." 11.8 p.m.
 Leeds and Yorkshire Architectural Society.—Mr. Halsey Ricardo, on "Some of the Conditions of Modern Architecture in Towns." 7.30 p.m.
 Liverpool Architectural Society.—(1) Mr. H. L. Beckwith, F.S.I., on "Quantity Surveying." (2) Miscellaneous Contributions. 7 p.m.
 TUESDAY, FEBRUARY 18.
 Institution of Civil Engineers.—(1) Mr. J. W. Hart on "The Shanghai Water Works." (2) Mr. J. Orange on "The Tystem Water Works, Hong Kong." (3) Mr. J. H. T. Turner on "The Construction of the Yokohama Water-Works." 8 p.m.
 Sanitary Institute (Lectures for Sanitary Inspectors).—Mr. E. C. Roberts, F.S.A., on "Practical Considerations for Sanitary Officers." 8 p.m.
 Society of Arts (Foreign and Colonial Section).—Mr. J. Bentker Heaton, M.P., on "Ocean Penny Postage and Cheap Telegraph Communication between England and all Parts of the Empire and America." 6 p.m.
 WEDNESDAY, FEBRUARY 19.
 Society of Arts.—Professor Sivanus P. Thompson, D.Sc., on "The Organization of Secondary and Technical Education in London." 8 p.m.
 British Archaeological Association.—(1) Mr. G. Patrick on "Wandsworth and Its Ancient Buildings." (2) Mr. M. Drury on "The Roman Station of Lindum." 8 p.m.

Free Lectures to Artisans and others on Matters Connected with Building.—Professor W. H. Corbett on "Modern Sanitation." Carpenters' Hall, London-wall. 8 p.m.
 Civil and Mechanical Engineers' Society.—Mr. A. F. Bruce on "Italian Water Supply." 8 p.m.
 Builders' Foremen and Clerks of Works Institution.—Ordinary Meeting. 8.30 p.m.
 Inventors' Institute.—8 p.m.

THURSDAY, FEBRUARY 20.
 Royal Academy.—Mr. S. Murray on "Sculpture in Greek Temples." 11.8 p.m.
 Institution of Electrical Engineers.—8 p.m.
 Edinburgh Architectural Association.—Mr. H. F. Kerr, on "Ingress and Egress for Public Buildings." 8 p.m.

FRIDAY, FEBRUARY 21.
 Royal Institution.—Mr. S. Bidwell, M.A., F.R.S., on "Magnetic Phenomena." 9 p.m.
 Sanitary Institute (Lectures for Sanitary Inspectors).—Dr. Louis Parkes on "Water Supply, Drinking Water, Pollution of Water." 8 p.m.
 Institution of Civil Engineers (Students' Meeting).—Mr. C. N. Goodall on "Some Types of American Locomotives and their Construction." 7.30 p.m.

SATURDAY, FEBRUARY 22.
 Architectural Association.—Visit to the Imperial Institute, South Kensington.
 Royal Institution.—The Right Hon. Lord Rayleigh, M.A., F.R.S., on "Electricity and Magnetism." 11.3 p.m.
 President Institution of Builders' Foremen and Clerks of Works.—Annual Dinner, Holborn Restaurant. 6.30 p.m.
 Edinburgh Architectural Association.—Visit to Parliament Hall and St. Margaret's Chapel.

Miscellaneous.

"Tiled" Floor-cloth.—The "Scarborough Patent Tiled Floor-cloth Company" send us some specimens of their manufacture, the object of which is to produce a floor-cloth in which the pattern will not become obliterated by use except in the entire wearing out of the material. The surface of the cloth, instead of having merely an application of paint, consists of what are called "tiles" of solid pigment laid on to a backing of stout canvas or cotton and subjected to heavy pressure. In section the cloth is seen to consist of a layer of pigment of nearly equal thickness with the cloth which forms the backing. The obliteration of the original surface of the pigment, by wear, leaves the colour as before, instead of leaving the whitish worn space which is often seen on the portions of a floor-cloth which have received the most traffic, even when the material is still quite sound and substantial regarded as a mere covering. The specimens appear as if they would answer the end intended; and the material is certainly worth attention in this respect.

London and County Banking Company, Limited.—The half-yearly report of this company to December 31 last, presented and adopted at the annual meeting held on the 6th inst., states that after paying interest to customers and all charges, making provision for bad and doubtful debts, allowing £6,532, 12s. 10d. for rebate on bills not due, and transferring 15,000*l.* in reduction of premises, the net profits amount to 189,955*l.* 6s. 4d. This sum, added to 54,641*l.* 17s. 11d., the balance brought forward from last account, produces a total of 244,637*l.* 4s. 8d. The directors recommended the payment of a dividend of 10 per cent. for the half-year, which will absorb 200,000*l.* This will leave a balance of 44,637*l.* 4s. 3d. to be carried to profit and loss new account. The present dividend, added to that paid to June 30, makes 20 per cent. for the year 1889.

The Building Crisis in Rome.—It is stated from Rome that the building and economical crisis which has prevailed in the Italian capital for over a year is becoming very acute. It has been necessary to discontinue nearly all building operations, and the number of failures in the trade is becoming appalling. Thousands of workmen are idle, and disturbances worse than those of last winter are feared.

Proposed Testimonial to Mr. C. Roach Smith.—We learn that at a meeting held some little time since at the rooms of the Society of Antiquaries, it was resolved that subscriptions be invited for the purpose of striking a medal in honour of Mr. Charles Roach Smith, and that the balance of the fund he handed to him, in recognition of his life-long and valuable services in the cause of archaeology.

The Dresden Collections.—The famous art treasures at Dresden are being subjected to a thorough re-arrangement, and a portion of them are to be moved to the Albertinum, an imposing building now being erected for that purpose in the vicinity of Brühl-terrace, and which will shortly be completed. It is expected that the work of re-arranging the collections will be completed in six months.

Certificated Plumbers.—At a meeting held at the University College, Nottingham, on the 6th inst., Professor Garnett, M.A., D.C.L., delivered a lecture on "Sanitary Plumbing," and Sir Philip Magnus presented certificates of registration granted by the Plumbers' Company, London, to a number of masters and operative plumbers in the district. There was a very large attendance, including Mr. Alderman Lindley, J.P. (Chairman of the University College Committee), Mr. S. G. Johnson (Town Clerk), Dr. Boobyer (Medical Officer of Health), Dr. J. White, Principal Clowes, Prof. Heaton, Councillors Sutton and Wright, and numerous representatives of each section of the plumbing trade. Sir Philip Magnus, in presenting the certificates, said that the Plumbers' Company had entered upon a very important work in their system of registration, which had taken deep root, and was now flourishing in very many of the principal towns of England, Wales, Scotland, and Ireland. It was intended to place on a register the names of those plumbers who were capable of conscientiously and intelligently performing their work. He thought it quite as important to register plumbers as to register medical men, for plumbing, if properly carried out, had the effect of preventing disease, which was, after all, better than curing it. But it was perfectly useless to establish a register for qualified plumbers unless the plumbers were also provided with facilities for qualifying themselves. There was scarcely any art which touched so many branches of science as the plumber's art did. Prof. Garnett had shown its dependence upon a knowledge of geometry, chemistry, physics, and mechanics, and, perhaps, to some extent, a knowledge of electricity. It was not for a moment expected that plumbers could become professors of all these different branches of science, but what was wanted was that each plumber should know so much of them as to enable him to deal in an independent and intelligent manner with the difficulties of his craft. At the present moment they were seriously engaged in working out a systematic and progressive course of instruction for apprentices and other plumbers. He was sure they would succeed. Nothing could be more successful than the organisation of plumbing classes had been throughout the country during the past few years. In the session 1885-6 there were 312 plumbers students in these classes; in the following year the number increased to 403; in the year after to 695; and in the year 1888-9 to 1,043; while during the present session no less than 1,217 student plumbers were receiving efficient instruction in the technical and theoretical branches of their craft. He ascribed this success mainly to the fact that the workmen had taken the greatest possible interest in the movement, and both the masters and the operatives were fully alive to the great importance of technical education.

Obituary: Mr. J. T. McCulloch.—The death is announced of Mr. John Thompson McCulloch, a well-known architectural sculptor. Mr. McCulloch has fallen a victim to bronchitis, following an attack of influenza. From his studio at Kennington, where he had a large staff of workmen, Mr. McCulloch—who has died at the early age of forty-seven—has sent out some very good specimens of English architectural sculpture. The following may be mentioned among the important works for which he has executed the carving within the last twelve years, viz., restoration of the quadrangle at Christ Church, Oxford; restoration at the Bodleian Library; carvings at the Queen's Hall and the Library of the People's Palace; carvings at the Edinburgh Public Library; carvings at the Laboratory, Cambridge; Pembroke College; and at the Market, Sheffield. Mr. McCulloch did a great deal of work for the Duke of Norfolk and the Marquis of Bute, and carried out many designs for Mr. E. R. Rohnson. At the time of his death he was engaged on some important works at St. George's Cathedral, Southwark. Mr. McCulloch's unfinished work will be carried out by his son.

The Castle of Chillon.—The *Allg. Schweizerische Zeitung* states that the Waadtland Society, formed for the restoration of the Castle of Chillon, on the Lake of Geneva, and rendered famous by Byron, now considers that sufficient funds have been collected to commence the work. An architect fully conversant with Mediaeval architecture is to be selected, whereupon his plans are to be submitted to a jury of experts.

LONDON.—For proposed alterations, new fittings, and repairs to the Duke of York's public-house, Victoria-street, S.W., for Messrs. Sidney Stone, Messrs. Saville & Martin, architects, 86 and 87, Strand, W.C. Quantities supplied.—

Table with 2 columns: Name and Amount. Includes Patman & Fotheringham (£3,654 0 0), Ward & Lambie (3,547 0 0), C. Ansell (3,333 0 0), H. Burnian & Sons (3,195 0 0), T. Champell (accepted) (3,059 0 0), T. Gregory & Co. (3,057 0 0), E. Toms (3,028 0 0), Hoild & Brand (2,987 0 0), J. Beale (2,950 0 0).

LONDON.—For alterations, sanitary work, drainage, re-decoration, and building of new billiard-room, at 9, St. James's-square, W., for the Committee of the Portland Club.—

Table with 2 columns: Name and Amount. Includes Colls & Sons (£2,651 0 0), Patman & Fotheringham (1,871 0 0), F. G. Davis, 54, Theobald's-road (1,775 0 0).

LONDON.—For alterations, &c., at the "Kenilworth Castle" public-house, New North-road, N., for Mr. R. Howland, Messrs. Birk & Walters, architects, 64, Seymour-place, Bryanston-square.—

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Table with 2 columns: Name and Amount. Includes Goodchild (£384 16 7), Beckland (322 0 0), Marks (294 0 0), Tennent (235 18 0), G. Godson & Sons, Kilburn (accepted) (214 0 0).

LONDON.—For road-making and paving work, East End-road, in the parish of Fulham. Mr W. Sykes, New Streets Surveyor.—

Table with 2 columns: Name and Amount. Includes Atkins, Kingston-on-Thames (£346 0 0), Hes, Wimbledon (795 0 0), Coat, Hammersmith (776 0 0), Adams, Kingsland (772 0 0), Tones & Wimpey, Hammersmith (749 0 0), Nowell & Robson, Kensington (729 0 0), Neave & Son, Paddington (689 0 0), Nash, Fulham (679 0 0).

LONDON.—For road-making and paving works, Broughton-road, in the Parish of Fulham. Mr W. Sykes, New Streets Surveyor.—

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LONDON.—For alterations and additions to No. 13, Eagle-street, Holborn, W.C. Mr. H. Huntly-Gordon, architect, 123, Cannon-street, E.C.—

Table with 2 columns: Name and Amount. Includes Gower & Sons (£164 0 0), F. Hudson (123 0 0), T. Sobey (124 15 0), Kirby & Chase (accepted) (104 5 0).

LONDON.—For alterations and decorative repairs to Block B, 6, Albany-chambers, Piccadilly. Mr. W. H. Huntly-Gordon, architect, 123, Cannon-street.—

Table with 2 columns: Name and Amount. Includes Kirby & Chase (accepted) (By schedule).

LONDON.—For the erection of four houses in College-road, Catford, for Mr. H. Stanley. Messrs. Williams & Hopton, architects.—

Table with 2 columns: Name and Amount. Includes Geo. Weaver, Bromley, Kent (accepted) (£2,875 0 0).

LYDDINGTON.—For the restoration of Lyddington Church, near Oakham. Mr. J. E. Traylen, architect, Stamford: Diocesan Surveyor for Peterborough. Quantities by the architect:—

Table with 2 columns: Name and Amount. Includes Roberts Bros., Stamford (£1,197 0 0), Thompson, Peterborough (1,182 0 0), Law & King, Lutterworth (1,155 0 0), Storey, Bourne (1,075 0 0), Herbert Bros., Leicester (963 0 0), T. F. Halliday, Stamford (926 0 0), J. Halliday, Clifton (959 0 0), Roberts & Son, Weedon (814 0 0).

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SATURDAY, FEBRUARY 22, 1890.

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Masonry Construction.*

"The first cost of masonry should be its only cost. Though superstructures decay and drift away, though embankments should crumble and wash out, masonry should stand as one great mass of solid rock, firm and enduring."



THIS may sound very fine; "decay and drift away" rhyme nicely; but, in an absolute sense, nothing is enduring. Endurance is comparative and variable, dependent on climate,

physical causes, and so on. Nor do we quite see why the superstructures especially should decay and drift away, as they are frequently structures of masonry. But, whether they be "super" or "sub," we are entirely in accord with the sentiments of the anonymous author of the lines above quoted in that masonry should be firm and enduring.

Those lines are the text on which Professor Baker has built up his very interesting "Sermon on Stones." He has given us from Illinois a work of great value, and has been equally happy in the selection of his details, and in the method with which he has placed his knowledge at the disposal of his students, amongst whom we believe he may reckon many on both sides of the Atlantic. The work, 552 pages in length, is divided into four parts:—

- Part I. Description and Characteristics of the Materials.
 - „ II. Methods of Preparing and Using the Materials.
 - „ III. Foundations.
 - „ IV. Masonry Structures.
- And an Appendix.

These parts are subdivided into chapters, the chapters into articles, the articles into numbered paragraphs, and the numbered into unnumbered paragraphs. It is, consequently, very easy, with the further assistance of a good "Table of Contents" and an index (not, perhaps, quite as copious as might have been), to find our way to any particular point in a particular branch of the subject on which information may be desired.

In the very first article of the book the author at once throws down a challenge

which we are not loth to accept. He arranges the merits of good building stone in the following order, and also gives them a space in his book proportioned to the order of merit which seems best to him:—

1. Cheapness.
2. Durability.
3. Strength.
4. Beauty.

It would have been better to have dispensed with any such statement of priority of importance. In the four lines he devotes to beauty, he says that it is "an element of more importance to the architect than to the engineer," and his ideas of what is beautiful appear to be comprised within the expression, "The stone should have a durable and pleasing colour." Beauty of form and of details seem to him almost necessarily excluded from the purview of the civil engineer, and to be confined to the consideration of the architect; but we have always held that these four cardinal merits should receive equal consideration at the hands of civil engineers and their employers. What merit is there in a structure being executed at a low cost if it is neither durable, strong, nor beautiful? It is not cheap at all at such a price. Nor is it cheap if either of these three factors is made to take an inferior position. There are many cases in which durability, or strength, or beauty must indubitably be of considerably greater importance than mere lowness of cost. There is no word perhaps in the English (or the American?) language so much misinterpreted as the word "cheap."

It is somewhat unfortunate that the author has committed himself to the remark that "it seems questionable whether the Parliament House in London can be made to endure as long as a timber building would stand, so great is the effect of the gases of the atmosphere upon the stone." A good deal of nonsense has been written about this matter of the decay of the stone in the Houses of Parliament. The decay is very superficial, and no difficulty whatever is experienced in restoring or renewing the decayed surfaces. We are all aware now that a better selection might have been made of the stone for that important edifice, but there is no occasion to despair of the endurance of the structure on account of the stone which has been used.

Most of the author's observations relating to the tests of building stones are full of interest, and we heartily endorse the extract in paragraph 19 from the "Report on the

Quarry Industry, U.S.A., vol. x," as follows:—

"Hardly any department of technical science is so much neglected as that which embraces the study of the nature of stone; and all the varied resources of lithology in chemical, microscopical, and physical methods of investigation, wonderfully developed within the last quarter of a century, have never yet been properly applied to the selection and protection of stone used for building purposes."

One of the most difficult tests to carry out satisfactorily is that which is to determine the tensile strength of a briquette of cement. The difficulties lie mainly in two directions: one being to get the briquette properly prepared, the other to get it made the right shape. As regards the first of these points, we have known cases where the contractor's foreman has been quite unable to gauge cement so as fulfil the condition specified regarding the strain per square inch of section which it should bear, whilst the employer's clerk of works has, by superior skill in gauging, made briquettes from the contractor's cement to stand the strain readily, and thereby enabled himself to avoid the unpleasantness of having to reject passably strong cement. This point was very forcibly commented on not long since by Mr. W. Y. Dent,* who speaks of it as "a sleight-of-hand that can only be acquired by practice." Professor Baker gives us the various modes specified in Germany, England, Austria, France, and America for testing tensile strength. The Germans attach a greater value to the tests with cement mortar than with the neat cement, the mortar being usually mixed in the proportion of one cement to three sand, both the hand-mixed and the machine-mixed mortars being used. The French particularly specify that sea-water should be used for admixture with the mortar, and that both the air and the water should be maintained at a uniform temperature of from 59 deg. to 64 deg. during the continuance of the experiments, twelve parts (by weight) of water being used to 100 parts of cement and sand combined. With them, as with the Germans, and particularly with the Americans, great stress is laid on the excellence of the sand used for testing, crushed quartz being generally recommended of a size that will pass a sieve of from 300 to 400 meshes to the square inch, and be caught by one of about 800 or 900 meshes to the square inch. It is well, doubtless, that tests

* A Treatise on Masonry Construction, by Ira O. Baker, C.E., Professor of Civil Engineering, University of Illinois. (New York: J. Wiley & Sons; London: Tribner & Co.)

* Lecture on Building Materials. S. M. E. Chatham 1888.

should be carried out with specially prepared sand to show what cement can do; but what we really want to know when we are building is the strength of the mortar we are going to use in a particular structure, and not especially the strength of mortar containing sand which we are not going to use. The shape of briquette recommended by the Committee of the American Society of Civil Engineers may be described as very similar to that of the ladies' corsets so much illustrated in some newspapers, and is a slight modification of the briquette adopted by our Board of Works.

In the chapter on mortar, the author enlarges on the subject of mortars in which lime and cement are jointly used, and on the advantage in some cases of mixing slow and quick-setting cements together. He strongly recommends that "lime should be reduced to a paste before being added to the cement." Of course the cost of the mortar is a good deal reduced, but you do not get equal strength. He adds that "the mortar for the 'ordinary brickwork' of the United States public buildings is composed of 'one cement, one lime, and two of sand.'" The relative tensile strengths of mortars of this description, and also of cement mortars, are illustrated with admirable simplicity by means of diagrams with graduated scales, vertically for tensile strength in pounds, and horizontally for periods of time. The same kind of diagram is also advantageously used to show the transverse strength of concretes of various compositions, except that in this case the vertical scale represents the modulus of rupture in pounds per square inch, and the horizontal scale the proportion of cement used. Curved lines at varying heights on the diagram represent the several ages of the concretes tested.

The author exercises his usual care and accuracy in the observations he makes on the effect of the admixtures of sugar and of salt with mortar. He considers that the best qualities of Portland cement derive no great advantage from being combined with sugar; that Rosendale (or magnesian) cement, mixed with from one-eighth to one-fourth per cent. of sugar, gains about 20 per cent. in tensile strength; and that lime mortar gains about 50 per cent. in tensile strength when the weight of sugar added is about 10 per cent. of the weight of the lime. The practice in India is to add 1 lb. of the coarsest sugar to a gallon of water, and he adds—

"It is better to dissolve the sugar in the water than to mix it dry with the lime, since some limes in slaking burn the sugar, which blackens the mortar and destroys its strength."

As regards salt, he considers that, with ordinary and magnesian cement mortars, work can be carried on in frosty weather if salt be added to the water with which it is mixed, the rule usually adopted being as follows:—

"Dissolve 1 lb. of salt in 18 gallons of water when the temperature is at 32 deg., and add 1 oz. of salt for every degree below freezing point."

He considers that the addition of salt to Portland cement mortar does not seem to do either good or harm, and that mortar composed of one part Portland cement to three parts of sand is entirely uninjured by freezing or thawing; this is accounted for by estimating that the expansive force of water in freezing is less than the strength of Portland, but greater than that of Rosendale cement.

We have observed with surprise the very scanty mention the author makes of silenitic cement and silenitic mortar, merely alluding to it in a casual way, as follows:—"The addition of plaster of Paris to common cement is the special feature of silenitic cement,"—a description of that valuable material which is neither sufficient nor sufficiently accurate, and is an omission which is scarcely covered by the observation in the Preface that "it is neither wise nor possible to give in a single volume minute details." It is possible, however, that silenitic mortar is not much used yet in America.

Great stress is laid (and, in our opinion, very rightly) on the character and chemical composition of the material which cements

together the particles of which a stone is mainly composed, called respectively "matrix" and "aggregate" when applied to concrete. This is a matter of extreme importance, but it is too often overlooked, especially in varieties of stone apparently hard, such as some of the igneous rocks, many of the limestones, and several of the grits.

Dealing with the pressures on existing masonry structures, the author gives much valuable information respecting the permanent loads on several English and American bridges, and records his final opinion of safe loads as follows:—

Concrete.....	from 5 to 15 tons per sq. foot.
Rubble	" 10 " 15 " "
Squared Stone ..	" 15 " 20 " "
Limestone Ashlar ..	" 20 " 25 " "
Granite Ashlar ..	" 30 " 30 " "

But he is especially interesting in the paragraph relating to the importance of the mortar as affecting the strength of masonry, and shows how completely all theories of strength may be upset by the quality and quantity of the mortar:—

"Experiments made upon brick piers 12 in. square and from 2 ft. to 16 ft. high, laid in mortar composed of one volume Portland cement and two sand, show that the strength of the masonry is only about one-sixth the strength of the brick. An increase of 50 per cent. in the strength of the brick produced no appreciable effect on the strength of the masonry; but the substitution of cement mortar (one Portland and two sand) for lime mortar (one lime and three sand), increased the strength of the masonry 70 per cent."

Although it does not materially affect the point of the argument, there is, evidently, a little slip in the passage which has been quoted, for, on referring to the table giving the details of the experiments on brick piers, it is evident that the author should have used the word *decreased* in place of *increased*; and, in place of a gain of 70 per cent., it should have been put as a loss of 60 per cent. in using lime in place of cement in the mortar. Moreover, whilst the brick masonry with cement mortar was one-sixth, with lime mortar it was only *one-tenth* of the compressive strength of the bricks. The description of lime is not stated.

The thickness of mortar in the joints of the best ashlar masonry is especially noticed,—public buildings in cities $\frac{1}{2}$ of an inch, bridge piers, abutments, and large arches from $\frac{3}{4}$ to $\frac{1}{2}$ of an inch, smaller masonry $\frac{1}{4}$ to 1 inch in thickness, and he adds, "the less mortar used, the stronger the wall, therefore the thinner the joints and the larger the blocks, the stronger the masonry, provided the surfaces of the stones do not come in contact." We have in our mind's eye the walls still standing at Samos, in Cephalaria, thousands of years old, though with no roof to shelter them, and other ancient testimonials of skill.

In that part of the work relating to foundations we have a very complete and almost exhaustive treatise. The author truly says,—

"Probably no branch of the engineer's art requires more ability and skill than the construction of foundations. . . . The decision as to what general method of procedure will probably be best in any particular case is a question that can be decided with reasonable certainty only after long experience in this branch of engineering. . . . The experienced engineer, even with all the information which he can derive from the works of others, finds occasion for the use of all his knowledge and best common sense."

Certainly; but after this grave warning it is rather startling to the student or the novice to be told that "it is unpardonable that any liability to danger or loss should exist from the imperfect comprehension of a subject of such vital importance."

Who is there amongst us who has had much to do with the design and execution of engineering and building works, that has not had his judgment upset in this respect some time or other in the course of his career? Unfortunately, our misdeeds are too apparent when we have erred. The doctor *may* kill his patient without his blunder being detected, but we cannot kill ours. We may putty up cracks, but they *will* widen and widen, until the inevitable underpinning has to done, at a

pretty penny of cost to someone. But we do not expect to remain unpunished.

The observations on foundations on clayey, sandy, and semi-liquid soils are well worth attention, as also those on "improving the bearing-power of the soil," which the author divides under four heads:—(1) by increasing the depth of the foundation; (2) by draining the site; (3) by compacting (?) the soil; or (4) by adding a layer of sand. The mode of dealing with some troublesome springs in laying the foundation of the dry dock at the Brooklyn Navy Yard is given *in extenso*, but we will not repeat the account of all the rough-and-ready remedies they tried, until at last they hit off one which was successful. A few pages further on we find an interesting collection of portraits of our old enemies, the cracks due to insecure foundations.

The author presents us with the equations and formulae (aided by diagrams) which he considers most suitable for calculating the extra pressure temporarily brought to bear on certain points of structure, such as the edge of the base of a tall column or chimney, by the force of wind, and his observations on this matter are well worthy of our readers' attention. "If," he says, "the maximum pressure exceeds or is dangerously near the ultimate strength of the soil, the base must be widened."

Over and over again in the course of this book valuable data of work executed are given, and in that part of the work devoted to pile foundations for masonry we have a good example of work with screw piles. "For depths of from 15 to 20 ft., an average of 4 to 8 ft. per day is good work for wholly hand labour."

We have next a close examination of the relative merits of the two principal methods in operation for driving piles,—the steam hammer and the drop hammer,—with an exposition of the disadvantages of the gunpowder driver. After a lucid description of the mode of sinking piles by means of the water-jet, the author compares the respective capabilities of the water-jet and the hammer, and shows that they can often be advantageously used together, especially in stiff clay.

There is a necessary severity displayed in the remarks on the variable results obtained from the different formulae (which are subdivided by the author into *rational* and *empirical* formulae) for calculating the supporting power of piles." He says that—

"Many engineers, instead of inquiring into the relative merits of the different formulae, take an average of all the formulae they can find, and feel that they have a result based on the combined wisdom of the profession."

The whole of the chapter relating to this point is well worth careful study, and bears the stamp of having been investigated very thoroughly. The author is of opinion that "the deduction of a rational formula for the supporting power of a pile is not, strictly, an appropriate subject for mathematical investigation, as the conditions cannot be expressed with mathematical precision." But he proceeds to argue out the whole matter, laying very special stress on the value of the accurate measurement of the *last blow*, and the necessity for adding off the head of the test pile, so as to present a sound and solid surface for the last, or test, blow of the hammer.

The equation that he works out to be the most reliable one to be used in practice is—

$$P = 100 (\sqrt{wh + 50d^2} - 50d).$$

P is the pressure in tons, which will just move the pile the very small distance d , i.e., the supporting power.

d " " penetration of the pile, i.e., the distance the pile is moved by the last blow, in feet; to be ascertained by measuring the movement of a point 2 ft. or 3 ft. below the head.

w " " weight of the ram, in tons.

He admits that, after all, it is only approximate, and is based mainly on the average co-efficients of elasticity of the ram and the pile, but that "probably the error occasioned by the approximations is not material."

Weisbach and Rankine's rational formulae are given and examined, and, amongst

empirical formula, those of Beaufoy, Nylstrom, Mason, Sander, Trautwine, and McAulpine are criticised, and rejected for that evolved by the author. He then, as in most parts of this excellent work, compares theory with practice, and gives a few results of actual measurements taken, and of recorded safe loads, as follows:—

- Piles driven 32 ft. into sand sustain 20 tons each.
- Piles driven 28 ft. into sand sustain 13½ tons each.
- Piles driven 16 ft. into alluvial mud sustain 20 to 25 tons each.
- Piles driven 30 to 40 ft. into sand sustain 70 tons each.

The chapter on "Foundations under Water" contains in Article I an admirably clear and instructive section of an ordinary coffer-dam, and a few words in the next page explains the reason why puddle is improved by an admixture of gravel, as follows:—

"With pure clay, if a thread of water ever so small finds a passage under or through the puddle, it will steadily wear a larger opening. On the other hand, with gravelly clay, if the water should wash out the clay or fine sand, the larger particles will fall into the space and intercept first the coarser sand and next the particles of loam which are drifting in the current of water; and thus the whole mass puddles itself better than the engineer could do with his own hands. An embankment of gravel is comparatively safe, and becomes tighter every day. While a clay embankment may be tighter at first than a gravelly one, it is always liable to breakage."

Timber is much more freely used for subaqueous foundations for masonry in America than in Europe, and the work consequently contains far more explicit instructions than usual about cribs and crib work, and (as previously noted) about piles, with several important examples of executed work, including that for the Poughkeepsie Bridge (which crosses the Hudson about 75 miles above New York), a few notes of which will be of interest:—

"The crib for the largest of the four piers is 100 ft. long, 60 ft. wide at the bottom and 40 ft. at the top, and 104 ft. high. It was sunk through 53 ft. of water, 20 ft. of mud, 45 ft. of clay and sand, and 17 ft. of sand and gravel. It rests at 134 ft. below high water, upon a bed of gravel 16 ft. thick, overlying bedrock. The timber work is 100 ft. high, including the floor of the caisson, and extends to 14 ft. below high water (7 ft. below low water) at which point the masonry commences and rises 39 ft. On the top of the masonry a steel tower 100 ft. high is erected. The masonry in plan is 25 by 87 ft., and has nearly vertical faces. The lower chord of the channel span is 130 ft. and the rail is 212 ft. above high water. The crib contains 2½ million ft. of timber (board measure) and 350 tons of wrought iron."

The author particularly emphasises the fact that timber, when *always* wet, is as durable as masonry, "and," he adds, "ordinarily there is not much difference in cost between timber and stone."

Not the least valuable part of this exhaustive work is that devoted to the pneumatic processes for forming foundations, and the conclusions at which the author ultimately arrives are that,—

"Except in very shallow or very deep water, the compressed-air process has almost entirely superseded all others. The following are some of the advantages of this method:—1. It is reliable, since there is no danger of the caissons being stopped before reaching the desired depth by sunken logs, boulders [sic] "boulders" usually, " &c., or by excessive friction, as in dredging through tubes or shafts in cribs. 2. It can be used regardless of the kind of soil overlying the rock or ultimate foundation. 3. It is comparatively rapid, since the sinking of the caisson and the building up of the pier go on at the same time. 4. It is comparatively economical, since the weight added in sinking is a part of the foundation, and is permanent, and the removal of the material by blowing out or by pumping is as uniform and rapid at one depth as at another, the cost only being increased somewhat by the greater depth. 5. This method allows ample opportunity to examine the ultimate foundation, to level the bottom and remove any disintegrated rock. 6. Since the rock can be laid bare and be thoroughly washed, the concrete can be commenced upon a perfectly clean surface, and hence there need be no question as to the stability of the foundation."

In "Masonry Dams" we have an extremely interesting and carefully-prepared chapter. The author divides dams into two types,—

arch dams and gravity dams; but in consequence of the rare instances in which dams have been constructed arched in plan (there being only two instances known to him), he very properly devotes nearly the whole of his remarks to the other ordinary type. Rankine, Krantz, and Cain's works are frequently referred to. He says that "the profiles of most of the high masonry dams of the world are exceedingly extravagant, and hence it is not worth while to give examples." He gives, however, a maximum section of the great dam proposed for Quaker Bridge, a structure of vast dimensions,—e.g., width of base, 216 ft.; ditto of top, 22 ft. The full height of the masonry structure from the bottom of the foundation to the top of the parapet wall is 277 ft., of which 99 ft. is below the ordinary river bed. The depth of water at the back of this dam is to be 164 ft. The sole of the foundation is secured from sliding by being sunk well below the level of the bed-rock, and is given extra security on this account by means of two longitudinal keys, each 10 ft. square in section, and placed respectively 45 ft. from the toe and heel of the dam.

After discussing the merits of the two types, the author concludes with the opinion that a gravity dam should be built in the form of an arch, i.e., with both crest and toe curved, but that whilst the arch form gives additional safety, "the vertical cross-section should be so proportioned as to resist the water pressure by the weight of the masonry alone." If this is correct, it is manifest that a very slightly-curved dam is the best. He states that the maximum pressure on rubble masonry in cement mortar in some of the great dams of the world is from 11 to 14 tons per square foot. That at the Quaker Bridge dam will be 16.6 tons per square foot. After going through a variety of equations, he gives utterance here, as he does elsewhere in the work, to the contempt which he scarcely desires to conceal for mathematical calculations. He says:—

"There are a number of unknown and unknowable factors, as the weight of the stone, the quality of the mortar, the character of the foundations, the quality of the masonry, the hydrostatic pressure under the mass, the amount of elastic yielding, the force of the waves and of the ice, which have more to do with the ultimate stability of a dam than the mathematically exact profile."

Some remarks on "Rock Fill Dams" are worth perusing; but we drift naturally after "Dams" into "Retaining Walls"; and again, after analysing the theories of Weyrauch, Coulomb, Rankine, &c., he prefers to accept the empirical rules of Mr. Benjamin Baker and General Fanshawe, and gives his reasons for considering the tables of computations for the thickness of retaining-walls to be of but little practical value.

We should like to have seen more space devoted to that branch of the subject relating to the ruin of retaining walls by water at their backs. Looking to some recent misfortunes in the South of England and elsewhere from this cause, it is evident that we want some more light shed on it. So far as they go, the author's observations on this point are most sensible, but there is a quaintness in his suggestion that "one way of making provision to resist the additional pressure which may arise from such saturation is to calculate the requisite thickness of wall as if the earth were a fluid." What sort of fluid does the author refer to? A ton of water has a measurement of about 36 cubic feet, a ton of mould about 33, clay 28, and sand 22 feet. Consequently all dry earths exercise a greater thrust than still water. We apprehend that some other mode of calculation would be necessary in such a case. A few words (less than half a page) are given to "Relieving Arches," but not one word to "Counterforts," notwithstanding the immense importance of a right comprehension of this part of the art of preventing walls from being ruined.

That considerable portion of the work which relates to bridges,—their abutments, piers, and arches,—is a mine of wealth to the student, whether old or young, abounding alike in each part with the theories of

experts, with records of actual work and known arches, with tables of contents, and with specifications. We can do no more now than recommend to every one the perusal of these chapters, as also that on culverts; but before concluding we present this extract about arches, which shows so clearly the practical nature of the author's mind:—

"Every theory of the arch requires certain fundamental assumptions, and hence the best theory is only an approximation. . . . The stability of a masonry arch does not admit of exact mathematical solution, but is to some extent an indeterminate problem. . . . Considered practically, the designing of a masonry arch is greatly simplified by the many examples furnished by existing structures which afford incontrovertible evidence of their stability by safely fulfilling their intended duties, to say nothing of the history of those structures which have failed, and thus supplied negative evidence of great value. . . . Theory should be interpreted by experience; but the experience should be studied by the light of the best theory available."

Consistently with his opinion respecting the importance of the factor of *cheapness*, the author has supplied in every part of his work records of cost as well as estimates. They are worked out in dollars and cents, and are based on prices for labour and materials to which we are not accustomed in England. Any one who desires could, of course, with a little trouble, compare them and reduce them to the coinage of England or any other country, and no doubt they are valuable in some measure. A somewhat important omission in the work is that of masonry in lighthouses, but of course we could scarcely expect that everything should be included.

In conclusion, let us see whether the author has borne out in his work the claims, or most of the claims, he has made in the preface, viz., that common theories have been compared with the results of actual practice, that principles and methods have been developed, that the subject would be presented clearly and concisely, that it would prove useful to the man of experience, and that no pains have been spared in verifying data and checking results. If each and all of these have been fulfilled, as we consider they have, there can be but one verdict possible.

The author has, however, slightly overstepped the mark when he claims that nearly all the matter is believed to be entirely new. Much is new, undoubtedly; and the Professor must accept our grateful thanks for all that is new; but the work must necessarily, and does, contain a great mass of information which is not new at all. Most of it is worth repeating, but still it is not new, and the claim so far as that,—a really minor point,—is concerned cannot be admitted.

But we close the book with the feeling of satisfaction which always comes over the mind when one has had the privilege of perusing the work of a master hand. Professor Baker's is unquestionably the most complete and the most useful work which has ever yet been published in the English language on masonry construction.

NOTES.

LORD BALFOUR OF BURLEIGH made an important statement last week as to the course of procedure in the Railway Rates inquiry. The Board of Trade, it appears, are determined to endeavour to bring a Bill (or report, as may be found necessary) before Parliament this session; and, with this end in view, they desire that the number of witnesses be considerably reduced, so that the Court may visit Edinburgh in March, and Dublin in April. Although such a large proportion of the objections have been abandoned, the number of witnesses still tendering themselves for examination is far too large to admit of any hope of this programme being carried out if all are to be heard. It is, therefore, very desirable that Lord Balfour's proposal should, as far as practicable, be adopted. Mr. Balfour Browne may be trusted to keep back no really essential evidence. The views expressed by

Mr. Marshall Stevens as to the effect produced on the companies' profits by high prices for material and labour (to which we alluded last week) were fully borne out by the evidence of a Newcastle witness. Statistics were put in relating to the North-Eastern company, showing that in 1873, when the price of iron and coal touched the highest figure known in modern history, this Company paid their highest dividend, while subsequent dividends have fluctuated very much in sympathy with the variations in the price of these materials. Complaint has been made that the companies do not go far enough in the direction of low rates for quantities. It would, doubtless, be very beneficial for trade if this principle, already recognised, were extended; but at whatever figure the maximum rates are eventually fixed, the exigencies of trade will always exert an influence in this direction, and the companies will find it to their own advantage thus to assist in the extension of business. The desire to limit the companies' power is, of course, due to the fear that these considerations will not restrain them from exacting the "pound of flesh" in the case of traffic passing between non-competitive points, to the destruction, perhaps, of struggling industries. There has been abundant evidence given during the present inquiry to show that this is a real danger.

THE Council of the Surveyors' Institution has issued a statement of reasons against the application of the "Betterment" principle of rating in regard to the Strand improvements. The ground of opposition of the Institution is mainly based on the principle that most public improvements, and this one in particular, do not operate solely in the appreciation of property, but draw along with them the depreciation of other property; and that therefore a compensation out of public money must often be called for which would balance the increase of rates on account of "appreciation" (a long-established expression which is certainly to be preferred to the clumsy invention, "betterment"). The general principle, as well as the specific application of it in the case of the Strand improvements, is put thus by the Surveyors' Institution:—

"If the appreciation of contiguous property by a public improvement be matter for special taxation, the depreciation of neighbouring property by the same improvement should be matter for compensation. If the public has rights it has also liabilities. The supposed appreciation (or "betterment"), the value of which it is desired to intercept, will proceed from an anticipated increase of trade, and consequently of rentals. But this, in the great majority of cases, would only be obtained to the detriment of some other localities, from which such increased trade and such increase of rents would be diverted. Therefore, in such cases the whole, and in any case the greater part, of any charge or rate which the County Council might succeed in apportioning upon the various parties interested in the properties appreciated should, as a matter of justice, be afterwards distributed by that body among those interested in the depreciated properties; this distribution may be regarded as impossible in practice.

The element of depreciation is obviously present in the Strand scheme. For several hundred yards the southern side of the Strand enjoys at present a virtual monopoly of the traffic, which means the trade. The widening of the street, and the creation of a rival frontage on the north side, means at the least an equal division of traffic between the two sides of the thoroughfare. It means, indeed, more than this, for upon the new sites will no doubt be erected more attractive premises, comparing favourably with many of the old and cramped houses on the south side. There is no proposal to compensate the south side for a depreciation so manifest and so certain to ensue, but on the contrary to make either owners, lessees, or occupiers pay for the so-called "betterment."

In regard to the general idea that appreciation of one portion of property affected often draws with it depreciation in regard to another, we believe the Council of the Surveyors' Institution are quite correct in their views, and that this side of the subject is one which has escaped notice and demands consideration; but we feel some doubt as to whether their illustration in reference to the effect of the Strand improvements

on the property on the south side is quite a valid one. We should be disposed to say that the widening of the Strand and the other alterations which will make this portion of it more central, spacious, and accessible, must inevitably appreciate in a positive degree the property on the south side, though relatively the new site on the north side may enjoy the higher proportion of appreciation.

WE recently referred to a protest by leading Swedish architects against competition jury decisions of late in Sweden, and the document has now been published. The following is a *résumé*:—The protest first draws attention to one made by two architects in the late competition for the new House of Parliament, which was silently ignored by the authorities, and the undersigned therefore wish to endorse the same as fully justified. Complaint is made that architects observe all the conditions laid down in the programme, but that juries are far from doing so. Four instances are cited since 1886. Thus in a recent competition for a large palace, in Stockholm, it was expressly stipulated in the programme that the style was to be German or Italian Renaissance, and that there was to be no tower, and nevertheless the jury awarded the first prize to the only design sent in, with a tower, and in a style quite different from what the conditions required. In the competition for the new church at Sundsvall it was expressly stipulated that the cost should in no case exceed 250,000 kronor, and still the first prize is awarded to a design calculated to cost 440,000 kronor, and the second prize to one estimated at 475,000 kronor, although there were several estimates within the cost stipulated. In the competition for the new House of Parliament the second prize has been awarded to an architect who has entirely neglected the instructions as to the nature and execution of the designs to be sent in, as well as the position of the building on the site. The complainants ascribe this state of things to the faulty and careless drawing-up of the instructions, and predict that if not remedied the leading Swedish architects will abstain from competing when the awards are so unjust. The protest has attracted much notice in Sweden, on account of the position of the signatories.

A LONG and important letter on the subject of electric lighting appeared in the *Times* of Monday, from Colonel Flood Page; a letter written partly in pursuance of a request made to the writer, along with Mr. Crompton and the Earl of Crawford, by the Electrical Committee of the London Chamber of Commerce, to give some expression of opinion in the press in regard to the extent of danger of fire from electric lighting. Colonel Page's letter is mainly devoted to arguing that any such danger is more to be apprehended from bad and unscientific installation than from the conditions of electric lighting when properly carried out. Admitting that the percentage of electric lights in use is but a small one at present in comparison with other forms of lamp, it is nevertheless significant to note that during the last three years there has been an annual average of 565 fires in London owing their origin to lamps, gas, or candles, while there have only been in that period four fires attributable to electric lighting, and of these the last one (that in Grosvenor-square) arose from an installation which was pronounced by the most accomplished of experts as being radically bad and not in accordance with any fire insurance rules whatsoever. In conclusion, Colonel Flood Page says:—

"I think that the public may rest assured that while the employment of electric lighting does not altogether get rid of the liability to accidents which is inherent in everything human, and which at present reaches a most serious percentage in the case of all ordinary artificial illuminants, yet it tends to reduce the risk to a *minima*, far below the chances of fire from candles, oil and gas. The extent of the security is, however, in exact proportion to the skill and care exercised by those who wire the house; while cheap work is fit nearly every department of life poor and bad, in wiring for electric light it is simply fatal. I am

confident that when a competent electrical firm is employed, and a fair price paid for the wiring, &c., of a house; when a consulting electrical engineer, or a competent fire insurance expert is called in to report upon the work before it is paid for, that those who introduce electric light into their houses may enjoy amongst other advantages a sense of security from fire not to be attained by any other means of lighting their houses. I venture to suggest that every householder whose house has been wired by any one not an electrical engineer should call upon the office in which his house is insured, or if uninsured upon an electrical engineer, to inspect and report upon the electrical apparatus which has been fixed in his house; and to those who are at present thinking of having their houses wired I would suggest that they should entrust the work to some electrical firm of known standing."

ARRANGEMENTS are progressing for the holding of an international exhibition in Berlin in 1892. The Polytechnical Society has wisely decided not to construct an imitation of the Eiffel Tower, as such an engineering undertaking would now have but little novelty, and as a technical achievement be far eclipsed by the Forth Bridge.

IN regard to the subject of technical education, it may of interest to note that, according to an official Berlin contemporary, Germany has at present eight technical colleges ranking parallel to the universities. A total of 4,821 persons (or 381 more than last year) are this winter being benefited by the instruction given at these institutions, and of this number 3,372 are matriculated students. Of the eight colleges, Berlin, with 1,457 names, is by far the largest, Munich coming next with 844, and then Karlsruhe 524, Stuttgart 465, Hanover 420, Dresden 380, Darmstadt 275, Brunswick 241, and Aachen 215. Of a total of 757 names entered for "architecture," 435 fell to Berlin, whilst Brunswick has only 13 and Aachen 25 in this division.

IT would appear certain that the recently reported case of the Ravensthorpe Local Board v. Hinchcliffe renders necessary an amendment of section 156 of the Public Health Act, 1875. That section states that "it shall not be lawful in any urban district, without the written consent of the urban authority, to erect or bring forward any house or building in any street beyond the front main wall of the house or building on either side thereof in the same street." It is unnecessary to state in detail the facts of the above case; it is sufficient to say that Hinchcliffe began to build the front main wall of his house 6 ft. beyond what the Local Board alleged was the front main wall of the adjoining house; this was, in fact, only the beginning of such wall, since it was only five inches above the ground. The court decided that there was no "house or building" within the meaning of the Act, only some beginnings of walls. Therefore there had been no infringement of the Act. But it is clear that if this decision were to be acted on, persons might make what should be a street with a regular level of houses, a street of the most extraordinary kind. It is equally clear, therefore, that this section should be altered by authority of Parliament so as to meet such a difficulty as occurred in this case.

DR. PARSONS'S report to the Local Government Board (dated January 21) on the prevalence of enteric fever in the Bedlington Urban Sanitary District, suggests a danger to tenants of small rural property which has not been often noticed before, and perhaps does not exist in many places, in regard to the process of emptying privy middens. This is done by contractors under the Local Board; but it is observed that—

"The contractors are only expected to get out the contents of these cists, alongside of which a cart can be brought. In other places, as where the asphalt is in a yard approached by a narrow entry, it is deemed to be the occupier's duty to get out the contents, and wheel them into the street to be fetched away by the contractor's cart. This practice is objectionable, as imposing an offensive and dangerous duty upon a number of individuals, some

of whom will probably be susceptible to injurious effects, instead of its being undertaken by persons who, being insured to it, are not likely to suffer. Another objection is that the tenant gets out the stuff at such time as may suit him, and it sometimes remains many hours in the street awaiting removal by the contractor."

It is not surprising to learn that the first patient who was attacked by the "fever" attributed the illness to his having a few days before emptied the privy-midden and wheeled the contents into the street for removal. Another evil to which Dr. Parsons drew special attention was the frequently filthy and unhealthy state of unpaved yards and back streets, which were found "littered with refuse through the carelessness of the tenants, and worn into holes full of mud and foul water." A good deal of this may be directly the fault of the tenants, but people of this class eminently need sanitary guidance and instruction.

THERE is, it seems, in Manchester and Salford, and has been for nearly thirty years, a Society known as "The Manchester and Salford Ladies' Sanitary Association." The Mayoress of Manchester gave an entertainment in aid of it about a week ago, and the Mayor took occasion to describe the work of the Society, which has for its object the improvement of the conditions of life among the people dwelling in the slums. The lady-members are not exactly amateur sanitary inspectors, reporting nuisances and so forth, but rather teachers seeking to instil into the minds of the very poor elementary lessons on health, such as the value of cleanliness, fresh air, the good cooking of plain food, and the evils of their opposites. Leaflets on such subjects as these are distributed, and sixteen mission-women, each of whom lives in the district of which she has charge, inculcate the same lessons; evening classes and amusements form part of the programme, and every summer hundreds of children are sent into the country for three weeks' fresh air. How beneficial such a Society may be to the general health of a district is difficult to estimate, but it is well known that the gross ignorance of the masses of the people respecting simple sanitary and sanitary laws is one great obstacle in the way of general improvement. The apathy with which Boards of Guardians in rural districts, and many Local Boards, regard sanitary reforms, is the result of the same ignorance of the simple laws of health. Dr. Page and Dr. Parsons would not have so many dreadful nuisances to report if there were more such Associations in the country for simply drawing the attention of ignorant people to the first conditions of healthful existence.

AN excellent and interesting example of road-mending on scientific principles may now be seen on the main road in the neighbourhood of Kensington. At great expense to the ratepayers, the old macadam was taken up and wood pavement was laid down. Like all mundane things, this pavement has begun to show signs of wear and tear, and ruts, not inferior to those which used to find their way into the macadam, have made their appearance. Into these ruts, harrow-loads of stones and rubble are being emptied. The result is certain. The wood becomes disintegrated and broken up, dust in dry weather becomes more abundant than ever, and mud in wet weather covers the wood surface to a much greater extent than hitherto. Such mending hastens the destruction of the wood pavement. But of one thing there can be no doubt, that if wood pavement is to be used where much traffic is found, it must be laid in a manner to exist without ruts longer than it does at present. But if it is laid down, it should be repaired in a proper manner. To set to work as the Kensington Vestry are doing is only to make matters worse.

THE report of the Special Commissioners appointed by Lord Lothian to inquire into the causes of the Templeton mill disaster

has been issued, and is of a somewhat unexpected character as compared with the evidence previously given. We defer the consideration of it in detail.

"AN Edinburgh Contract of 1754" was the title of an exceedingly interesting paper read by Mr. T. M. Rickman before the members of the Institute of Builders on the 13th inst. The contract referred to was that for the "Exchange," a large block of buildings which covers the site on which it was proposed a year or two ago to erect new Municipal Buildings. Mr. Rickman said that a year ago he purchased a small octavo volume entitled "Contract of Agreement for building an Exchange in the City of Edinburgh, between the Magistrates and Town-Council and the Tradesmen," printed in 1754, which referred to this building. The book contained nine pages of "The Contents," an interesting and elaborate piece of typography; an elevation and a plan of the building; the agreement, including a specification of sixty pages, and an appendix of twenty-seven pages, "containing estimates of the particular pieces of work in the Exchange," comprising the quantities for the whole building. The agreement appeared to Mr. Rickman singular, and one so complicated that it was likely there would be variations in carrying it out, and adjustments necessary in its final settlement. He had endeavoured to investigate what was the outcome of this agreement, but he regretted to say that to a great extent he had been unsuccessful. He had, however, gleaned some information respecting its issue, which he laid before the meeting, as throwing some light on the subject of building contracts, on the system in vogue in Scotland 130 years ago, and, incidentally, on a variety of matters with which it is the business of builders and architects to come in contact in our daily avocations.

THE London Geological Field Class, which has for its object the systematic study of the geology of the London district, is to be congratulated on having obtained the use of the Lecture Theatre of Gresham College for its winter lectures (mainly through the good offices, we believe, of Mr. T. E. Knightley); and the Gresham Committee are to be congratulated no less on having found a new way in which their building can be utilised. The lecture theatre is not by any means an ideal one for use by day, as the strong light from the windows at the back of the lecturer's table prevents his diagrams and his features from being clearly seen by his audience. But where is the learned society's or philosophical institution's lecture-theatre that even approaches the ideal in convenience and safety? Not to pursue this subject, we will only add that the first of a course of four lectures was delivered to the members of the Field Class on Saturday last by Professor H. G. Seeley, F.R.S., "On the Tertiary Rocks on which London stands." Professor Seeley is master of his subject, and his first lecture was exceedingly interesting.

THE first number of a monthly magazine, entitled the *Parents' Review*, which is said to be specially written "to aid parents in their great function of training character," contains an article by Mr. E. C. Robins, on "The Profession of Architecture," which is apparently the first of a series of papers under the general heading "Our Sons," and gives, very briskly indeed, an account of the modern architect and his work. Mr. Robins's answer to the question, "What is an architect?" is especially good. "The 'born' architect is a man of poetic temperament, of creative imagination, and of artistic taste and judgment; coupled with seeing eyes and deft hands, he must have scientific accuracy and constructive power; he is at once a designer, a builder, a man of culture, and a man of business. It is more difficult to define what it is unnecessary for him to know than to expound what he may advantageously acquire. He might be an engineer if he were not an architect; but because he is an architect he should be an

artist and engineer combined. . . . We may define an architect as a *scientific artist*." He then points out the difference between an architect and a builder, and states that "five years is the usual term of apprenticeship; but three years is sufficient if preceded by a two years' course at a technical college." Speaking of the new system of Examinations inaugurated by the Institute of Architects, Mr. Robins enumerates: 1st, the *preliminary*, for youths in the opening years of their pupilage; 2nd, the *intermediate*, for pupils nearing the end of their term; 3rd, the final examination, for young architects who have completed their articles, commenced practice, "and are desirous of becoming Associates of the Institute as the only worthy mode of 'registration,' while endeavouring to make their independent way in the profession." A list of the Institute's annual prizes concludes the article. Mr. Robins does not give any opinion as to whether the present state of the profession holds out much hope of success to youths; and that, we take it, is just the one piece of information which "parents" would like to have. His advice is contained in these words: "If there is no love for art for its own sake, in any of its various phases,—no fancy for things beautiful,—do not make your son an architect." "*Hoc fecit Nykholm*," in the same magazine, is a very picturesque article on the great fourteenth-century architect.

IN a communication addressed to *Notes and Queries*, apropos of St. John's Church, Clerkenwell, Mr. H. W. Fincham seems to determine a question for which diverse criticisms are given by two local historians whom he cites: Pinks and Cromwell. About midway up in the central east window of the present church is fixed a pane of stained glass, bearing a coat-of-arms thus—gules, a chevron or between three combs, on a chief argent, a cross gules. The red cross has been generally taken to denote the old Priory. Having climbed up the scaffolding,—the church's interior being now in course of repair,—Mr. Fincham finds that "upon a narrow band of glass surrounding the coat is inscribed, in beautifully-drawn late Gothic characters: 'Robertus Botyll Pryor: Elect AD 1439 Resign 1469.'" He conjectures that this pane, 15½ in. by 10½ in., may be part of the original filling of the window, or may have been removed into its present position; for the surrounding glass is later in date, from another part of the priory. The removal of the flooring and dado brings to light the bases of some pillars of the earlier church, and, in the southern wall, a pointed doorway, together with portions of ashlar masonry marked with diagonal tool marks in good preservation. It is stated that these remains will henceforth be left exposed to sight. This church was originally consecrated in 1185, by Heraclius, patriarch of Jerusalem; who, in that same year, performed the same function for the Knights Templars' round church, dedicated to St. Mary. It is drawn in one of the three views, by Hollar, of the Hospital of St. John of Jerusalem. In the Guildhall Library is a copy of Vertue's print, showing it as seen from the south, taken from a Cottonian MS. The Order was dissolved by an Act of 32 Henry VIII., c. 24. We adverted to the repairs of the interior of the church in our columns of April 16, 1887.

AT Messrs. Dowdeswell's gallery in New Bond-street is a large collection of pictures and drawings, by Mr. Yeend King, Mr. J. M. Bromley, and Mr. J. M. Macintosh, in illustration of Berkshire scenery. The bulk of the collection is not of very high interest, but the paintings by Mr. King of some of the street scenes in the small towns and villages have very high merit as paintings of architectural subjects, especially "Thatcham," "Shrivenham," "Abingdon Bridge" (95, 96, and 97), and "Lambourne" (102); also a large painting of the "Water Bridge, Newbury," with its picturesque groups of buildings on either side

men appreciate the advantages of the fine arts. And it is important in other respects, for such owners usually have more wealth at their disposal than private persons, the buildings are mostly on a larger scale, and in more frequented parts of the town. Such adornments, too, attract the dwellers in our colonies, and foreigners, and the adornments themselves are a voucher for the cultivation of the nation. In certain respects this adornment is even more important in private houses, not only because there are more private than public buildings, but because if each dweller be cultivated the whole body of the people must be.

The two great material obstacles to painting and sculpture in private houses are the leasehold system, and the expense. On this latter subject two remarks may be made. First, that, even taking the present costliness of painting and sculpture, something might still be effected by leaving out the bad ornament, too often diffused over the whole front, and replacing it by excellent sculpture concentrated on a few important places; secondly, there must be an inevitable fall in the price of good work when so many thousand students are being educated for nothing, or next to nothing.

It is only advertising to a trisium to say that human progress is due to the gradual perfecting of what has gone before, for if this were not the case we might look for new creations in every art and science from savages who have not as yet learned the use of fire. Yet, no one would expect a more perfect steam-engine, a deeper treatise on mathematics, a finer picture, or a nobler building than we now have, from such savages. Even if we were told that such a thing had happened we should not believe it.

At Pompeii we see the remains of a complete system of coloured decoration, possibly the oldest on a large scale that still exists; there are, it is true, small painted chambers that are much older, the tomb of the Lucumo at Veii, and others; and, if we could be sure that the colouring of the Egyptian temples was the original colouring, that might be older still than the tomb of the Lucumo, but we know the colouring at Pompeii cannot be later than the year 79 A.D., when it was destroyed, in the days of Titus. This was the second best period for all the fine arts in the Roman Empire. During the reigns of the Flavian, Ulpian, Elitian, and Antonine families, literature and the visual fine arts flourished, and arrived at a perfection only exceeded at the end of the Republic, usually called the Augustan era.

It is true that Pompeii was only a little watering-place, and we cannot expect to find the arts there in the perfection they had attained in the great cities of the Empire, much less in Rome.

Pompeii only gives us a glimpse of the system. This would be valuable enough under any circumstances, but it is invaluable now when we can get nothing, or next to nothing, else.

The Romans were evidently great admirers of colour. In their public and magnificent private buildings colour was mainly got by veneering* the walls with beautifully coloured marbles, to obtain which every part of the known world was ransacked; one of the marbles, a sort of dirty yellow, called Astracian, is said to have come from Agra in India; we know, too, that the mere apposition of beautifully coloured and contrasting marbles was not enough to satisfy the eyes of the Roman, and to attest their magnificence, for the marble was often inlaid. Statius describes the purple synnadio as inlaid with Giallo Antico, and Seneca speaks of porphyry or Egyptian serpentine ornamented with the same marble. Very few quarries of beautifully coloured and figured marbles have been large enough for the great monolithic columns the Romans used, so the shafts had to be of Estelle, Parian, Carrara, grey Greek marble, of Giallo Antico, or Pavonazzetto, or else the shafts were of red or grey granite or of porphyry. I do not know if monolithic columns of the black Lucullean marble were to be got of the largest size. Pliny merely says there were 360 columns, 38 ft. long, at the temporary Theatre of Scarrus ("Nat. Hist.," XXXVI, cap. 24), which were afterwards removed to his house. The capitals and bases of columns, where Parian marble was not thought good enough, were of gilded bronze, and often the girders and roof-tiles were of the same metal. The doors of the temples at least were adorned with gifts and garlands and with stuffs embroidered with gold.

* The proper word is *finishing*, from a German word meaning to inlay, borrowed by the French, and again from the French by the Germans. *Veneering* is used in Sir William Gell's "Pompeiana" and in Duclos.



*Drawing of one half of the Mosaic Floor of the Prothyrum of a Pompeian House.
By Mr. A. M. Poynter.*

as we read in it the story of Psyche by Apuleius (Apuleius, Lib. VI.), and probably the columns and walls of the front of temples had embroidered bangings and festoons.

Originally the ceilings, vaults, and upper parts of walls were adorned with embossed plaster, painted and gilt, but, after the introduction of glass mosaic, the remaining part of the walls and the vaults were mostly covered with ornament or figures executed in it (Pliny "Nat. Hist.," Lib. XXXVI, cap. 14). We cannot now tell if the glass story of Scarrus's theatre was covered with slabs of cast glass, and the column shafts made of cylinders of it, or whether the whole was merely in mosaic (Pliny "Nat. Hist.," Lib. XXXVI, cap. 24). Columns covered with glass mosaic in patterns have been found at Pompeii, but it is thought by many antiquarians that this glass story was of cast glass. If to these magnificent decorations you add the floors of precious stones, the doors of carved ivory, of embossed and damascened bronze, or of beautiful woods inlaid, you have a splendidly coloured effect, and all the adjuncts were equally splendid. Arms and armour were embossed with sculpture and damascened with gold and silver, and often enriched with gems; the dresses were crimson, scarlet, purple, blue, green, yellow, grey, and white, and mostly embroidered; the couch covers were embroidered in gold and colours; there were gold and silver tissues, splendidly coloured curtains and carpets, not to mention furs; garlands and festoons of flowers, and shrubs and plants in pots; so I think you must admit that most buildings exhibited a most gorgeous display of colour, not to speak of the troops of slaves of all colours that enlivened the scene; and that this taste for colour was not a mere accident dependent on the use of costly materials, but was desired by the people, may be judged of from this, that whenever the walls were plastered the Romans painted them both inside and out.

Rome towards the end of the Republic was the one city from which the mandates of the Senate issued to the world, and must, therefore, have been thronged with the ambassadors of nations and their suites, with deputations from numberless cities, as well as with crowds of foreigners who had merely come to see what Rome and the Romans were like. It had too suddenly become possessed of the hoarded treasures of the world, and of an immense annual revenue from the tributes of the conquered. In consequence, it had become the emporium of the earth, to which all the talent, as well as all the choice commodities, of the world gravitated. The people were no longer the rude husbandmen who could only fight, speak, and make laws, but the better class at least had become cultured, so far as culture is consistent with trained ferocity and the absence of humanity. They read and spoke and wrote Greek, and were much employed in translating and imitating the masterpieces of Greek literature, and in learning Greek science, and eventually they were trying to rival both.

Many of them learned to draw and to model, some even learned to play on an instrument, and nearly all professed to be connoisseurs in painting and sculpture, architecture, and articles of vertu. Their public buildings were crowded with the masterpieces of the Greek chisel,—in Scarrus's temporary theatre there were three thousand bronze statues,—and the best easel pictures of the Greeks were in their temples, not to speak of those in private houses. As far as wealth could purchase talent they had the best, for the Romans had no notion of being outdone, even in the visual fine arts, by the nations they had conquered, and they also wished to see the great achievements of their arms recorded.

It is, perhaps, hardly necessary to mention that mere wealth can but buy what is to be had; it has but little stimulating effect on the transcendental faculties, and does not produce a medium or a surrounding in which genius naturally springs up; it is only when the arts are passionately admired that they arrive at perfection. I fancy all nations and all epochs get what they really and ardently desire. The Greeks adored beauty in every form, and they got it; the Romans adored valour and strategy, eloquence and statesmanship, law and order, and they got them; but the slaves who merely administered to their ostentation, or heguled their idle moments, they thought were only worthy of a pat on the head or a bandsome present. Amongst these slaves were the painters, sculptors, architects, musicians and singers. Old Pliny had wit enough to see that when the artist's highest object was wealth the art be practised necessarily declined; but he did not see that this desire for wealth amongst the artists was only the effect of their surroundings: high poetry only comes from a noble society when every fibre has been strung by passionate emotion. In the present day we have plenty of great natural philosophers, because the people love natural science, and a vast proportion of them know something about it, and passionately admire the great masters of it. These masters may be otherwise obscure, and only just above poverty; but they know the very mention of their names, through the wide realms where English is spoken, will evoke feelings of pride and a thrill of emotion. The feeling for architects in the present day, and the admiration for their works, reminds me of Milton's,—

— "Sent
With his industrious crew to build in Hell."

In the middle period of the Roman Republic there seemed likely to be a chance of painting being considered as a generous art, for some distinguished men in Rome practised it.

As early as 303 B.C., C. Fabius Pictor painted the Temple of Salus, on the Quirinal, and these paintings remained until the Temple was burnt in the reign of Claudius (41-54 A.D.), and his pictures were admired by the critics of the Augustan age. Pliny also tells us that Pacuvius, the poet (220 to 130 B.C.), painted the Temple of Hercules, in the Cattle Market

(Forum Boarium). About the same time P. C. Æmilius Scipio Africanus, the son of Æmilius Paulus, studied painting and sculpture, though painting subsequently seemed not to have been recognised as a generous art, and we hear no more of men of noble family practising it publicly. We have every reason, however, to believe that subject-pictures were as common in houses during the Empire as they were in the Middle Ages.

In Trimalchio's villa we read of painted subjects, past the porter's lodge, probably painted on the walls of the Prothyrum; others on the walls of the portico, probably the atrium, for it is the atriensis who explains them; and not far from them is the dining-room.

Many of the pictures at Pompeii are supposed to be indifferent copies of well-known subjects by the greatest Greek artists, and it is interesting, even if it be not useful, to architects to see how wall pictures were made into an integral part of the decoration; triptychs and framed pictures were hung on the walls just as they are now.

Three favourite schemes seem to have been adopted for the general decoration: the first, and ugliest, was to paint some doors, fill up the parts between with paintings of slabs of marble of different colours to paint a string, and some panels of plain colour above the marble, or to paint a row of full-sized columns or pilasters and fill in between with bordered panels of plain colour, or of imitation marble, and sometimes to paint festoons hanging from column to column. The second scheme was to divide the space, if comparatively narrow, into three vertical divisions with a wide centre and narrow sides, or, if wide, into alternate divisions of narrow and wide spaces, to make a dado line and panel it and the wall above, and to put some slight ornament in the panels or on their borders, and this was usually in monochrome. Still, there are rooms that are treated in a similar way and coloured; the narrow divisions are sometimes not panelled, but have a candelabrum in them, while the larger spaces are panelled, and have birds or figures in the middle, a few rooms are found that are merely panelled, and are without any other ornament than the lines forming the panels, the dado, the frieze, and the cornice.

The third and most usual plan was to divide the height into three unequal parts horizontally, to make the bottom part a dado, to make the middle piece the wall, and above that to make the painting represent the open air, or a wall with open windows in it. Very slight columns that divide the length of the room were put on the dado, or podium. It was customary to put large and important pictures on the back of a shrine, the front painted columns, supporting the roof of it, standing forward; to put some other slight columns, candelabra, or slight narrow structures at intervals, and to panel between them, the centre of the panel being often enriched by a floating figure or a bird. Occasionally, a small framed picture is put in some of the panels, to look as if it were hanging on the wall.

A favourite device, instead of panelling, is to put a light column where the divisions of the panels would be, and let it run up above the part representing the wall, and support one end of an entablature, which is supported at the other end by a column outside the wall.

In the house of Spurius Misor the dado is black with lilac lines, one above the skirting and one half-way up the dado, crossed by vertical lines under the centre of the columns; at the crossing there is a square, and a lozenge coloured mask in the middle, and a lozenge with a patera on the middle line between the two squares. The skirting is grey, put with black marble streaked with grey, put with the streaks slanting, and in each alternate piece the opposite way. The wall above the dado has a frieze above and a wide band below; in the middle is a picture of a huntsman and a dead fawn and a priestess; this picture is on the back wall of the shrine, the front is supported by two slight white columns with coloured hands, and at four places garlands are wound round the columns and carried up diagonally to the next band. The shallow entablature of the shrine is panelled with square panels, whose borders are green and pale plum colour, with the centres and two end panels bordered with white; the centres of the panels are dull orange and plum colour alternately, with patterns in white and green. The soffit of the top is a yellowish brown and coffered, meant for wood. All

round the picture is a framework of black with white end lilac lines, and the band above the dado before-mentioned is a dull orange at the sides and purple under the picture, separated at the top by one broad stripe of green next the black, and white below. In the band under the picture are birds and fruit; under the sides are vases and a volume. The side panels are a deep, dull red, with a small Cupid in natural colours in the middle; a border of about one-ninth of the whole width is formed by five lines, and on the centre line are squares and circles alternately, filled with green, with white ornaments on them. The frieze above is black, with a goose, a basket of fruit, a sistrum, and a bottle in natural colours, and this is separated from the red by an orange and green band; above the black frieze is a bluish cornice with red and orange lines; above this the wall is a creamy white, with light buildings, birds, and sprigs of foliage in light colours.

It is of no use talking about form or colour, for these cannot be described in words, but must be shown with the pencil or the brush; but I may say that the invention displayed is marvellous—plants and flowers, garlands and panels, beasts, birds, and chimeras, scroll-work and figures, are used in profusion, and are mostly confined to borders, the panels being mostly of one uniform plain colour. Though it is hardly necessary to say much of Pompeian decoration, as it is so well known, I may mention that the painted rooms found on the Palatine are in the same style, and from similar chambers found elsewhere most subsequent classic decoration has been taken.

The paintings on the walls of the Loggia at the Vatican are believed to have been taken by Raphael and his pupils from some underground Roman chambers that were excavated and filled in again, or if they were not copied, they were paraphrased. In Roman days this style was universal: we find the same sort of thing chased in silver, in the treasure of Hildesheim. This decoration is supposed to have been invented by the Greeks of Asia Minor—Vitruvius speaks of some executed at Tralles by Apaturus of Alabastra (Vit. Lib. VII, c. 5, p. 5),—and the idea of it may have been suggested by the tents and marquees formed of embroidered stuffs. "Attalike Vestes" were celebrated; *i.e.*, stuffs embroidered with gold at Pergamum, as well as Babylonian and Alexandrian work, which were in colours.

At Trimalchio's feast, during the interval between the courses, fresh covers are spread on the couches, "on which were embroidered the nets, the ambush men with their hunting spears, and the whole apparatus of a hunt" (Pet. Sat., cap. 40). We do not know whether this was a piece of Roman work or not, but these hunting scenes have been common subjects of Indian embroidery from the earliest historic times, and are known as wild-beast patterns.

The use of this sort of arabesque that is met with at Pompeii called down the indignation of Vitruvius; he says (Lib. VII, cap. 5, p. 3), after speaking of paintings representing persons, animals, places, or things:—"Those examples, however, which the ancients adopted from real objects, are now disapproved of in consequence of our depraved taste. For monstrosities are painted on the plaster instead of well-marked copies of definite objects; thus reeds are put in the place of columns; in the place of pediments, little striped grappels with crisped leaves and delicate volutes, and also candelabra, supporting the representations of little temples, above the roofs of which are delicate scrolled stalks rising out of roots, and most of them having little images seated upon them, against all reason; and quite as irrationally also, flowers springing out of their stalks, and having little images half issuing out of them, some with men's, half with beasts' heads. But these things neither are, nor can be, produced, nor ever have been. Thus our new taste has brought us to this point,—that through the inefficiency of bad criticism the excellencies of the arts have shut their eyes for the time. How is it possible for a reed to carry a roof, or a candelabrum a little temple and the ornaments of a pediment, or so tender and soft a stalk to carry a seated image, or to produce flowers and half-figures partly sticking out of roots and stalks? Nevertheless, men, on seeing these falsities, do not condemn them, but are delighted, and never think whether any of them could or could not exist. Minds, however, that are obscured by infirmity of judgment have not the power of testing what is possible, consistently with the authority and

reason of grace; for neither ought pictures to be approved of, which have no resemblance to reality; nor even if they are rendered elegant by their art, ought the judgment about them to be on that account favourable, unless they rest on sound reasons of argument, set forth without self-contradiction."

My translation of this crabbish passage may not be correct, but I got it revised by Professor Middleton and Mr. Holmes, of Pembroke College and St. George's Hospital. What sort of decoration these "harpagineti striati cum crispis follis et volutis teneris," translated as "little striped grappels, with crisped leaves and delicate volutes," may be meant for, I cannot say. The editors of the "Fitture Antiche d'Ercolano" (1757) believe them to be shown in a wall decoration. There is a small open circular Ionic temple, and above the cornice of it are uprights projecting at an angle, with staff between, in the upper fringe of which there are two volutes and an upright stem that might possibly be taken for grappels; we do not, however, see either the striping or the crisped leaves.

We being accustomed to the immense strength of iron and steel, are not so much shocked with the apparent weakness of these supports as Villivius was. They were, doubtless, sufficiently ridiculous in his day. Possibly the notion of such very slight structures originated in the temporary buildings of bamboo used in Eastern festivals; such buildings were probably adorned with flowers, branches of shrubs, sprigs of creepers, ribands and feathers, adorned and hung with balls and little painted tablets.

Pliny describes much of the Pompeian painting as follows ("Nat. Hist." Lib. XXXV, cap. 37):—

"Ludius too, who lived in the time of the late Emperor Augustus, must not be allowed to pass without some notice; for he was the first to introduce the fashion of covering the walls of our houses with most pleasing landscapes, representing villas, porticoes, ornamental gardening, woods, groves, hills, fish-ponds, canals, rivers, sea-shores, and anything else one could desire; varied with figures of persons walking, sailing, or proceeding to their villas, on asses or in carriages. Then, too, there are others to be seen fishing, fowling, or gathering in the vintage. In some of his decorations there are fine villas to be seen, and roads to them across the marshes, with women making hargains to be carried across on men's shoulders, who move along, slipping at every step and tottering beneath their load; with numberless other subjects of a similar nature, redolent of mirth and of the most amusing ingenuity. It was this artist, too, who first decorated our uncovered edifices with representations of maritime cities, a subject which produces a most pleasing effect, and at a very trifling expense."

In some of the old Basilicas at Rome, in St. Mark's at Venice, in Monreale at Palermo, in San Vitale, and in other churches and tombs at Ravenna, we see what must have been the effect of colour in Roman buildings when it was wholly obtained by marble and by marble and glass mosaic, but it is mainly from Pompeii that we see what magnificence can be got by painted decoration. There are, it is true, Pompeian examples of light coloring where the grounds are white or of very light tones, and the best of these are interesting enough and pleasant as a change; but by far the most magnificent instances are where black, dull scarlet, deep crimson, purple, deep orange, and green, form the principal masses of colour. In the house of L. Ceclilius Jucundus, the skirting is high and of a uniform plain green, very like green oxide of chromium, the dado black, the panels a dull scarlet, the frames to the panels of black, and the columns, narrow borders, strings, and the parts which are supposed to show to the open air, of a creamy white. The black dado is enlivened with coloured narrow panels under the columns, and between these light thyrsi are suspended in slanting lines from the top, and are tied on to flags projecting from the panels; flower scrolls grow up from the bottom, and support each of the thyrsi in the middle, and from the point where these last are tied together a tambourine with strings depends; in another part of the dado a lute-shaped piece comes from the bottom in the centre, from the top of which branches of foliage come out and support the sloping thyrsi, and on these last are hung Pandean pipes and a brass dish; the white string above is ornamented at intervals with green and orange; the black band above it, has red panels near the columns, with a nar-

rower orange-coloured panel in the middle. Between the red panels there are projections on either hand, like a signboard, painted in green and purple and ornamented with white; on scrolls at the angles of the lower part of the centre panel swans are perched, holding festoons in their beaks, on which are peacocks. Above, is a yellow string ornamented with a pattern in green and plum colour. Under the centre picture is a black band, with scrollwork in colours, with elephants' and rams' heads growing out of the flowers, and cheetahs as the scrolls; the white borders have orange, green, and plum-coloured panels of various shapes with heads on them, and ornaments between. The white columns are banded with coloured and ornamented bands, and the two deep bands on them are enriched in the middle, with oval plaques with pendent ear-rings between them. From the large imbricated columns scrolls spring out at intervals, or else the columns are supposed to stand in front of fanciful panels on the ground, and on or within each scroll are goats, deer and birds, and a fawn being devoured by a chimera* or some winged monster. The plain red panels are separated from the outer black borders by a band of yellow network, from which grow star-shaped flowers that bend over on the black; the black is banded twice in its height with plum-coloured bands, on each of which is a beast or bird. In the middle of the upright yellow network a scroll, with flowers and fruit at the end, comes forward on to the black, on which are a griffin and a sphinx; the ground work from these to the red is filled with green and plum colour, which is bordered by a yellow line that forms a segment projecting into the red. It would be endless to describe it all, and I have only gone so far to show you how the colours were broken up, and to show the infinite pains that have been taken to make every part interesting.

Whatever may be said against the taste of the Romans in form, I think every one with a passion for colour must allow that they had a pronounced taste for dignified colour. Merely to read of the colours would give a notion that the effect of them was staring, tawdry, and vulgar, but when seen, all that reads like violent contrasts are so skillfully arranged, proportioned, and toned down by art, that the effect is a superb magnificence.

Since Roman times there have been many superb schemes of decoration, some of the Saracenic for instance, and some of the Moorish. I do not know anything that looks more lovely, and is more entrancing for a short time, than the carved and painted plaster-work of the Alhambra, for, as you shift your position, the different planes of colour come out and produce beautiful varieties of tone and tint and fresh patterns; but at last you weary of this, and there is nothing else to arrest the attention, or rather everything is calculated to turn it in other directions. Nothing at the first view is so likely to attract attention as superhuman complexity, but nothing one so soon sickens of; no one can long delight in interlacing lines, commonplace shapes indefinitely repeated, and coarse carving. In Pompeian work we see a profusion of invention that is quite marvellous, and a beauty of form and colour that makes one linger over each bit when one is satiated with the general effect, though I presume it was mostly done off-hand by provincial artists. These very heads of men and animals that grow out of flowers and so disgusted Vitruvius, charm one by their unexpectedness. And we find fawns and goats, lions, tigers, leopards, and cheetahs, owls, eagles, chimeras, and sphinxes perched on every scroll just as you see goats planted on isolated pinnacles in a rocky country; geese and swans bold up strings and ribands, festoons, or necklaces in their beaks; peacocks, golden pheasants and parrots perch on poles or peck at festoons. Masks, lyres, satira, flutes, and trumpets, are interspersed with baskets of fruit and flowers; fauna, onpids, and satyra dance on tight-ropes, and wherever there is a spare place a little picture is introduced. Genii, onpids, bacchantes, dancing, and music girls float in the panels; natural flowers grow from the skirting up the dado. Friezes are painted with subjects, sometimes with comic ones, and almost every vessel in household use is utilised for ornament. In some of the subsidiary pictures all sorts of trades and occupa-

tions are painted, and these are diversified with landscape or architectural subjects. The main pictures are mostly illustrations of subjects from the Iliad, the Odyssey, the tragic poets, or from old Greek stories. The latest subject shown is the onslaught of Alexander the Great and the flight of Darins at the battle of Issus, in the celebrated mosaic at the House of the Faun. Every hint culled from the curls of creepers, the growth of plants, and from the shapes of flowers was used in the ornament. Necklaces, ear-rings, medallions, and hair-pins were used amongst the ornament, as well as garlands, fillets, thyrsi, feathers, tablets, standards, arms and armour, chased plate, and coffers. The ornaments in colour on glass vessels and on pottery are brought in, here and there gardens with their structures in trellis-work, and garden pavilions are introduced as ornaments on bands or on borders of plain colour.

Never since the days of Pompeii has anything of equal inventiveness and artist's excellence come down to us, with the exception of the paraphrases executed by the Italian artists of the fifteenth and sixteenth centuries. Such decoration can only be carried out where there is enormous wealth, as in the latter times of the Republic, in the days of Augustus, and in those of the early Emperors who succeeded him, or where there is a superabundance of highly-skilled talent, as in the days of the Italian Renaissance. The majolica plates, for instance, now worth their weight in gold, were often painted by first-rate artists who were out at elbows, or who had to escape from the towns they were working, for a shilling or two a dozen, to get a dinner with, while they were waiting for better-paid employment; a few eminent painters have done such work in their own houses for their own delight, as Mr. L'Alma Tadema did in his late house.

If we have such fine work in a little country town, what must have been the work in the most sumptuous rooms of Nero's Golden House on which he squandered all the wealth hoarded by Tiberius, and a good part of the State revenue? Monster as Nero was, there can be little doubt that he was a cultivated connoisseur of the Fine Arts, though singing and music seem to have been his most favoured diversions.

Few of the enormously wealthy men of the day have either the taste, patriotism, or open-handedness to have a few of their state rooms decorated in colour by first-rate artists. Although it is important to keep up the finest possible race of horses, and of dogs, and to practise hospitality, the unconscionable sums squandered on horse-racing, hunting, banquets, equipages, and servants, leave nothing for the encouragement of men of letters, men of science, or of artists. Many writers have said that there would be plenty of Virgils, Horaces, and Livys even now, if Mæcenæ could again be brought to life. The Government and the municipalities are far from comprehending the feelings of the working-classes, who would only be too glad to see the public buildings more imposing, and of more magnificent materials, and see them decorated with first-rate painting and sculpture, even though they had to pay another $\frac{1}{2}$ d. in the pound. They at least like to see, as well as to feel, the greatness of their country. The few fine rooms that we do see are mostly done for men with very moderate incomes, who love artistic work, and, like the Italian Cardinals, who enriched Italy with palaces, dine on five shillings a day to have money to spend on adorning their houses.

BUILDING LEGISLATION:

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The eighth ordinary general meeting of this Institute for the present session took place on Monday evening last, Mr. Arthur Cates (Vice-President) in the chair.

The Chairman stated that the President had been invalided by the prevailing epidemic, and obliged to go to the Spanish coast to recruit his health. He hoped the President would return with renewed health and vigour.

The Chairman announced that a Preliminary Examination would be held on March 11 and 12. Forty-two candidates had applied to be admitted to this examination. Of these, seventeen, having satisfied the Board of Examiners, had been exempted, and would at once be registered as Probationers of the Insti-

tute. The remaining twenty-five, with the twenty who were relegated to their studies at the last examination, would come up for examination on March 11 and 12, at London, Bristol, and Manchester, the societies at the two latter places having agreed to hold examinations for the candidates resident in those districts.

Mr. John Slater, B.A., then read a paper on "Building Legislation," of which the following is an abstract:—The author said he considered the subject of the greatest practical interest, and that as our great cities were getting greater and more populous year by year, so its importance also increased,—although, speaking generally, it was regarded with apathy by the public at large. Having given statistics showing the enormous and rapid increase of the population of Greater London during the present century,—which increase was almost as great in the manufacturing districts of Lancashire and Yorkshire,—Mr. Slater asked whether the building regulations now in force, not only in the metropolis, but also in the majority of our great cities, were suitable and sufficient for the necessities of the present day. He thought not; and considered that the metropolis ought to have a Building Act which would be a model for other towns. For many years the Roman law, of which nearly all our laws were developments or modifications, referred only to landed property, and not to houses; but about 202 B.C. the population of Rome increased rapidly, and from that period dated laws relating to buildings, and (1) the institution of the party-wall, with its rights and obligations on the owners on each side thereof; (2) regulations as to carrying off rain-water; and (3) rights of light and prospect. Both in Roman and Byzantine regulations powers were found to control the height of buildings. The earliest regulations in the metropolis were *Fito-Aiywina* Acts of Building, passed in the first year of Richard I., exactly 700 years ago, the general intention of which was very similar to that of the present Building Act. The author then gave some interesting quotations from these regulations, which were to be found in the *Liber Albus* of the City of London, compiled in 1419 by John Carpenter, the Town Clerk. He then briefly referred to several Acts, down to that of 1844, which though manifestly imperfect, was in many of its provisions superior to the 1855 Act. (1) It provided a special court of appeal; (2) it placed the buildings, which were now entirely exempted from all superintendence, under special supervision; (3) the regulations as to carrying out work to any party structure were less likely to lead to dispute than in the existing Act; (4) it contained regulations as to drainage and as to width of streets, which certainly ought to be comprised in any Building Act; and (5) it contained better and more complete regulations as to footings of walls than the present Act or by-laws. There were at present no fewer than fourteen separate Acts in force in the metropolis, while the County Council were promoting a Barking Creek Bill, containing other amendments affecting building law. It was essential that all regulations as to streets and buildings should be codified and embodied in a single document, and that piecemeal legislation should cease. The Act should regulate the width, construction, sewerage, and gradient of all new streets, the line of frontage of the houses, and should provide for a sufficient number of adequate open spaces. It should define clearly the difference between public and private buildings; should exercise control over the situation and construction of the former, and the means of ingress and egress. To secure the prevention of fire, due stability, and healthiness in all buildings, it should control the site; the construction of foundations, walls, floors, roofs, and chimneys; the drainage; the amount of space about a building; and the height of the building in connexion with its position. It should provide an executive for carrying out its provisions, and a special court of appeal for all disputed matters. Regulations as to noxious trades, infectious diseases, common lodging-houses, &c., should be relegated to a special sanitary code, as in New York.

Mr. Slater then dealt at considerable length with the foregoing points one by one. The present regulation as to the width of new streets—that they shall be at least 40 ft. wide—was not sufficient; for a much-used thoroughfare there should be a carriage-way not less than 42 ft. The definition of a public building should be as wide as possible, and none

* The Classic chimera had the head of a lion, the body of a goat, the tail of a dragon, and vomited fire.

should be allowed to be erected with a frontage to one street only. The Manchester new draft Bill contained many improvements, and be congratulated the Manchester Society of Architects upon the result of their representations to the Corporation. The restriction as to cubical contents was unnecessary as a hard-and-fast rule, and there ought to be a discretionary power of allowing larger buildings to be erected, if the authorities were satisfied with their construction. With the increased knowledge of the behaviour of stone and iron under heat, it was absolutely criminal to allow stone staircases carried on unprotected iron supports in buildings used as flats; and, in fact, all the provisions as to fire-resisting construction needed remodelling. The securing of due stability was an important point, and perhaps the most crying defect in the Buildings Acts was that the controlling officers had no power whatever over the materials used other than bricks and mortar. It would not be difficult to frame a schedule which should stipulate, for instance, that lead for gutters should be of not less than, say, 5 lbs. per foot super.; that zinc should be not less than 16 ozs., &c. It was also time that some regulations as to the use of iron in buildings should be laid down—such as, for instance, the minimum depth of a girder spanning a certain opening. If such details were not to be provided for, then the superintending officials should be empowered to satisfy themselves as to the stability in each individual case, and be made responsible. With regard to drainage, he thought the sanitary officers of the various vestries did their duty well; but he considered a divided control unwise, and that the same officer should be responsible for both the erection of the building and its sanitation. Provision should be made for underground rooms being, to a certain extent, protected from the damp, either by the walls being built in cement or by forming a dry area. The close juxtaposition of the houses was a great evil in large cities, and a regulation prescribing a minimum distance between the backs of all houses, large or small, was most urgently needed. The existing provision was positively ridiculous, because it simply prescribed the area of the open space in the rear of a building. The minimum depth of that open space should depend on the height of the house, and should be at least equal to it. In the case of buildings facing public streets, the width of the street should govern the height of the house as a general rule, as in Paris, in nearly every city of the German Empire, and in Sweden. In the last-mentioned country streets 32 ft. wide and less might have houses 43 ft. high; up to 44 ft., houses 54–56 ft. high; and streets about 44 ft. might have houses 66 ft. high. Such stipulation was eminently reasonable, but power should be given to relax the rule in certain cases, provided the construction satisfied the controlling officer of the Building Department as to fire resistance, stability, &c. In order to avoid a monotonous skyline a clause might be framed to the effect that if the front of a building be carried up as a gable, then the limit should apply not to the apex, but to half-way up the gable. The regulation of the relations between adjoining owners as to works to party structures was then dealt with, and reference made to the 1844 Building Act, which had a very wise provision, under which, if the adjoining owner did not give his consent, the matter was referred to the District Surveyor, who was required to report on the matter to the court of appeal. With reference to light and air, a clause to the effect that a building owner should give notice of rebuilding to all parties who could be affected, and their surveyors empowered to investigate the matter and to decide by a majority whether the building would injure any one, and, if so, the compensation to be paid, or to absolutely veto the proposed rebuilding, would be an immense gain to a Building Act in a large city.

Even with a liberally-conceived, comprehensive Building Act, well drawn and lucid in its provisions, disputes would certainly arise. To whom were these to be referred? The great desideratum was that machinery for enforcing the law should be simple, direct, efficient, and inexpensive, and that there should be uniformity of procedure. At present it was precisely the reverse; and a special tribunal should be created fit to deal with building disputes. Having quoted clause 80 of the 1844 Building Act, Mr. Slater referred to a report of the late Mr. Justice Mellor and the late Mr. Joseph

Gwilt, who recommended that a tribunal should be constituted, consisting of two persons, one belonging to the legal and one to the architectural profession; and he believed, if due care were exercised in the selection of the individuals, this would form a very strong court. Referring to the administration of a Building Act, he considered a body like the District Surveyors should jealously guard against abuses; but there could be little doubt that abuses had crept in. If it were true that one District Surveyor had held office for years after he was totally unable to climb a ladder, his duties being done by a clerk—if it were a fact that another found two hours a week sufficient for the personal administration of a large district, nineteen-twentieths of the work again being done by a clerk—it was truly a state of things certainly not contemplated by the framers of the Building Act, and it was no wonder that the office had fallen somewhat into disrepute in the eyes of the County Council. But the greatest defect was incidental to the Act itself; it did not allow the District Surveyors to exercise the slightest discretion, or to take the least responsibility beyond seeing that the bare letter of the law was insisted upon. Many surveyors felt in a great deal of trouble, when they saw this insistence would inflict undoubted hardship, in order to minimise that hardship; but others would never hudge an inch from the *littera scripta*. If the surveyors were armed with discretionary powers, to be exercised on their own responsibility, they would always take care to have good reasons both for permissions and refusals; and such an alteration in the law would surely be welcome to all. In conclusion, Mr. Slater said the London County Council had not yet given due attention to the reform of the Building Acts; but it was essentially a matter for the Municipal Parliament to take up; and he looked forward confidently to the day—in the not far-distant future—when this great metropolis would be administered in accordance with the regulations of a model Building Act, and when London, in addition to being the largest, would be in a fair way to become (as she easily might) the best arranged, best built, most sanitary, and generally most magnificent city in the world.

The Chairman, in inviting discussion on Mr. Slater's paper, said that as he believed several gentlemen wished to speak at great length, and as the time at their disposal was rather short, they would not be able to conclude the discussion that evening. He therefore thought it would be well to adjourn the discussion at the close of the meeting to the 3rd of March.

Mr. E. C. Robins said that the paper was one of great interest to those who were endeavouring to do their duty to the public at the present time. He agreed with a great deal that Mr. Slater had said, and the question of the heights of buildings was one which had always had attractions for him. He believed London was suffering from a plethora of buildings by no means suited to the position in which they were found, and which were getting out of all scale. Another important question, too, was that of air-space, and the building in Broadhurst-gardens, referred to by Mr. Slater, were a case in point. In a great city like London it was difficult to lay down hard and fast rules, but if they got a set of principles recognised by a body constituted for that purpose, it could not fail to effect a great improvement in the Building Act. There ought to be a consolidation of the Sanitary as well as of the Buildings Acts, and instead of permissive clauses, allowing public bodies to do certain things, there should be done. The independence and the proper qualification of sanitary officers was especially needed.

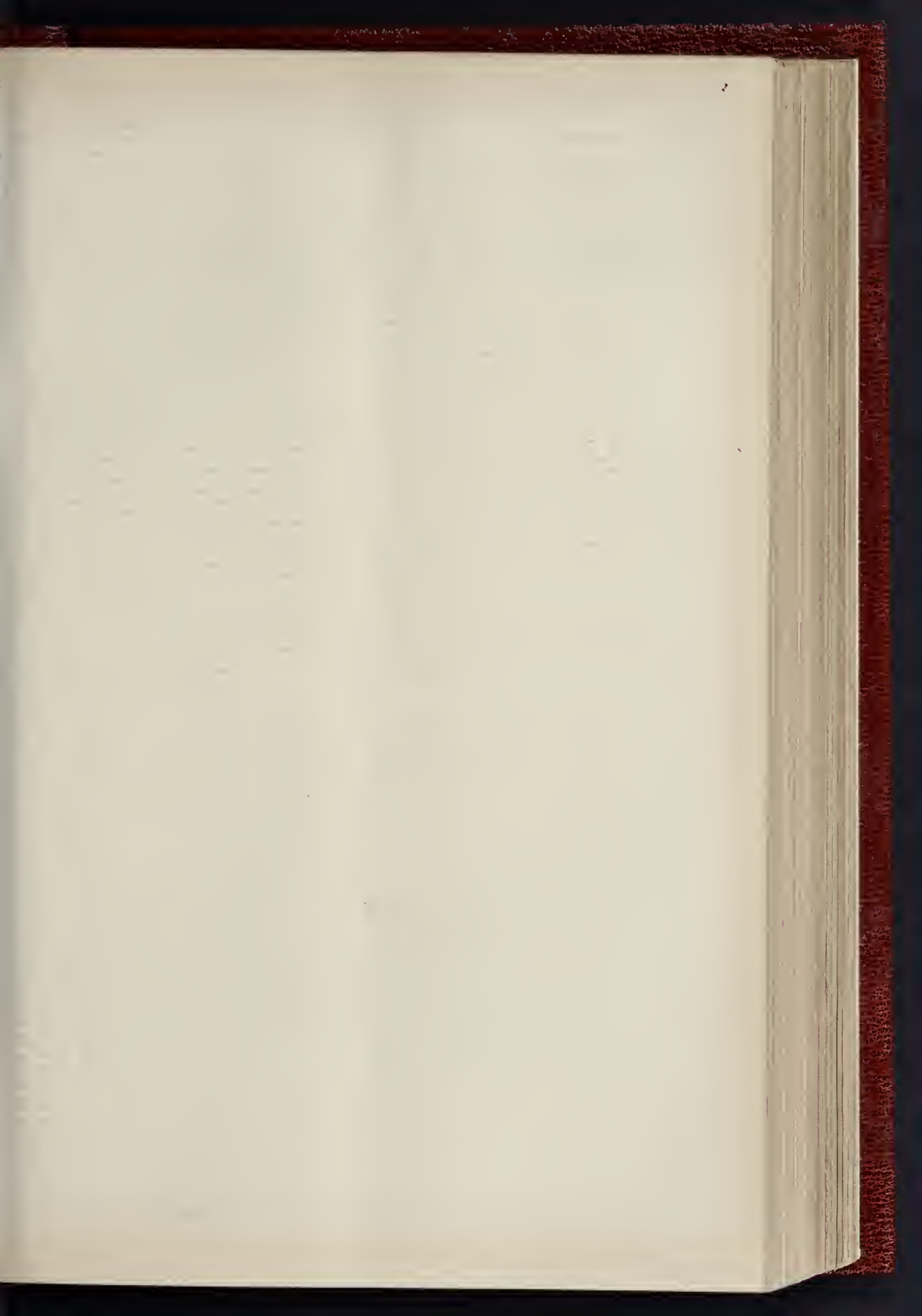
Mr. Henry Dawson said he rose because he could see there was a very urgent necessity for some action being taken on account, not of the committed acts of the County Council, but on account of their omissions. He referred to a most important announcement they had made—he did not say officially, although it was in some respects what might be called official—that they did not intend in future to exercise the power given them under the Metropolitan Building Act of 1855—to allow any excess of openings over solids in external walls giving light to buildings, and that they would not allow any departure from the strict letter of the 13th Section.

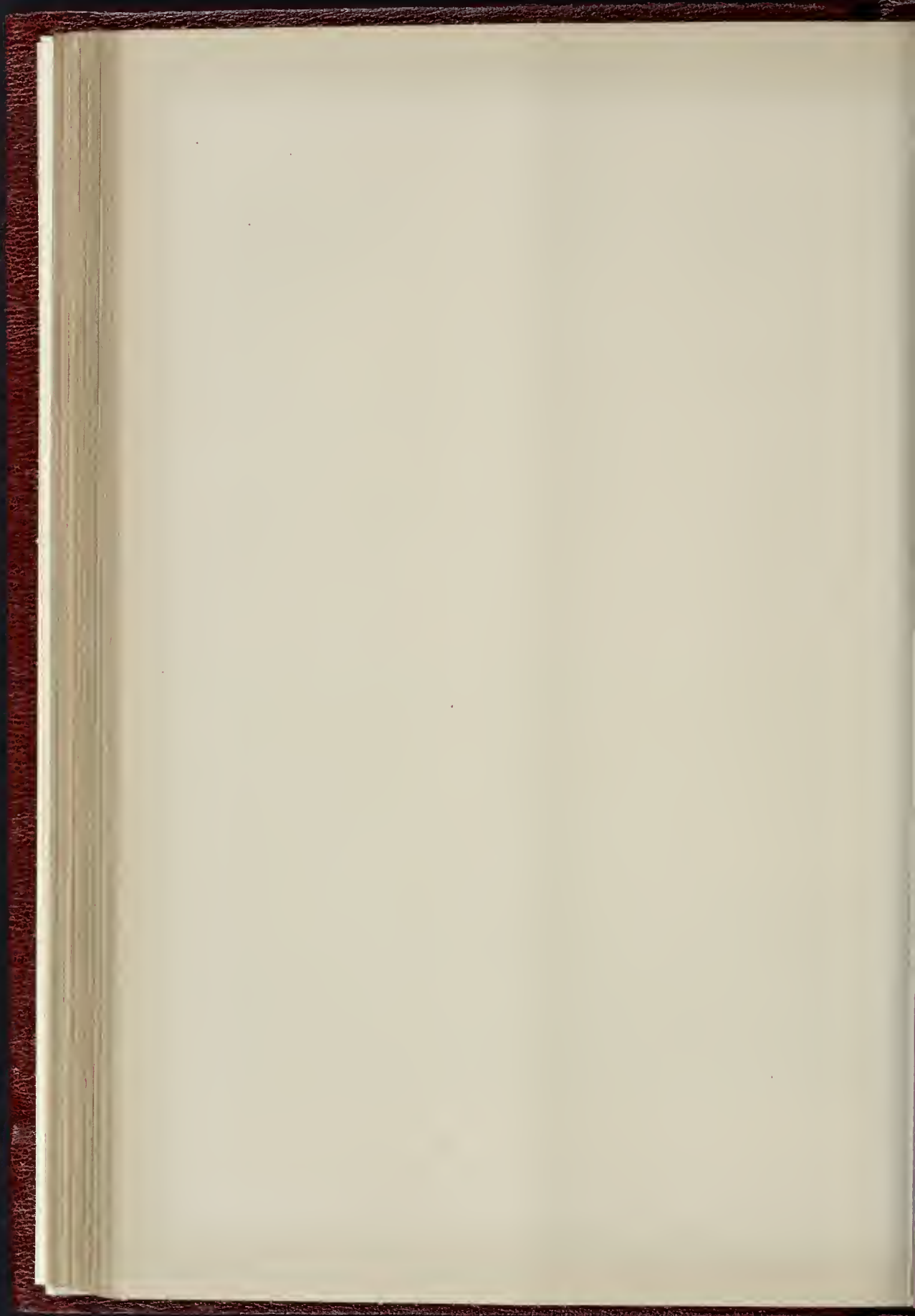
The Chairman: Which says that the openings shall not exceed one-half.

Mr. Dawson continued that the 13th Section of the old Act required that the openings in any external wall should not exceed the area of the solids. In cities like London, Glasgow, or Edinburgh, the areas, limited not only sometimes in front, but at the rear of the buildings, made it positively necessary that the openings should exceed the area of the solids. The County Council, in their supposed wisdom—but what he would rather call their ignorance—had put it forth that they did not intend in future that the external walls should have openings in them greater in superficial area than half of the entire elevation. Now that would really be a serious hindrance to all building, and he did not know any body so well fitted as that Institute to take urgent measures, in connexion with other bodies, before Parliament or otherwise, if the County Council persisted in their attitude on this question. They ought to be allowed to have the openings of any size, so long as the construction should be declared sufficient to carry the weights intended to be carried. In a city like London, the access of light to buildings was the one essential thing, not merely for health, but for the purpose of carrying on trades and manufactures of various kinds. He was aware that this subject was under the consideration of the Council Standing Committee of the Institute, and provided that they were really proposing to do something practical in the matter, he did not desire to push it any more than was necessary. But he would most earnestly urge upon the Council of the Institute that they should certainly put their shoulders to the wheel and insist that such a ridiculous clause as section 13 should no longer be insisted upon where not necessary. He was glad that the discussion on the paper was to be postponed until March 3, but this matter should not be left even until then. Some protest should be made in regard to the Bill of the County Council, and to obtain some provision which would prevent the necessity for insisting upon the clause he had referred to.

Mr. Charles Fowler proposed a vote of thanks to Mr. Slater for his excellent paper, which he considered very opportune when the London County Council were making certain propositions for the amendment of the existing Building Acts. It gave them the opportunity of making representations to the London County Council as to what their views might be, which in itself was an advantage. He had marked a few matters which Mr. Slater had mentioned in his paper. Mr. Slater had stated that the first time when Building Surveyors, now termed District Surveyors, were appointed was under the Act of George III., but he (the speaker) had always understood that the Act of Charles II. appointed Building Surveyors in London. As architects they would all agree that the regulation of the height of buildings in streets was most desirable. They might certainly differ as to the proportions of the height to the width of the streets, but they would all agree that it should be regulated.

There was at present a certain number of regulations, only applicable, however, to new streets, and power was vested in the old Metropolitan Board of Works, whose authority had been transferred to the London County Council, to exercise a discretionary power, though some might imagine that they had not exercised it wisely in regard to Northumberland-avenue. It appeared from Mr. Slater's paper that the Romans thought it a desirable thing to regulate the height of buildings, and we had, therefore, excellent authority for following in the steps of such a very practical people. Mr. Slater had mentioned the Act of Charles II., in which buildings were classed by rates, as was the case up to the time of the present Act, when the rates of buildings were superseeded with reference to the heights and lengths of walls. Mr. Slater seemed to think that the regulations with regard to party structures in the Act of 1814, which was superseded in 1856, were better in one respect than those which now existed. He also seemed to think that they led to less litigation, and that such matters were more easily settled in former days. He (the speaker) confessed he was not old enough to have acted under the old Act for a sufficient length of time to have had experience of the advantage of the regulations, but he should think the reverse was the case. It did not seem to him desirable to refer those questions, arising between adjoining owners, to the District Surveyor, but rather that they





should be left to a sort of civil settlement by each adjoining owner appointing a person to represent him, they, of course, appointing an umpire in case they did not agree. He confessed that, notwithstanding occasional failures, it appeared to him that the present method for settling party-wall cases was very good, and he fancied it could hardly be improved upon. Mr. Slater, in another part of his paper, had referred to a special tribunal, and most of them would think that such a tribunal would be an exceedingly desirable thing if they could get it. It was one of those things, however, which the House of Commons had the very greatest objection to, and certainly in the case of the Building Act their objection did appear to be warranted, because it was notorious that the Official Referees under the late Building Act were anything but successful. If they could get the principle admitted,—if the House of Commons would admit the principle,—then the questions might be discussed. He ventured to think that what Mr. Slater suggested, and what was suggested under the former Act, by those gentlemen who had to report, was not what he should have thought most likely to be successful. The architects would require a legal person to formulate their decisions, and he should have thought, if there had been a judge appointed with two professional architects as assessors, that would be more likely to work than having one of each profession, who, if they differed, would have great difficulty in settling the case. He considered that two architects, acting as assessors to a barrister, sitting as a judge, would be more likely to form a successful tribunal, and one which would commend itself to the whole of the profession. The subject of giving discretion to the County Council, who should have certain powers under the Act, was one of very great difficulty. If the powers of the County Council were qualified by the necessity of giving some reason for their decisions in certain cases, the result would no doubt be better. A body invested with so much discretionary power, which could be exercised by the majority of those attending, was a very dangerous tribunal indeed. But, if the Council had to give reasons or allowing or disallowing certain things, it would bring itself under the control of public opinion, as far as those decisions became public, and in that way any tendency to abuse which might arise would be very much checked. He considered the discretionary power in a great many things could be safely vested in the London County Council, subject to certain restrictions. Mr. Slater had slightly touched upon the regulation of other matters in the Building Act besides the mere thickness of walls. He was sorry to say that he had not sufficient time to look up some of the Provincial Acts, particularly that applying to Liverpool. That Act, he always understood, was framed under the advice of the late Sir William Tite, and he believed that it contained certain schedules with reference to the thickness of joists, girders, and so on. Those schedules appeared to work very well, and they might to a certain extent be embodied in a Metropolitan Building Act. The difficulty was very great in framing such schedules, but with competent advisers it might be done. In the case of iron girders certain weights per foot run might be assigned to certain spans, and if the regulations were framed under competent advice, he could quite imagine it could be done with advantage. With regard to officials to carry out the regulations of the Building Act, Mr. Slater had complimented the District Surveyors a good deal, by suggesting that discretionary powers should be given them in a great many instances. He was afraid, however, that many people were much averse to giving officials personages very considerable discretionary powers. They seemed to have a tendency to distrust the discretion of individuals; but he believed that to give a competent and reliable set of officials discretionary powers would be a great advantage.

Professor Kerr hoped that at the adjourned meeting, on March 3, the questions before them would be thoroughly discussed. He would only at present draw attention to one very excellent institution, which seemed to have been rather overlooked by Mr. Slater, namely, the District Surveyors' Association, which was, practically, a court of private appeal in all matters referring to the Building Act, and he could testify, was one of the most useful institutions the profession possessed. The

gentlemen composing it were associated together for the purpose of avoiding everything like a stumbling-block to the efficient performance of their duties as servants of the public. Consequently, when any one had a difficulty with a District Surveyor, he should always ask him to refer it,—and he was bound to do so—to the District Surveyors' Association. A committee would be found there composed of very intelligent men, and they gave their very best attention to all disputed matters submitted to them. If his opinion was worth anything, it might be taken as an assurance that any question which was submitted to that very large committee would be treated in a fair and reasonable spirit. He therefore hoped that in the coming discussion due weight would be given to the existence of that body, as a means of settling disputes without going to the magistrate. He had also always been in favour of the late Metropolitan Board of Works, and now of its successor the London County Council, usurping authority if they did not possess it, in order to get over such difficulties as must constantly occur in the administration of the Building Act. He did not believe that any court of law would object to Mr. Blashill being indirectly vested with power to give his decision upon many questions in dispute, which would be thus intercepted on their way to the Law Courts.

The Chairman: I understand you will take part in the discussion at the adjourned meeting?

Professor Kerr: Yes.

Mr. Edwin T. Hall said that the Practice Standing Committee of the Institute had those matters very fully before them. They had had a Sub-committee dealing twice with the subject already, and he held in his hand a draft document which contained some seventy suggestions for the amendment of the Building Act, and it was probable that on the following day the Committee might authorise the publication of this document in the Institute's *Journal of Proceedings*, as a text to bring the subject to the notice of members. He hoped that every member of the Institute would forward to this Committee any suggestions they might have to make in regard to difficulties they had experienced and as to amendments which they desired to see adopted. These would be taken into consideration at once. He might say that the Practice Standing Committee had received the greatest assistance from the District Surveyors' Association, on more than one occasion, in dealing with matters connected with the Metropolitan Building Act.

The Chairman said he thought it was very desirable that the suggestions referred to should be printed in the *Journal of Proceedings* to be issued on the following Thursday.

Mr. Hall replied that no doubt they would be ready for publication.

The Chairman said he also considered that Mr. Slater's paper should form the foundation of action by the Institute on the matter before them. It might be in the knowledge of the members that the President of the Local Government Board had under consideration a Bill for the consolidation of all the sanitary legislation of the metropolis. That was announced in the Queen's Speech, and there was one section of the legislation, to which Mr. Slater had alluded, now under consideration. Therefore the present would be an opportune moment for bringing before the notice of the Government the absolute necessity for some legislation for building, on the lines suggested by Mr. Slater.

Mr. D. T. Hall said that, incomplete as was the text he had referred to, it would pave the way for a good discussion at the adjourned meeting, and if members would communicate their suggestions to the Committee it would enable them to prepare a document more or less complete, which would be of great service to the London County Council and the public generally.

The Chairman remarked that, if the suggestions could not be published in the *Journal of Proceedings* that week, he believed it would be well to send them round to the members in a printed form.

Professor T. Roger Smith moved that Mr. Slater's paper should be printed and circulated amongst the members before the next meeting.

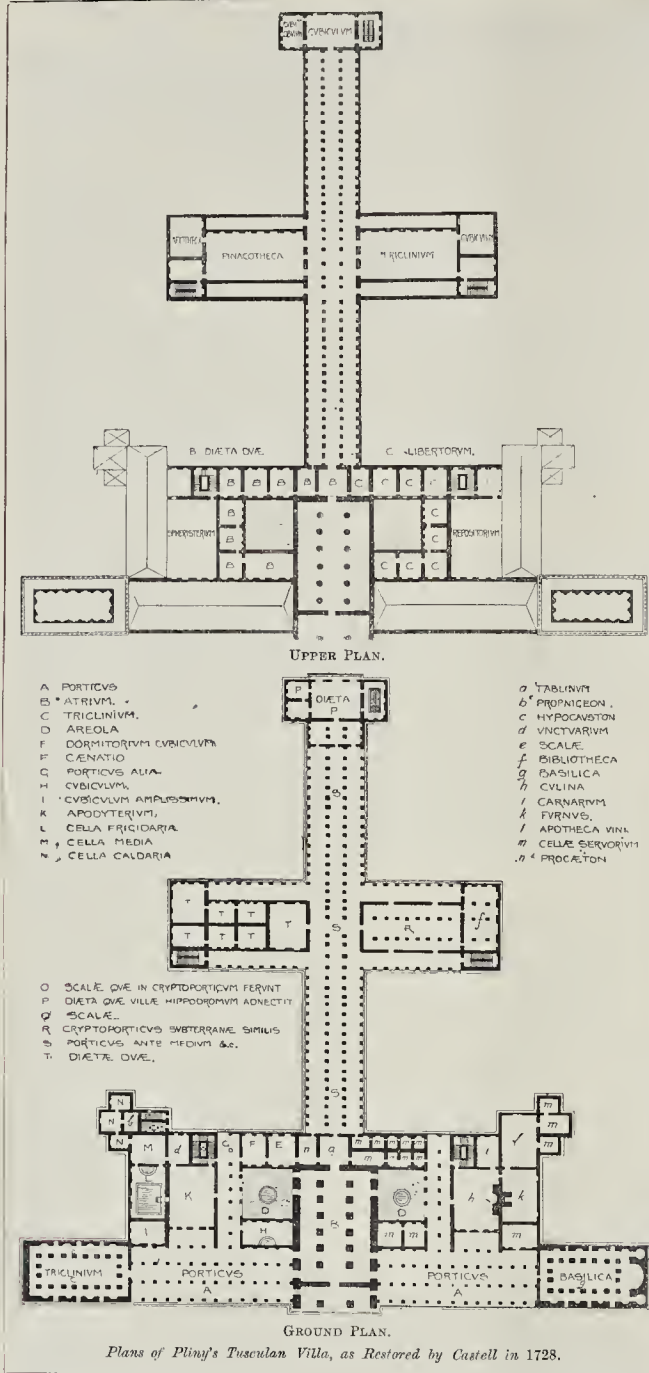
Mr. Rickman seconded the motion, which was unanimously agreed to.

Mr. Hall moved the adjournment of the debate to the 3rd of March, and the meeting then stood adjourned.

PLINY'S TUSCULAN VILLA.

WE anjoin the plans of Pliny's Tusculan villa as restored by Castell (1728), and given as illustrations to Professor Aitchison's second Royal Academy lecture. The following is Pliny's description (translated by the Rev. F. T. Bosanquet), which, as before observed, we withheld from giving in its place in the lecture till we could have opportunity of giving the plans along with it:—

"The greater part of the house has a southern aspect, and seems to invite the afternoon sun in summer (but rather earlier in the winter) into a broad and proportionately long portico (Porticum Latum), consisting of several rooms, particularly a court (Atrium) of antique fashion. In front of the portico is a sort of terrace (Xystus), edged with box and shrubs, cut into different shapes. You descend from the terrace by an easy slope adorned with the figures of animals in box, facing each other, to a lawn overgrown with the soft— I had almost said the liquid acanthus; this is surrounded by a walk enclosed with evergreens, shaped into a variety of forms. Beyond it is the gestatio, laid out in the form of a circus running round the multiform box-edge, and the dwarf trees, which are cut quite close. The whole is fenced in with a wall completely covered by box cut into steps, all the way up to the top. On the outside of the wall lies a meadow that owes as many beauties to nature as all I have been describing *within* does to art; at the end of which are open plain and numerous other meadows and copses. From the extremity of the portico, a large dining-room (Triclinium) runs out, opening upon one end of the terrace; while from the windows there is a very extensive view over the meadows up into the country, and from these you also see the terrace and the projecting wing of the house, together with the woods enclosing the adjacent hippodrome. Almost opposite the centre of the portico, and rather to the back, stands a summer-house (Dieta), enclosing a small area shaded by four plane-trees, in the midst of which rises a marble fountain (Labrum), which gently plays upon the roots of the plane-trees and upon the grass plots underneath them. This summer-house has a bedroom (Dormitorium cubiculum) in it, free from every sort of noise, and which the light itself cannot penetrate, together with a common dining-room (Cenatio) I use when I have none but intimate friends with me. A second portico looks upon this little area, and has the same view as the other I have just been describing. There is, besides, another room, which, being situate close to the nearest plane-tree, enjoys a constant shade and green. Its sides are encrusted with carved marble up to the ceiling (podio tenus), while above the marble a foliage is painted with birds among the branches, which has an effect altogether as agreeable as that of the carving, at the foot of which a little fountain, playing through several small pipes into a vase (Crater) encloses, produces a most pleasing murmur. From a corner of the portico you enter a very large bed-chamber (Cubiculum) opposite the large dining-room (Triclinium), which from some of its windows has a view of the terrace, and from others of the meadow, as those in the front look upon a cascade, which entertains at once both the eye and the ear, for the water, dashing from a great height, foams over the marble basin which receives it below. This room is extremely warm in winter, lying much exposed to the sun, and on a cloudy day the heat of the adjoining stove (Hypocaustum) very well supplies its absence. Leaving this room you pass through a good-sized pleasant undressing room (Apodyterium) into the cold-bath room, in which is a large, gloomy bath; but if you are inclined to swim more at large, or, in warmer water, in the middle of the area stands a wide basin for that purpose, and near it a reservoir from which you may be supplied with cold water to brace yourself again, if you should find you are too much relaxed by the warm. Adjoining the cold bath is one of a medium degree of heat, which enjoys the kindly warmth of the sun, but not so intensely as the hot bath, which projects farther. This last consists of three several compartments, each of different degrees of heat; the two former lie open to the full sun; the latter, though not much exposed to its heat, receives an equal share of its light. Over the undressing-room is built the tennis-court, which admits of different kinds of games, and different



sets of players. Not far from the baths is the staircase (Scala), leading to the enclosed portico (Cryptoportions), three rooms (Dietae) intervening. One of these looks out upon the little area with the four plane-trees round it; the other upon the meadows, and from the third you have a view of several vineyards, so that each has a different one, and looks toward a different point of the heavens. At the upper end of the enclosed portico, and, indeed, taken off from it, is a room (Cnbiolum) that looks

out upon the hippodrome, the vineyards, and the mountains; adjoining is a room (Cnbiolum) which has a full exposure to the sun, especially in winter, and out of which runs another (Dieta) connecting the hippodrome with the house. This forms the front. On the sunny side rises an enclosed portico, which not only looks out upon the vineyards, but seems almost to touch them. From the middle of this portico you enter a dining-room (Triclinium) cooled by the wholesome breezes

from the Apennine valleys; from the windows behind, which are extremely large, there is a close view of the vineyards, and from the folding-doors, through the summer portico (Cryptoportions). Along that side of the dining-room where there are no windows, runs a private staircase for greater convenience in serving up when I give an entertainment. At the farther end is a sleeping-room (Cnbiolum), with a look out upon the vineyards, and (what is equally agreeable) the portico underneath this room is an enclosed portico, resembling a grove, which, enjoying in the midst of summer heats its own natural coolness, neither admits nor wants external air. After you have passed both these porticoes (Cryptoportions), at the end of the dining-room stands " (this is hardly a translation, Pliny says "begins the portico") "a third, which, according as the day is more or less advanced, serves either for winter or summer use. It leads to two different apartments (Dietae), one containing four chambers, the other three, which enjoy by turns both sun and shade." I have omitted the east summer-house.

Houses are built not only to protect people from the inclemency of the weather, but to afford conveniences for the avocations they pursue, and for the recreations they indulge in; so there is no need of apology for giving the account of how Pliny passed his time there.

Illustrations.

ILLUSTRATIONS OF CAMBRIDGE.

WE give in this number reproductions in ink-photo of two of Mr. Fulleylove's charming series of water-colours of Cambridge which, as before noticed, are now being exhibited at the Fine Art Society's Galleries. These of course do not convey the charm of colour which belongs to many of these drawings, to none more than to that of "The Conduit" which is such a well-known object in the centre of the great court of Trinity College. Architecturally perhaps "Wren's Bridge," giving access to John's College from "the backs," is the more interesting; with the gate and gate-piers it forms an effective contrast, in its quiet stateliness of effect, with the more homely and domestic character of the residential buildings. It is curious to see the Gothic feature of the sloped set-off in the bridge buttresses, introduced here for practical reasons as the easiest way of connecting the necessary cut-water form, on the up-stream side of the pier, with the pilaster above.

WREXHAM CHURCH TOWER.

THE peculiar interest of the fine tower at Wrexham (which we may observe is not actually in Shropshire as stated in the plate title, but in Denbighshire, though not far from the Shropshire border) consists in the fact that in style, proportion, and general architectural treatment it is essentially a Somersetshire Tower which has found its way north by some accident, and acts as a surprise in this respect to the architectural traveller and sketcher, who is not expecting to meet anything of this character on the north-east border of Wales. Whether there was any local reason, any connexion with Somersetshire at the time, to account for this, there is no record.

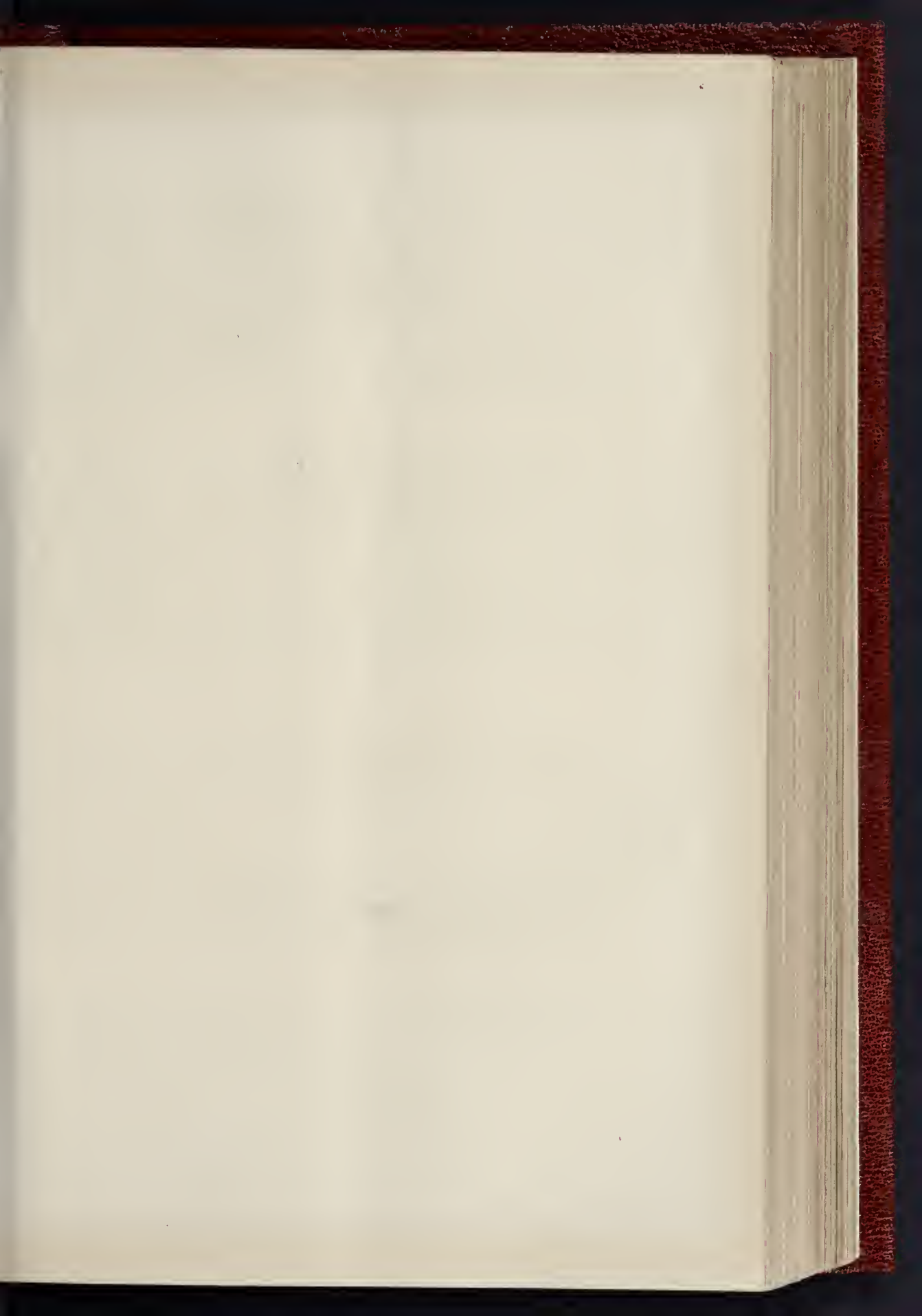
Mr. Arnold Mitchell's drawing reproduces very faithfully the design and architectural effect of this interesting tower.

CHISWICK PARISH CHURCH.

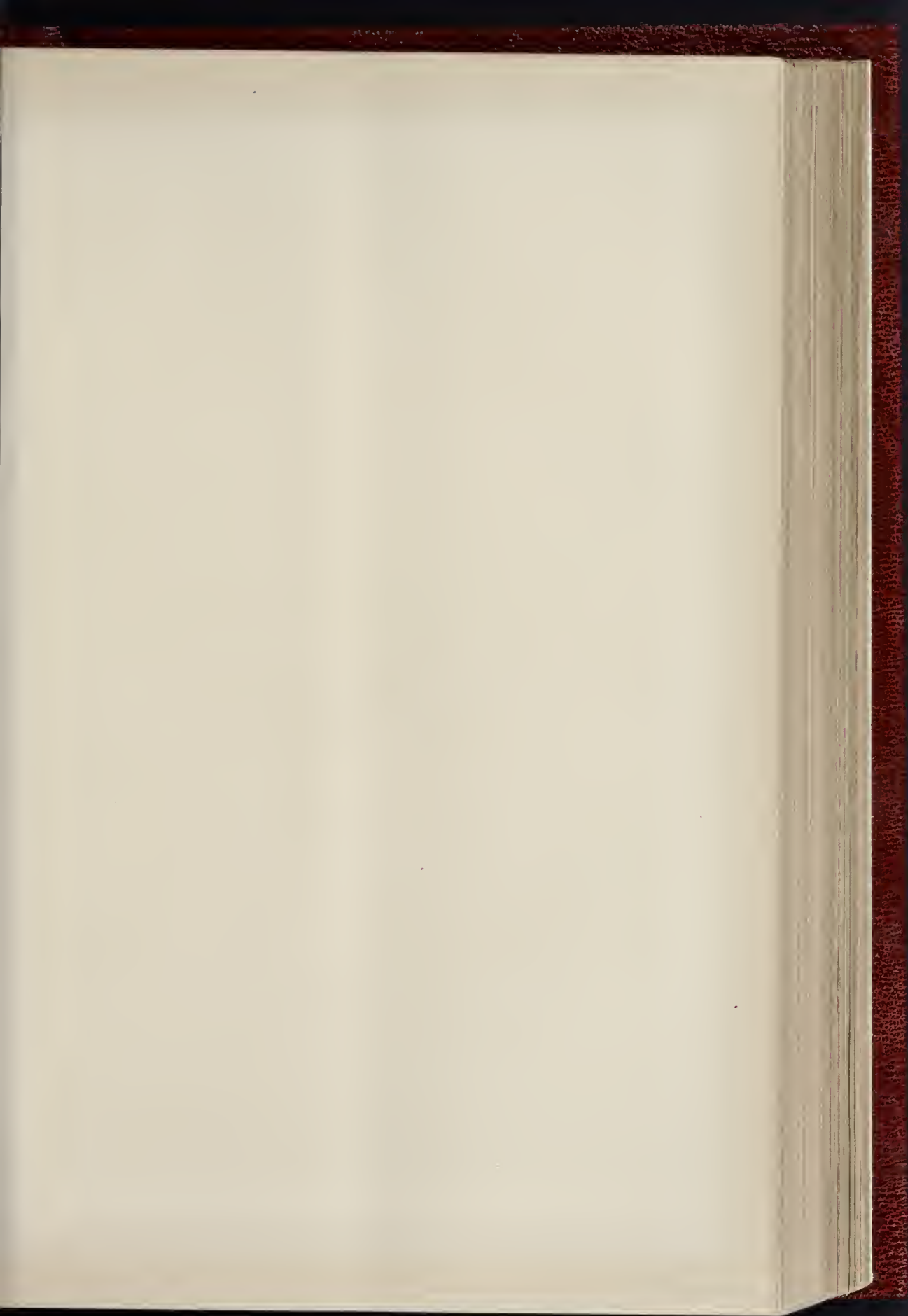
THE window to-day illustrated is the centre one of three on the N. side of Chiswick Parish Church, the design of which was required to illustrate the building of Solomon's Temple.

Centre window.
David with plan of Temple. } Through the base of Solomon with model of Temple. } the four lights a small processional subject of the dedication of the Temple.
Hiram, King of Tyre. } }
The Chief Priest (Zadok). } Solomon. The Elders of Israel. }
The bearers of the ark and a band of choristers. }

The first and third windows are designed to complete the scheme. SHRIGLEY & HUNT.
* * * The drawing from which the illustration is taken was exhibited in the Royal Academy Exhibition of 1889.









THE PHOTO. ENRAGUE & CO., 11, MARTIN LANE, LONDON, W. 1. E.

THE CONDUIT. GREAT COURT, TRINITY COLLEGE, CAMBRIDGE.

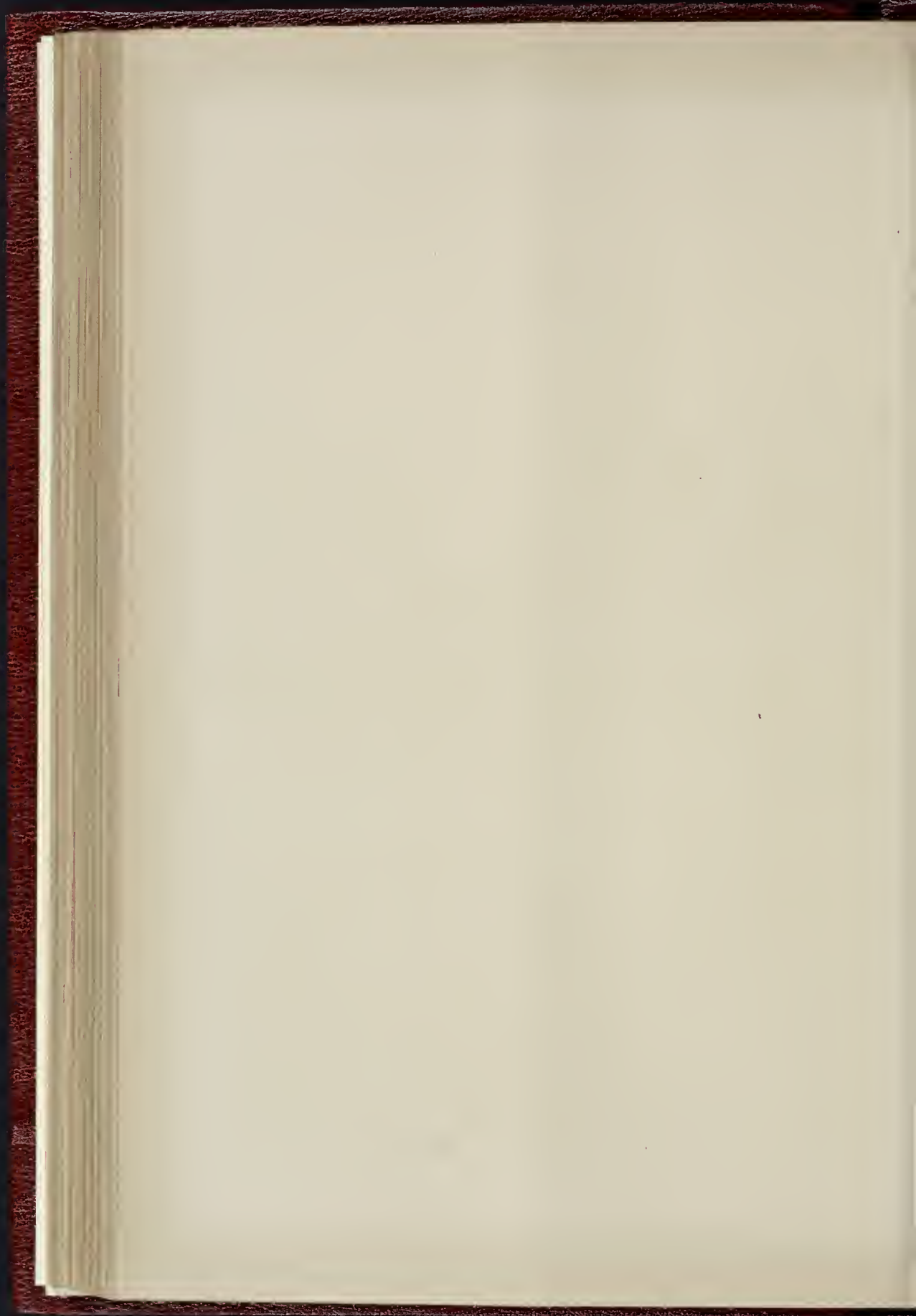
From a water colour drawing by Mr. John Fulleylove.

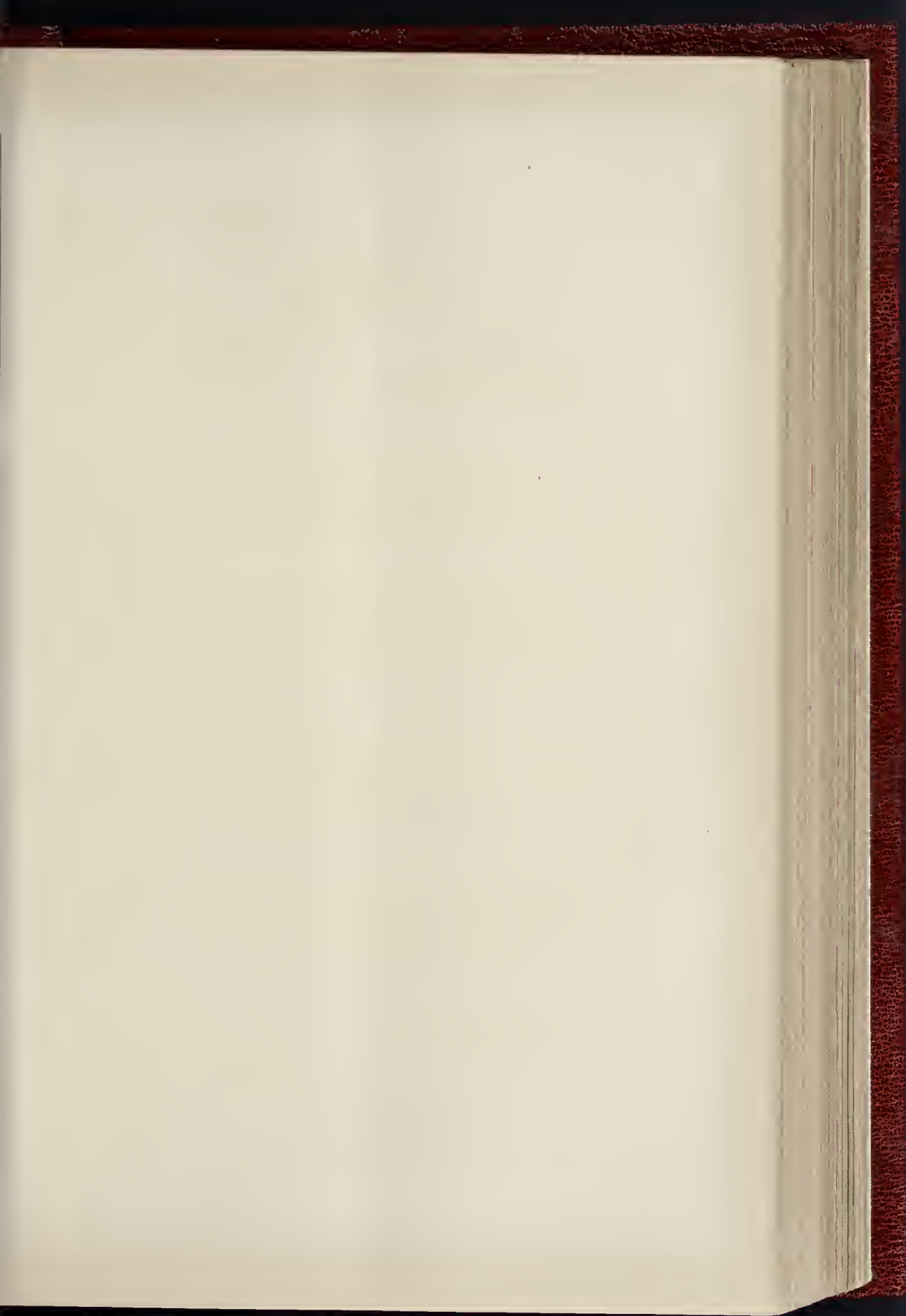


THE PHOTO "PRA. OF A. G." MARTIN LANE. "ARTHUR ST. LOUISIANE"

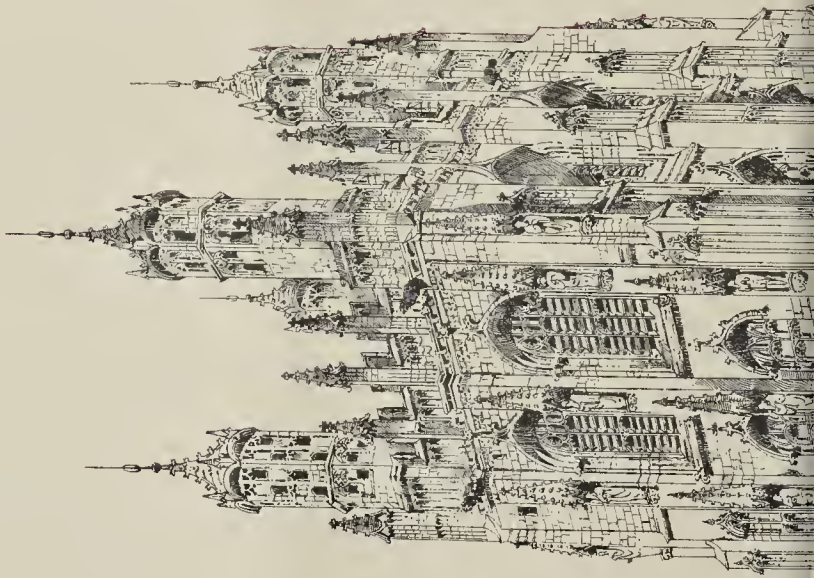
WREN'S BRIDGE, ST. JOHN'S COLLEGE, CAMBRIDGE.

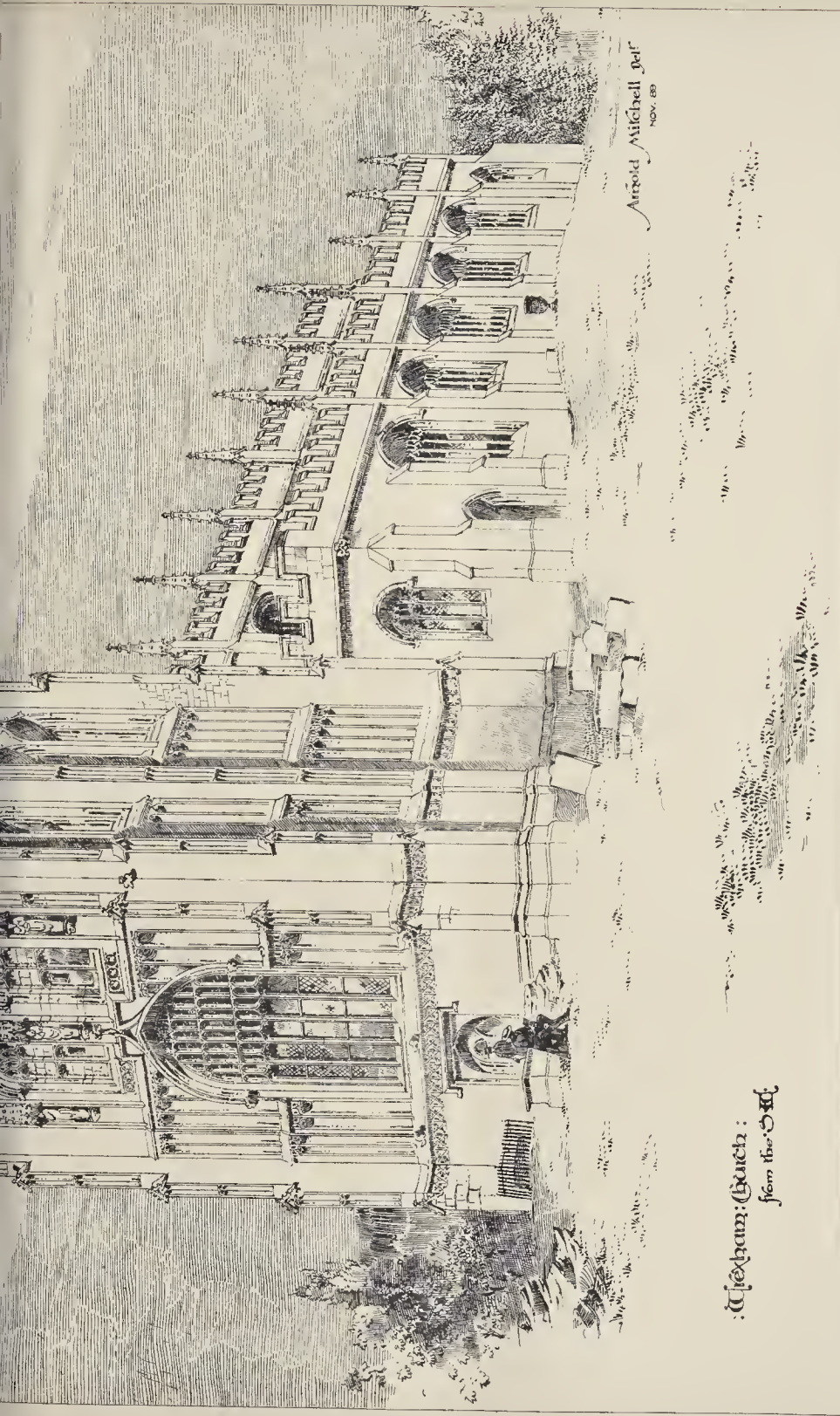
From a water colour drawing by Mr John Fulleylove.





THE BUILDER. FEBRUARY 22, 1890.

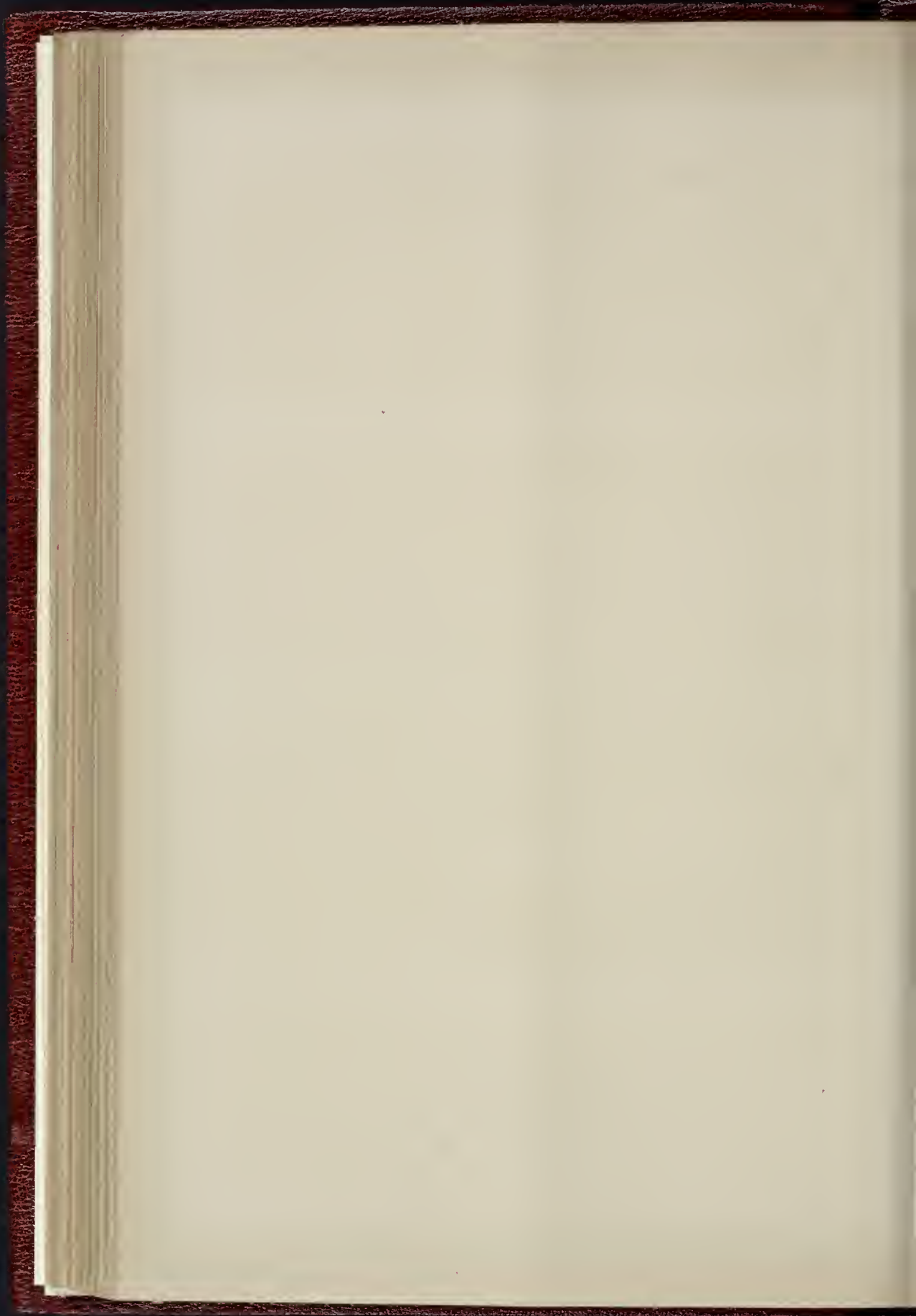




Wrexham Tower:
from the South

WREXHAM TOWER, SHROPSHIRE.—FROM A DRAWING BY MR. ARNOLD B. MITCHELL, A.R.I.B.A.

PHOTO LITHO. SIMMONS & CO. 22, HANBURY PLACE, LONDON, E.C.



PLAN OF THE PALACE OF THE CÆSARS.

These are reproduced, by permission, from the measured plan and restoration by M. Deglaine, one of the most talented and distinguished of the younger generation of French archaeological architects, originally published in the *Moniteur des Architectes*. They are given here in order to illustrate Professor Atchison's Royal Academy lectures on Roman Architecture.

They are specially referred to in the fifth lecture, which will be published in our next, when we will give some further plans in illustration of the subject.

ON SOME TYPICAL GREEK BUILDINGS.*

I am glad to believe that an increasing number of English architectural students are showing their interest in Greek work by visiting the country and examining the remains of the buildings in their original place, and I only hope that this paper may have some influence in increasing this number. I am sure that any one who does so will gain very valuable lessons, even though he may never care, or have the opportunity, to erect a modern building in either of the Greek styles. There never has been a period since the time, some two centuries ago, when the Parthenon still stood practically complete, when a visit to Greece would so well repay the architectural student. Archaeological societies—Greek, French, German,—have, with infinite care and pains, and at great expense, laid open buildings for decades, if not centuries, buried and unknown, and full of instructive points; and equally important excavations have been carried on by Dr. Schliemann in his private capacity.

It may not be out of place here to say that Athens cannot be considered now an out-of-the-way place to visit. There are several routes; the one I myself prefer is *via* Marseilles, and by this route travelling expenses out and back need not amount to more than 20*l.*, nor the time occupied in travel exceed about eleven days. Athens, itself and alone, is well worth a visit, though, of course, when once there, it seems desirable if possible to see at least two or three of the other sites; and any student going out properly accredited will find every facility put in his way for pursuing his studies both by the Greek archaeological officials and by the Directors of the English and American Schools. Any one acquainted with German will receive equal consideration from the Director of the German School, who has no equal in the practical acquaintance with the buildings themselves, except Mr. Penrose.

It seemed to me, in selecting a subject for this paper, that it would be better to take a few characteristic buildings, and examine them in detail and with some care, rather than to visit hurriedly a large number of sites.

I propose to refer briefly to three buildings which we may take as representing the domestic, secular, and sacred architecture of the Greeks, viz.,—the Palace at Tiryns, the Propylæa, and the Erechtheion of the Athenian Acropolis. The last of these is also a wonderfully beautiful example of the use of the Ionic order, while the second illustrates the very best period of the Doric order, and all three are specimens of the magnificence and freedom of Greek planning. And I may, perhaps, confess that the possibility of adequately illustrating them to you, either by means of photographs or diagrams, had its influence upon the selection of these buildings for our purpose. At the same time, I shall not scruple to show you a few photographs of other buildings, which may assist us to understand them more completely.

Of the three buildings which we are to consider, by far the oldest is the Palace at Tiryns, though six years ago its existence was unknown, and, by most people at least, undreamt of. It is, perhaps, therefore suitable that we should consider it in the first place, more especially as we shall discover in it the beginnings of much of the later Greek art and architecture.

The citadel of Tiryns occupies a magnificent position near the sea, overlooking the Bay of Nafplia. The rock rises abruptly out of the level plain, and nowhere is there any eminence that, in the days before artillery was introduced, could command it. The natural features of the rock were seized upon by the Greeks, and form the key to its fortifications, which were adapted to it with great skill; they are said to be the

most massive of their kind in Greece, and possess several points of great interest. But we must not linger over them, and I can only refer any student who wishes a more detailed account of the walls or the palace to Dr. Dorpfeld's account of them contained in chap. v. of Dr. Schliemann's "Tiryns."

Suffice it to say that, owing to the form of the rock, three more or less separate forts existed within the outer ramparts,—the lower, the middle, and the highest,—and that crowning the last, and occupying the greater part of it, stood the king's palace. The materials used in its construction,—clay, either beaten hard or used as mortar or cement, or as sun-dried bricks; lime, and wood; while in the decoration of its surface, plaster covered with coloured decoration, carved alabaster, and almost certainly bronze plates, were employed. The plan of this fortress-palace, though not perfectly preserved, approaches being so, and is far less incomplete than the palaces at Mycenæ or Troy, or the fragments of Erechtheus's palace on the Athenian Acropolis, and all three have many points of similarity both in plan and construction.

At Tiryns, having passed through the fortress-wall, not an easy matter in the old days for any but a friend, we approach the outer gate of the palace. This gives admittance to a large open space, devoid of building. After traversing this we reach the outer or great Propylæum, with an outer and an inner portico, the forerunner in every essential particular of the great Propylæa at Athens, and of many others. Each portico takes the form of a distyle in antis, while the wall of the gate is pierced by a single opening in the centre, whose great folding-doors stood, not between the jambs, but inside them, and their bronze-covered pivots worked in circular holes cut in the stone of the threshold, which was much wider than the wall. From the inner portico a door admits the visitor to a long winding passage leading to the women's apartments, and just beyond the portico a short passage gives a side entrance to the court of the men's apartments. This Propylæum gives direct admission to a large outer court of irregular form; the buildings enclosing it to the south and west have been either largely obliterated by later buildings, or slipped down the hill with the line of fortification, which gave way here. On the north side they are more perfect, and it is possible to trace distinctly the line of the small Propylæum giving access to the court of the men's apartments. This gateway was similar to the great Propylæum, having an outer and inner portico, and the gate-wall was provided with folding-doors. The court-yard to which this gave admission was large, about 65 ft. by 50 ft., clear of the porticoes which surrounded it on three sides, the east, south, and west; this court was paved, and so also was the outer one already referred to, with concrete and laid so as to clear itself of water. Nearly in the centre of the south side was placed the great altar of Zeus, which is on the axial line of the vestibule which occupied the greater part of the north side of the court. The front of this vestibule took the form of a temple in antis, and was raised on two steps, forming a stylobate. The bases of the two columns and of the ante remain; these below the ground level are of irregular form, but above they are carefully squared to the line of the wall. This also is the usual treatment of the thresholds here, but at Mycenæ they are squared throughout. The bases of the ante have their tops rebated and drilled with a series of holes for wooden dowels. In general the base stones at Tiryns are from 18 in. to 2 ft. high. The upper part of the ante was formed of timber beams placed in juxtaposition side by side, and dowelled to the base, and probably to each other; and these would carry the ends of the lintels, probably formed in a similar way of more than one piece, as was the case later with the great stone architraves of the Parthenon and other temples. The side walls of this vestibule were decorated with slabs of alabaster, richly carved and inlaid with glass. Three pairs of doors hung folding between the jambs gave access to an ante-chamber, from which an opening, not, however, provided with a door, led to the megaron, or principal men's apartment, which was over 30 ft. wide and nearly 40 ft. deep. In the centre are the bases for four wooden pillars which helped to carry the roof, and between them are traces of the large circular clay hearth, found in much

greater perfection in Mycenæ; the floor of the

hall was of concrete, ornamented with a rectangular pattern in incised lines. Of course any restoration of elevations or sections is somewhat uncertain. The walls in the upper parts were of perishable materials—wood and sun-dried bricks—and these fell an easy prey to the fire which destroyed the Temple. The roof was almost certainly flat, and made of clay on a layer of rushes, and the room may have been lighted either by openings in the walls or by having a portion of the roof raised as a simple clear-story or central lantern. From the ante-chamber access is also obtained to the bath-room, which could also be reached from the men's court. The floor of this room was formed by one single stone, sunk and polished and drilled with dowel-holes for a wood lining to the room, and was provided with a movable terracotta bath and with a drain; this bath adjoins a long and winding corridor, out of which several rooms, whose exact purpose it is difficult to determine, opened. It also led to the staircase to the middle fortress, and eventually to the women's apartments, and may have been intended for the use of servants or slaves.

The women's apartments, in general arrangement, closely copy the men's, but they are smaller, and the two sets have no direct communication. The long passage from the inner portico of the great Propylæum gives access through a stoa on its west side to an open court; this communicated directly with the inner court of the women, which had stoa on its east, and on part of its north side. The rest of the north side was occupied with the vestibule to the women's hall, and with the entrance to the corridor which ran round them. This court was drained into the channel from the bath, already referred to, which was formed of rectangular terra-cotta channel pipes which fitted into each other.

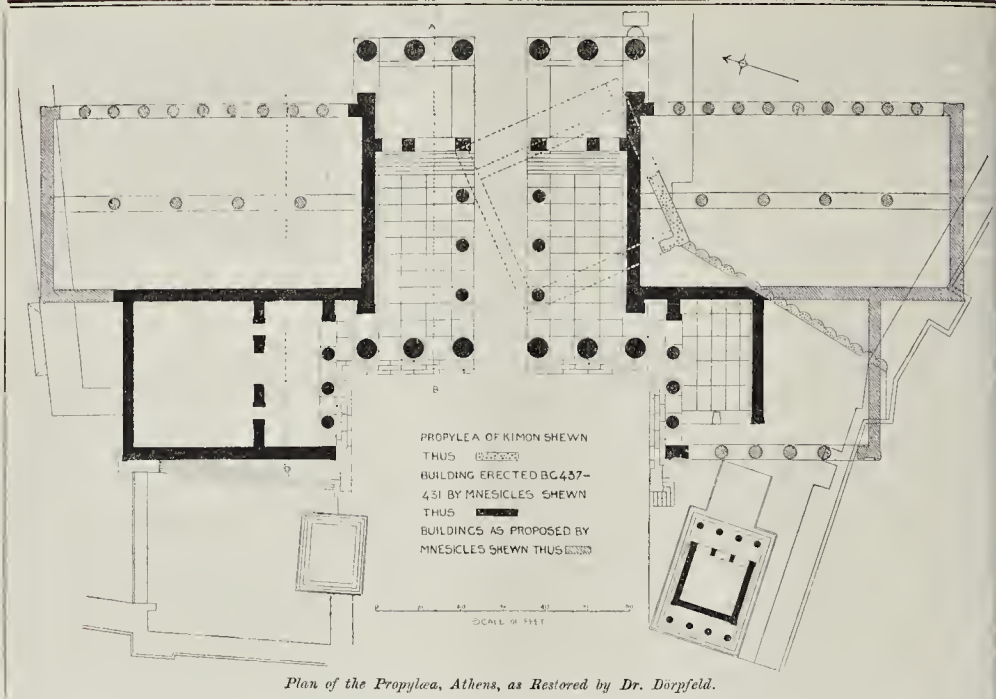
The south side of the vestibule is quite open; the span is about 18 ft., and therefore a lintel would not require intermediate support. This vestibule is nearly square; east and west doors lead into the surrounding corridor, and on the north side a single door, about 5 ft. 3 in. wide, leads to the women's hall; this door is of special interest, for in the pivot-hole the great bronze pivot was actually found. In the centre of the hall there seems to have been a square hearth. East of this hall are several well-defined rooms, grouped together, and only accessible from the surrounding corridor; they probably comprised the King and Queen's sleeping-chamber, with a vestibule, while a small passage gives access to inner rooms, which formed the treasury and armoury; south of this passage is probably the position of the staircase leading to the roof.

A few other rooms are accessible directly from the women's outer court; their exact purpose cannot be at all definitely fixed, but the most important rooms of the palace have been passed in review, and there is but little question as to their identification.

To refer to a few general particulars as to construction, &c., the walls of these rooms stand, for a height mostly of from 1 ft. 6 in. to 3 ft., the lower portions being constructed of stone; above this height the walls seem to have been constructed of timber and sun-dried bricks, and were usually from 2 ft. 6 in. to 4 ft. 6 in. thick. Both the upper and lower parts of the walls, external as well as internal, were coated with clay and then lime plaster; the latter was painted in various colours, subjects being introduced as well as geometrical patterns. The ante, as we have seen, had usually solid stone bases, the upper parts being formed of massive timbers forming an end to the wall. It is probable that these timbers, and also the wooden columns of the porticoes and the megaron, were encased with bronze plates; fragments of such plates belonging to a column were found at Mycenæ, and it is supposed that the interior of the vast chamber known as the Treasury of Atreus was extensively, if not entirely, lined with a similar skin of bronze.

The thresholds were, with one or two exceptions, of stone, of irregular form, but all, excepting a broad central band, which was carefully worked to the width of the wall and stood slightly above the finished floor-level, was worked down so as to allow the floor to be carried up to the wall-line evenly throughout. The roofs were probably flat, formed of massive timbers, which carried, as already stated, reeds, and above them clay; this forms a heavy but good roof if well looked after during the wet season, and is still in general use throughout the East. There may have been an upper story

*From a paper by Mr. R. Eusey Smith, A.R.I.B.A., read before the Architectural Association on the 14th inst., as elsewhere mentioned.



Plan of the Propylea, Athens, as Restored by Dr. Dörpfeld.

over a good portion of it; at any rate, it is probable that there would be at least summer sleeping apartments.

This is one of the earliest Greek buildings of which we have any extensive remains, and belongs, probably, to the sixth century B.C., or possibly an earlier date even. It was certainly finally destroyed in the early part of the fifth century, but the Mycenaean palace, which is of later rather than earlier construction, certainly cannot be later than the eighth century. We have thus a not incomplete idea of a palace of an early Greek king, and are able, in conjunction with the discoveries in the Mycenaean tombs, to form some idea of the splendour of their homes. They were essentially warriors, and probably there was little in the way of what we should consider luxury in their manner of living, but their fortresses and palaces were magnificently constructed, and the latter richly adorned, and their armour and weapons and utensils were often of precious material and most delicate and graceful workmanship.

But, apart from the interest that attaches to whatever may help us to realise the life of the old Greek heroes, of whom we have all heard or read, this palace possesses a very genuine architectural interest, for in it we find evidence of the origin of much that we shall encounter in our study of the later marble architecture; and here already the difficulties of a trabecated system of architecture have been encountered and overcome. In the megaron of the men, for instance, we have an arrangement almost exactly repeated in the episthodomus of the Parthenon. Here, too, we perceive the constructional *raison d'être* of the anta, which was repeated in the early stone and marble architecture, but which ceased to have any real purpose, other than an artistic one, in those buildings which were entirely constructed of marble, and where this feature becomes purely ornamental. We detect, also, the fondness of the Greeks for colonnades or porticoes, a necessity, indeed, of the climate. The system of decorating walls with bronze plates may suggest an origin for the great friezes of later days. We notice, too, great facility in adapting the plan to the limits of the site and to its special requirements, and the importance they attached to a magnificent and stately approach to an important building.

If we endeavour for a moment to realise the effect produced on a visitor to the Palace in all its glory we cannot imagine it to have been otherwise than a striking and grand one, for

which the plan seems eminently adapted. The angle at which the great Propyleum is set to the little one would bring the latter at once into view in passing through the entrance-door; it would, moreover, produce a pleasing variety in shade effects, a point which the Greeks seem to have studied with the utmost care, and notably so in the arrangement of the buildings on the Athenian Acropolis. The outer court itself was probably in some way shaped up, as suggested by its outline now appears; and the small Propyleum led on thence to the Court, with its colonnades casting deep and welcome shadows, and through the pillars of the vestibule and the triple doors of the ante-room to the dimly-lit megaron itself. The whole was rich with colour, alabaster, and bronze, and probably further beautified with splendid textiles. The women's apartments would produce somewhat the same effect on a smaller scale. Of the proportions in elevation it is not safe to speak, but, at any rate, the important rooms, as far as planning is concerned, seem well considered and grouped, and at least to approach nearly to the simple relative proportions so markedly employed later.

No better example of their delight in lavish expenditure of thought and labour over the erection of an imposing portal can be brought forward than the Propylea at Athens, yet this is but an elaboration of the principle contained in the Propyleum at Tiryns, carried out on a magnificent scale and with the very finest materials and workmanship.

The word Propylea means simply "before the gateways," and signifies the colonnade of the entrance either to a sacred precinct, or, as in the case under consideration, to a fortress or some other enclosure. Other examples may be found at Eleusis, Argina, Epidaurus, &c., but none equalled in magnificence that at Athens.

The older gateway of Kimon, of which remains exist, was on a more modest scale, and was partly built of limestone faced with marble slabs or stucco, and with marble antae, and probably columns. The present building was commenced the year following that in which the Parthenon was dedicated, when mechanical skill and mathematical science had reached the utmost perfection, and was planned on a truly magnificent scale. The entire scheme was never carried out; what the true cause of its being abandoned may have been is not quite certain, and does not greatly matter to us, but the Peloponnesian War brought work to a final standstill in 431 B.C., and at this time no por-

tion of the building was finished, and much of it not commenced, or up to foundation level only.

The line of the wall of marble which contains the actual gateways is approximately north and south, and to the west and east were two great hexastyle porticoes; the western one is very deep, and is flanked on either hand by less important porticoes with buildings behind. Somewhat similar but more extensive buildings were designed to flank the eastern portico, but were never carried out, though traces showing the starting and position of them remain. The site presented great difficulties—it was irregular, uneven, and with a very rapid fall to the west—but so skilfully were the very difficulties turned to account, and so admirably does the building fit its site, that they may readily be overlooked; and the whole design is so natural and straightforward that the effect produced on the mind seems to be, that it could hardly have been treated differently.

I have given a brief outline of the original scheme, which will be readily understood from the plan.* I wish now to describe briefly the portions coloured black, those that were actually erected, and which still remain more or less complete. They comprise, briefly, the wall of the gateways; the east and west porticoes, both imperfect, the north-west wing, complete, except for the roof, and a small part of the south-west wing.

A magnificent flight of steps, flanking the approach for chariots, must have led up from the entrance below the temple of Nike to the level of the western or outer portico, which stands on a stylobate of four steps; but this approach no longer exists, and the steps now *in situ* are quite modern. The Doric portico, with a wide intercolumniation in the centre, was surmounted by a pediment, while the two lines of slender Ionic columns behind each supported an immense architrave in a single block, extending the full depth of the portico; the beam is partially hollowed out, to reduce its weight. The wall containing the gates, and which stood on a lofty stylobate of five steps, is pierced by five openings, which were originally filled with

* The diagram from which our illustration is taken was enlarged from the small plan by Dr. Dörpfeld in the *Mittheilungen der German Archaeological Institute at Athens*, Vol. X., 1885. The plan of those portions of the building actually existing was corrected from Mr. Penrose's plan in his "Principles of Athenian Architecture," and in a few details from dimensions taken by Mr. R. Eisey Smith.

bronze doors: the central one (the largest) would be used by the Panathenaic procession, the two smaller side-doors being of comparatively small dimensions. The side walls of this portico undoubtedly had low seats running their whole length, and this would form a magnificent and convenient place of meeting and discussion. The eastern, or inner, portico had a similar elevation to the western, but the columns were raised on a continuous square plinth or stylobate.

The north-west chamber is fairly complete: its west wall stands on an earlier foundation in a different line, and to this the new work has been very cleverly adapted. This chamber is entirely enclosed by walls, the southern one being pierced with openings for a door and two windows, and having a portico of three columns further to the south. It is worthy of remark that the doorway does not come centrally with an intercolumniation. The columns of this portico were also of the Doric order, but on a very much smaller scale than those of the great porticoes. The roof to this wing was hipped, and, as usual, flat in pitch.

The opposite wing to this was never completed, but there is sufficient to show that the original design of this wing, while balancing the other in its total mass, differed widely in its plan, and no doubt in its uses. You will see, from a glance at the plan, that the portico here which exists, is similar in elevation to the opposite one, but is much deeper; and that the chamber, instead of being enclosed, and approached by a door, is open on its west side to another portico, whose columns occupy the line of the west wall of the corresponding wing. I wish to avoid touching on anything that may be considered merely of archaeological rather than of architectural interest, but I think it may be well to briefly refer to the reasons for the restoration of the original plan of this wing, which most certainly was never completed, and this will render necessary an allusion to an earlier epoch in the history of Greek architecture; but for this purpose we need not leave the present building, but merely consider the Propylæa of Kimon.

As was the case with many of the Greek buildings erected later than very archaic times, when marble was hardly used, but previous to the magnificent epoch of Pericles, when lavish expenditure was made, and marble used exclusively for the finest work, this earlier Propylæa was constructed partly of fine limestone and partly of marble. The walls were constructed of the former, but they were terminated, at least when they were in a line with a range of marble shafts, with blocks of marble forming the well-known antæ. These projected beyond the line of the wall, so as to stop the marble or plaster casing which was applied to the rougher material, and the width of the antæ was proportioned to the diameter of the column in connection with which it stood. We have seen instances at Tiryns of a still earlier treatment in wood, but very similar in purpose.

When buildings were entirely constructed of marble, the feature was copied in it, just as in earlier days we find the features of timber construction copied in stone, and observe the way in which it was adapted to various positions. Where it forms the termination to a wall in line with a range of columns, it has a broad face and narrow sides. But where it terminates a wall at right angles to a line of columns we have two broad faces and one narrow one. Bearing this in mind, let us examine the remains we have of the south-west wing, and see what they teach us. I should remark here that the pier occupying the angle between the north and west porticoes is not now *in situ*, but was until a few years ago. The blocks of which it was composed are close at hand. The plan of this pier clearly seems to point to the fact of its having formed an angle pier between two porticoes, for we find a broad face to come next a column, another broad face forming the termination of a wall, and with a narrow return, and then after a very short bit of wall we have another antæ, very clearly pointing to a line of columns running in a direction at right angles to the first portico. If we use now an intercolumniation identical with the north portico, in our attempt to construct the west one, the second column comes, as it should do, exactly opposite the antæ of the existing wall, and with four columns in all, this allows of an angle pier at the south-west angle similar to the one from which we set out. As this west portico was never built, a makeshift had to be adopted, and the small pier, of an entirely irregular and un-

usual form, was introduced to carry the architrave running from the end of the existing wall to the westernmost column of the existing portico, but in an irregular line.

I have dwelt on some length on this point firstly because it seems to me not unimportant to feel tolerably certain of any restoration that may be attempted of this building, which, without doubt, was second only to the Parthenon in hearty and in reputation amongst the Greeks; and secondly,—and this is to us of even more importance perhaps,—because it seems to me to be an instance of the care and thought that should be devoted to any building, whether Greek or Roman or Gothic, that it may fall to the lot of any one of us to restore, either on paper or in actual practice. As regards myself, I can only say that I cannot recall any single lecture or paper that I have heard or read that impressed me more and gave me a clearer idea of the method to be pursued in the examination of existing architectural buildings, and the importance of not disregarding the least bit of evidence, however apparently trivial, than the lecture I heard Dr. Dörpfeld deliver on the subject of the Propylæa on the spot, where he could point out each point as he referred to it. To that lecture I am largely indebted for a great part of any knowledge I possess of the building. The general surface of the walls seems to have been left unfinished, though this was not the case with the columns, and I may refer again to it when the lantern slides are thrown upon the screen, as also to the method of working the drums of the columns, which I recollect Mr. Penrose explaining here some years ago, and which I hope to be able to show you. The full-size mouldings shown on the walls were taken by my friend, Mr. Schultz, during the year I was in Athens. They strike one rather, I think, as being small in character and especially small in projection; were they executed in a coarse material and placed under the dull skies and smoky atmosphere of London they would, probably, not be very effective, but in the pure air of Greece the sun casts shadows as sharp and clear as possible, and every line tells, and the delicate material allows of very delicate treatment.

The Doric order, drawn to a small scale, is sometimes apt to look excessively severe, and possibly uninteresting. The same may, perhaps, be said of various reproductions of it in stone. It is, however, a different matter when you see it executed in marble, with perfectly true and sharp lines, and, as a result, perfectly true and delicate shadows. Even as a ruin the Propylæa produces an almost inexpressible effect of grandeur and magnificence. Turning round from under the Nike bastion one comes full upon it from below, and one can realise the object of the deep portico on the west side, for nearly the whole of its richly-decorated soffit, when it still existed, would have appeared at once to an old Greek visiting it; while the great pediment of the central portico would have towered above the hipped roofs of the wings. The break in the roof-level, which on a section seems unsightly, would from no point have been visible, except at such a distance as to be unobjectionable. One can nowadays sit down near the commencement of the steps under the shade of the bastion, and watch the sun, as it creeps round gradually, bring out new lines of light, and cast fresh shadows and deepen existing ones; and when all this took place, with the gloomy depths of the great portico and its gorgeous roof for a background, it must have been, indeed, a sight for gods and men.

Finally, we will make a short inspection of the Erechtheion, and though it is not from many points of view the most typical temple to have selected, it is a very interesting example of the variety and hearty that may be introduced into a Greek religious building, and further, it is a beautiful example of the Ionic order. Another reason which, I think, alone would justify me in its selection, is that when you have obtained some idea of the plan and elevations of the building, any of you who care to do so may examine for yourselves, and within a mile of this room, almost every detail of it. In the British Museum, between the Parthenon marbles and the new Phigaleian room, a great many fragments are collected together—an entire column, including cap and base, from the east portico,—the only column missing from the exterior of the building,—large portions of the architrave and cornice, and various smaller details. One or two fragments from the Propylæa, including a cap,—badly placed, how-

ever,—and the drum of a column and part of an architrave, may be seen in the same room.

Mr. J. Ferguson read a paper on this building before the Royal Institute of British Architects on February 14, 1876, but he confined his attention principally to the elucidation of the difficulties in connection with the arrangement of the interior. I dare say many of you know the paper; it is very learned, and seems to have proved his point, but I wish only just to refer to this interior which is destroyed, to show its effect on the existing exterior. It was divided internally, says Mr. Ferguson,—whose restoration has been, I believe, generally accepted,—by a cross wall into two distinct temples; the eastern one at the higher level was dedicated to Erechtheus, and the western, much lower, to Athene Polias, and this latter was the most sacred shrine on the whole Acropolis.

This arrangement naturally affects the exterior very largely. The position chosen for its erection is just at the point where the Acropolis rock commences to fall away rapidly. At the east end we find a hexastyle portico standing on a stylobate of three steps, with its architrave in position, and it would be complete but for the removal of the north-east column to the British Museum. Portions of the frieze of black marble also exist. The south wall remains throughout its whole length, but not to its full height. The stylobate and the base moulding of the antæ are continued; and, as usual, the first course of stone is very much deeper than any of the others. At the west end of this wall is situated the Caryatid portico, with six female figures, and these, though at a glance almost identical, reveal a great variety in their treatment as regards detail; to this point a uniform level has been maintained, but this portico is founded on the stylobate of a large early temple, and below it there is a sudden drop to the ground-level. The west façade had a blank wall for nearly half its height, with a plain central doorway; above this, the wall had attached columns, and was pierced with windows.

The north wall extends far enough beyond the west wall to obtain a doorway in it entirely outside the building, giving access to a courtyard to the west of the building, and entered from the great north portico; beside it is the principal doorway. This tetrastyle portico has six columns in all, and still retains part of its coffered ceiling; its floor level corresponds to that of the western doorway. The north wall is complete as regards its length, and at some point an external flight of steps between the building and the Acropolis wall must have led up to the higher level.

Sadly ruined as this building is, we are enabled to obtain a very fair idea of its general effect; from whatever point of view it is seen there is a charming variety of grouping and outline, and it is hardly possible to find a view in which at least two of the porticoes are not visible. Added to the hearty of outline, the delicate mouldings and the exquisite carving, which though employed with no niggard hand is concentrated on certain points, must have given the complete building an air of wonderful delicacy and refinement, and this was no doubt heightened by an extensive use of colour.

We have now considered more or less briefly each of the three buildings I proposed to describe to you. In the first case we had to confine our attention mainly to the plan and observe its clever grouping and variety of line, with the early promise of future development. The other two examples belong to the very best period of Greek art, and as regards style no more perfect examples of the Doric and Ionic orders are to be found, and it is interesting to contrast the two. In each case the materials and workmanship are the same, that is to say, literally the most perfect that it is possible to obtain. The Propylæa owes its impressiveness and dignity, which even in its present ruined state is undeniable, to the most careful grouping of the various parts, and its comparative massiveness, combined with the most accurate and carefully considered proportions of the relative parts and very delicate optical refinements. It is absolutely devoid of carving or sculpture, and there is no trace of such ever having existed; carving indeed was sparingly used in the Doric order, but sculpture was often used in a lavish way, as at the Parthenon; it was almost invariably set in some frame, such as the pediment or metope, and skilfully designed so that the main lines of

the groning should give a contrast to the enclosing lines. In the Ionic order as typified by the Erechtheon we find sculpture comparatively unimportant, though a sculptured frieze is by no means unusual; the carving of long lines of surfaces is, however, adopted; this is no doubt more suited to the slenderer proportion and more delicate effect of the composition. Before closing I should like to try and show you something of the effect produced by these buildings as they stand. Though for architectural purposes, including those of instruction, photography may be, in many ways, inferior to a good set of drawings, I believe no other means is so capable of conveying the effect of a building and its workmanship, even to a trained architect, as a good photograph, thrown on to a large screen, with the aid of a lantern. (Nearly thirty views were then shown on the screen and explained by the lecturer.)

[We must defer our report of the discussion until next week.]

FREE LECTURES TO ARTISANS AT CARPENTERS' HALL:

MR. BANISTER FLETCHER ON "THE ARCHITECTURE OF THE WORLD IN ALL AGES."

The first of this year's series of free lectures to artisans and others on matters connected with building, under the auspices of the Worshipful Company of Carpenters, was delivered on Wednesday, the 5th inst., by Mr. Banister Fletcher, J.P., F.R.I.B.A., Master of the Company, as already briefly mentioned. Sir John Lubbock, F.R.S., presided, and there was a large attendance.

Mr. Banister Fletcher, in his introductory remarks, referred to the necessity for art-training, and quoted a remark made by Mr. T. G. Jackson, M.A., at the Art-Congress at Liverpool in 1888, "that architects should train public taste." Asking the question, "What is Architecture?" the lecturer answered it by giving the following short definition:—"Architecture is the art of constructing buildings upon scientific principles with proportion and beauty." After quoting the late Mr. E. M. Barry's definition of architecture,—"a useful art as well as a fine art"—the lecturer proceeded to trace the history of the human habitation from the earliest times, quoting from Viollet-le-Duc and Gwilt, and pointing to enlarged copies of illustrations from the works of those writers in elucidation of his remarks. He next treated of the rock-cut cave dwellings and temples of India and Asia Minor. Passing on, he briefly and rapidly referred to the varied and characteristic forms of Egyptian, Assyrian, Hindu, Chinese, and Mexican architecture, and then described the main features of Greek and Roman architecture. Next came a description of Sarcenic architecture, with its developments in Syria, Persia, India, Turkey, and Spain. The lecturer then briefly treated of Romanesque, Gothic, and Renaissance work, and concluded by alluding to modern revivals. This is but an outline of the lecture, which covered so very wide a field, and necessarily extended to such length, that we cannot print it *in extenso*, having regard to the many other claims on our space just now. We give, however, the lecturer's concluding remarks: "In dealing with this vast subject to-night, I have treated it more as a short and concise history, from a superficial point of view, rather than as an architectural history dealing with the details; for it is too vast and great a subject to be so dealt with in a single lecture. But I have endeavoured to place before you the very many different types of architecture, showing how they each arose, and the reason for the fresh forms. I would again remind you that each type was the outcome of some distinct impulse. We have had in this country during this century a great impulse. I refer to steam and electricity. Compare the result of their introduction on ship-building with the result of their operation on architecture. In shipping they have created a new style: in architecture they have done practically *nil*. We have, it is true, large viaducts and lofty buildings, large hotels and termini, but there is no peculiar style. We meet to-day with Gothic, Greek, Moorish, &c. Surely there must be some reason for these incongruities? I think you will agree with me, it is due not only to a want of artistic feeling on the part of a people, but also to the great competition of the age, in which all join in striving to turn in as great a result as possible out of the least outlay of intellect or money. Much has of late years been done by city companies and kindred

institutions to educate the people, and to endeavor to create an artistic feeling, but much remains for us to do. As an illustration of what has been accomplished in a minor department, I would mention stage scenery. Compare it with that of thirty years ago, and the great improvement will be at once seen. Managers, ever quick to suit the taste of the public, have realised the necessity. In conclusion, I hope that this evening has been a pleasant one,—that the time spent among the glorious works of the past has given us elevating thoughts, an earnest desire to cultivate our taste, a longing for and power to appreciate the beautiful and good, and determined us, as far as in us lies, to make our buildings more architectresque and our homes more artistic."

PROFESSOR ROGER SMITH ON DRAWING: GEOMETRICAL AND PERSPECTIVE.

The second lecture of the series was delivered on Wednesday, the 12th inst., by Prof. T. Roger Smith, F.R.I.B.A., who observed at the outset that drawing was becoming more and more one of the "matters relating to building." Every difficult piece of construction was worked out on paper. Our contracts were arranged, our estimates were made on the basis of plans and drawings, and these were consulted every hour during the progress of any important building; while the deposit of plans of sites, drains, and buildings, which modern laws and by-laws so often rendered necessary, had made it requisite to prepare copies, in duplicate or triplicate, of plans of almost every building, even the smallest. This was the case far more now than it was when the lecturer first began to become familiar with building matters, and very far more than it could possibly have been a century back; while, before the use of paper had superseded parchment, or even before the time when paper was obtainable in large sheets, drawings were a rare luxury. No one could do much building work who could not read a drawing with facility, while no one could hope to rise to any position of responsibility in connexion with buildings who could not make a tolerable drawing of anything that he had to deal with. Even those the nature of whose work made it unlikely that they would be called upon to make drawings, would do well to learn to draw, in order that they might be able to understand and make use of working drawings. The phrase which he had just made use of, viz., "reading drawings," was constantly employed, and was very significant. To one man a drawing conveyed information, just as a book in a language he understood would do; to another man a drawing was as much a puzzle as a book in a language which he had not learnt; and the man who could not understand the drawings for a building was unavoidably shut out from much important employment in connection with it, for which he might in other respects be quite fitted. Now, there was no way of learning to read surer than learning to write,—no way of learning to read drawings surer than learning to make them. That alone ought to give draughtsmanship great importance to the members of an audience like the present. The subject naturally split itself into two divisions, and he had attempted to mark them by the use of the two words, Geometrical and Perspective, in the title. Geometrical drawing represented things as they were, and not as they were. Perspective drawing represented things as they appeared to the eye, and not as they were. That sounded like a paradox, but it was the simple truth, and the paradox, if there was one, rested upon the singular circumstance that our sight, from which we derived almost all our notions of solid things, rarely, if ever, let us see them as they were, but almost always modified or distorted them in a manner which they would recognise the moment it is pointed out to them. On this head the lecturer continued:—"Go into a great building with an open roof,—say, for example, Westminster Hall,—and look up at the trusses another,—or, at any rate, you see a portion of each past those nearer to you, and each one as you look up at it appears below the one on this side of it, and smaller. The trusses appear to be diminished and lowered by distance, and in drawing such an interior in perspective, the draughtsman would put in each truss lower and smaller as it recedes from the eye. In real truth, however, as has just been said, the trusses are equal in size and all on a level, and

were the draughtsman showing the interior of Westminster Hall on a geometrical drawing, he would draw the trusses all of a size and all at the same level (in such a drawing as, for example, a longitudinal section). Take a geometrical elevation of St. Paul's Cathedral, and look at the relative positions of the great west portico and the dome. The geometrical elevation will show you what is the fact: that the dome is exactly behind the portico, so that a line which divides the portico into two halves, and cuts through the apex of the pediment, if produced, would divide the dome into two halves. Go to the building itself, and you will find that though when you are exactly opposite the two features are in the same relation to one another, the moment you move to the right the dome appears to move to the right also, and the apex, or point of the pediment, begins at once to move towards the left of the dome, so that a person taking a view of the cathedral from a point where the front and flank are both visible—for example, from the south-west angle of the churchyard—must represent it with this pediment towards the left and the dome towards the right. Perspective drawings, then, mean drawings of objects as the eyes see them, including, if you will, other things than buildings, though to buildings we shall chiefly confine our attention. Geometrical drawings mean drawings which represent the actual shapes and arrangement of things, but represent them as we never exactly see them, but only as we know them to be—just in the same way as a map represents a country, a town, or an estate—not as we see it from some neighbouring eminence, but mapped out to scale. The foundation of all geometrical drawing is the use of a scale and the power of measurement.

We regret that we have not space to give the whole of the lecture, but we quote the concluding portion of it:—

Perspective drawing may be made one of the most difficult and perplexing subjects, and it figures as such a subject in most books. I strongly advise those who wish to learn it to get personal instruction, and that over a drawing-board. You may probably find instruction in a class, where the teacher is practical, which will answer the purpose; but the best method is, after a very little study of the principles, to begin a drawing under the guidance of some one who is familiar with this sort of work. You will find it quite as difficult to learn perspective drawing by a book alone as to learn in the same manner to ride on horseback, or to play at cricket. It was stated early in the lecture that perspective has to do with other things besides buildings with straight walls and roofs. See a line of scenery, straight, well set up, and perfectly in line. They look like a wall, and if you drew them you would draw them as a wall. Let the word be given to fall out, and the wall dissolves, but the men of whom it is composed, though they have dissolved into irregular groups, are just as much influenced by the laws of perspective as before, and their apparent size is just as much diminished if they are at the remote part of the parade ground as it was when they were at the remote end of a formal line. In drawing or painting the human figure, and in other artistic work, what is called foreshortening, which is one of the sources of artistic effect, is very much practised. This is perspective. Represent a man with his arm stretched out across the picture like a signpost, and you have a hold figure not very difficult to draw; but let him swing his arm round and point right at the spectator, or nearly at him, and you tax the resources of the most skilful draughtsman to render correctly on paper the effect which this attitude produces on the spectator. Foreshortening, or in other words the perspective of the human figure, needs much practice to manage it well. Another use of the word perspective is to be found in the months of those who discuss paintings, especially landscapes. I refer to aerial perspective, for which phrase might be substituted "effects of atmosphere." Here is no longer any question of outline, but of those sobering effects, due to the distance of an object, which rob its outlines of sharpness, its colouring of contrast, and hide much of its detail, and harmonise and blend together things that would be distinct and separate were the object nearer to the spectator. This is not, properly speaking, an effect of distance, and it seems to have acquired a name which gives it some claim to mention

when perspective is being considered. In taking leave of the subject, I wish to come back from any reference to the painter, or even the perspective draughtsman, to the sort of drawing which is more immediately the concern of most of us. I strongly recommend any who do not draw to make an attempt to learn. It is like acquiring a new language. After you have been practising drawing for a time, every drawing that comes into your hands has a new meaning for you, just as when you have done exercises in a foreign language for a time you begin to find that books in that language cease to be impenetrable mysteries to you, and find a voice with which to address you. When you get further, and are able to make good, useful drawings of intended works, you begin to feel like the man who has mastered a foreign tongue sufficiently to be able to speak in it; and it is not alone the sense of a new power which is desirable, valuable though that may be, but that power makes you a more useful man, and a more valuable man on a building, in whatever capacity you may be engaged, and will give you more certainty of employment and better prospects of good pay. Only let me urge on those who learn to draw to fix it in their minds that they must draw *well*. Your work, whether simple or otherwise, should be clear, vigorous, distinct, free from blunders, executed with a clean line, true to scale, and, in short, good in quality.

The third of this series of lectures was delivered at the Carpenters' Hall on Wednesday evening last, by Professor W. H. Corfield, M.A., M.D., his subject being "Modern Sanitation." Mr. Joseph Preston presided, and there was again a very large attendance.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of this Council was held on Tuesday last, in the Council Chamber of the Corporation of London, Guildhall. Sir John Lubbock, the Vice-Chairman, presided, in the absence of Lord Rosebery.

The Architect's Department.—The first part of the Standing Committee's Report on this department was then considered. This part of the Report was as follows:—

"We have to report that we have just concluded an inquiry into the staff and the general arrangements of the Architect's department, an inquiry which was rendered necessary by various circumstances, but particularly by the taking away from that department the work of valuation, and the constitution of a separate office of Valuer. The arrangements to be made have been carefully considered by a Sub-Committee appointed by us for the purpose, and their suggestions have been thoroughly re-considered by us. Our first recommendation is:—

(1) That the two departments be named respectively the Architect's Department and the Estates and Valuation Department.

Estates and Valuation Department.
The principal duties of this department will be the following:—
Prepare plans and estimates of cost of improvement schemes, and support such schemes before Parliamentary Committees.

Assist in the preparation of Parliamentary plans, when required.

Survey and prepare plans in detail of land and buildings to be purchased.

Value for compensation, and conduct negotiations for purchase, and give evidence.

Advise on the value of local improvements on applications for loans or contributions.

Value for reserve rents and prices for surplus property.

Advise on the assessments for rating of property belonging to the Council, and (with the assistance of the Solicitor when necessary) conduct all objections and appeals against assessments.

Examine the valuation-lists of the several parishes as prepared under the Valuation (Metropolis) Act, and support objections with a view of promoting uniformity of practice amongst Assessment Committees as will secure a fair basis of contribution to Metropolitan rates between one parish and another.

Value Government property with reference to the contributions made in lieu of rates in respect of such property.

Keep a register of the Council's property.

Manage the property taken for improvements, but not collect the rents.

Superintend the execution by the general works contractors of repairs and general works incidental to such property.

Deal with the Council's lands and buildings, valuing, plotting, letting, sales by auction, or otherwise.

Report periodically to the Corporate Property Committee, the Improvements Committee, the Local Government and Taxation Committee, and to any other Committees as required.

We recommend, —

(2) That the foregoing be approved as a general outline of the duties of the new department, it being

understood that the full duties comprise such as are required by any of the Committees associated with the department and approval of the Council.

In connexion with the interest of the Council in the proper working of the Valuation (Metropolis) Act, we have ascertained that a large percentage of the forms of return sent out by the local authorities are not returned, and, although in some parishes such non-return is taken as ground for increasing an assessment, this course is not generally approved. We believe that one excuse for many returns not being made would be removed, and the business generally expedited, if the return forms were allowed to pass through the post free, and, as the valuations made are made solely at the expense of the local rates, although used for imperial as well as local taxation purposes, we recommend, —

(3) That her Majesty's Government be requested to allow the return to be sent to the local authorities through the post free.

The Staff of the Estates and Valuation Department would be as follows:—

Principal Officer: The Valuer.—Mr. A. Young, Salary, 1,000*l.* a year.

Chief Professional Assistant: The Assistant Valuer. Duties.—To assist the Valuer in professional work as required, and in his absence to undertake his duties and responsibilities. Mr. E. J. Harper, service eleven years. Present salary, 428*0* a year.

We recommend —

(4) That Mr. Harper be appointed Assistant Valuer, at 350*l.* a year.

Chief Clerk: Duties.—To control clerical work of the department; examine accounts, prepare reports, indices, &c., conduct correspondence, and be generally responsible for the indoor work of the department. Mr. W. Garnsey, who has been seventeen years in the service, and is now in receipt of 430*0* a year, the maximum of his class.

We recommend —

(5) That Mr. Garnsey be appointed chief clerk at a salary of 350*0* a year.

First Class Officer: Mr. F. W. Cook.—Salary, 187*10s.* Service, eleven years.

We recommend —

(6) That Mr. Cook be placed in the first class, at the commencing salary of the class, 200*0* per annum.

Six Second-Class Officers.—Mr. A. Maddox, inspector of tenement property. Attends to changes of tenancy, valuation of fixtures, notices to quit, &c. He has been in the service eleven years, and is a very useful and experienced man. Present salary 43 per week.

We recommend —

(7) That Mr. Maddox be placed at the top of the second-class at 200*0* a year.

Messrs. F. J. Ruddle, H. Ainsworth, W. A. Webb, and F. Littlewood, are surveyors who have entered the service during the past two years. They have proved themselves good officers, and have been paid 3*l.* 3*s.* per week.

We recommend —

(8) That Messrs. Ruddle, Ainsworth, W. A. Webb, and Littlewood, be placed in the second-class at the commencing salary of 102*10s.* each.

There is a vacancy for an additional land surveyor, whose employment was authorised by the Council on August 2 last, but who has not yet been appointed owing to want of accommodation.

These recommendations were all agreed to, although amendments were moved to the effect that the Valuation work proper (the valuation of property which the Council might seek to acquire) should be kept distinct from the management of the Council's estates, another officer appointed for the last-named work. It was also urged that the salary proposed to be given to the Valuer was inadequate.

Green-street, Leicester-square.—On the recommendation of the Improvements Committee, it was resolved, after a long discussion,

"That the consent of the Council be given to the acquisition by the Vestry of St. Martin-in-the-Fields of the land now vacant in Green-street, including the site of the corner house, called No. 31, Leicester-square the demolition of which is only awaiting the resolution of the Council, for the purpose of adding to the public way so much thereof as may be arranged by the Council, and that the Council do, upon the usual conditions and subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, contribute three-fourths of the cost, after deducting the recompense; and that the Solicitor be instructed to prepare an agreement with the Vestry for carrying the arrangement into effect."

After transacting other business, the Council adjourned.

ARCHITECTURAL SOCIETIES.

The Architectural Association.—The ordinary fortnightly meeting of this Association was held on Friday, the 14th inst., Mr. Leonard Stokes, President, in the chair. The minutes of the previous meeting having been read and confirmed, Mr. E. S. Gale (Hon. Secretary) announced that the second sessional visit would take place this Saturday, February 22, to the Imperial Institute, South Kensington, when Mr. Colicutt had kindly volunteered to meet the party. Mr. Gale also proposed a vote of thanks to the various gentlemen who facilitated their visit to Mr. D'Oyly Carte's new theatre, in Cambridge-circus, on the 8th inst., specially mentioning Mr. D'Oyly Carte, Mr. T. E. Colicutt, and Mr. Holloway and his assistants. Mr. F. R. Farrow (Hon. Secretary) announced that he had received an appeal from the secretary of the committee for the restoration of the tower of the Church of St. Mary Magdalene, Chewton Mendip, Somerset, which it is proposed to restore under the supervision of Mr. J. D. Sedding as architect, Mr. R. Eley Smith then read a paper on "Some Typical Greek Buildings," the greater part of which we print in other columns.

Liverpool Architectural Society.—On Monday evening a special meeting of this Society was held in the Royal Institution, Colquitt-street, Mr. T. M. Reade presiding. The principal item of the proceedings was a paper by Mr. H. L. Beckwith, F.S.I., on "Quantity Surveying." Speaking of the importance of quantity surveying as compared with the position it had held some years ago, he said it had now come to be a recognised profession by itself, especially in London. In these days of competition, speed was of very great importance, and it was most important that the quantities should be so described that the contractor, in running through the items, should have no difficulty in at once assigning the proper value to them.

Manchester Architectural Association.—At the ordinary meeting, held at the Diocesan Building on Tuesday last, Mr. J. H. Woodhouse, President, in the chair, Mr. F. R. Farrow, A.R.L.B.A., read a paper on "The Ventilation of Public Buildings," which he treated in a most exhaustive manner. A vote of thanks, proposed by Mr. Mould, seconded by Mr. Booth, and supported by Messrs. Hodgson, Stelfox, Hinde, and Willoughby, terminated the meeting.

CAST-IRON COLUMNS.

SIR.—Will one of your readers kindly tell me how "in practice" the dimensions of a hollow cast-iron pillar are calculated, "without the use of tables," the height and load being given.

The formula $W = 42 \frac{a^{3.5} - d^{3.5}}{l^{1.6}}$ seems only adapted to checking estimated dimensions, and then a table of logarithms is necessary.

GREENWELL.

* * * "Greenwell" is referred to the four articles upon "Pillars" which formed our Student's Column ("Iron") in June, 1888. The formula he quotes is described in article xxv., page 454. In Stoney's standard book, as well as in other works upon the Theory of Stresses in Girders, &c., the powers of diameters ($d^{3.5}$) from 1 to 12, increasing by fractional parts, and also the powers of length ($l^{1.69}$) from 1 to 24 units of length, will be found.

Rankine's formula for the strength of struts and pillars is thus expressed $P = \frac{1}{1 + kl^2}$ in which reference to the above Tables of Powers is not involved. In this formula, which is constructed similar to the well-known Gordon formula: $P = \text{crushing strain in tons per square inch of section, } F = \text{the ultimate crushing strain of a short length of material in tons per square inch} = 35 \text{ for cast-iron, } k = \text{coefficient and for cast-iron} = 0.025 \text{ or } \frac{1}{40}, \text{ for circular section, and } l = \text{length of column divided by the radius of gyration, so that for a solid circular cast-iron section}$

$$P = \frac{F}{1 + \left(\frac{1}{400}\right) \left(\frac{l}{r}\right)^2}$$

and since r , the radius of gyration, = the moment of inertia divided by the mass, if a = the total area, we have

$$\frac{P}{F} = \frac{1}{1 + \left(\frac{1}{400}\right) \frac{a l^2}{I}}$$

This form is useful to apply when the moment of inertia of the section is calculated. In the case of a solid circular section the moment

of inertia = $7854 R^4$, and the area = $7854 D^2$, hence the radius of gyration

$$= \sqrt{\frac{R^4}{4 R^2} = \frac{R}{2} \text{ or } \frac{D}{4}}$$

The formula is an empirical one, but by its means we may thus estimate the proportion of sectional area that a long column must have in proportion to a very short column which has been experimented upon, and which would fail by crushing, independent of flexure. Practical knowledge and experience can alone suggest the most exact diameter to employ, but since there is a liability for the core not to be concentric in casting, there is no harm in erring upon the safe side in large columns. The hollow column of average thickness is preferable to a smaller one of greater thickness, and the latter is also preferable to a solid column, because by enlarging the diameter, increased stiffness is attained with the same quantity of metal. In the case of a hollow column the strength nearly equals the difference between that of two solid columns the diameters of which are equal respectively to the external and internal diameters of the hollow one.

Suppose, for example, we imagine we have to deal with a column 12 in. solid diameter and 80 in. long. If five tons may be allowed as the safe strain in a very short column, how much may be allowed for this column with both ends firmly fixed and bedded with extreme care?

$$r = \frac{12}{4} = 3 \text{ inches.}$$

$$P = \frac{5}{1 + \left(\frac{1}{400}\right)\left(\frac{80}{3}\right)^2} = \frac{5}{1 + \frac{6400}{3600}} = 1.8 \text{ tons}$$

per square inch, and since $\frac{5}{1.8} = 2.78$, it shows that the area required would be at least twice that of a short column where five tons permissible strain could be introduced.

IMPACT LOAD.

SIR,—A rectangular slab of concrete is firmly supported at two opposite sides in the direction of its length, and held firmly as between two girders, while the adjacent opposite edges in the direction of its width are free and unsupported. A weight of $\frac{1}{2}$ cwt., or 5 lb., is allowed to fall upon the centre of the slab, from a height of 9 ft., and it is required to know what dead load, applied passively, would be equivalent to the impulsive load described above.

Can any of your readers give the writer any suggestion on the subject? IMPACT.

AIR CURRENTS IN SEWERS.

SIR,—Referring to the article which appeared in your paper some weeks ago on Mr. W. Santo Crimp's experiments on the movement of air in sewers, I have recently taken observations in the deep headings and completed sewers in the outfall works at Margate, with the result that I find the direction of the air currents is controlled entirely by the wind on the surface. J. WILKINSON.

Phoenix Wharf, Battersea, S.W.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—VIII.

MAGNETIC TERMS.

IRON and steel play such important parts in the construction of dynamo-electric machinery and other plant used in connexion with electricity supply, that it is necessary, before proceeding further, to define certain terms used in describing the magnetic state and properties of magnetic substances. Until quite recently, magnetism has been very superficially treated in ordinary text-books; anything like an exact study of the subject has been by purely mathematical methods, that is to say, by methods which put certain abstract facts into symbols in such a way that the investigator entirely loses sight of their physical aspect. For mathematical purposes, magnetism is frequently considered to be a fluid capable of acting at a distance, an assumption known to be contrary to the truth, while the all-important lines of force are ignored. Now, however, that magnetism has, owing to the dynamo-machine, become an important factor in modern engineering, entirely new methods of dealing with problems connected with it are being developed. The subject being, then, in a somewhat transitional state, in the explanations of the various expressions which follow the customary definitions are first given, but an endeavour is made to translate explanations involving the idea of a fluid into language involving the idea of lines of force, the probable nature of which has already been discussed.

The definition of unit magnetic pole was given in a previous article. By this definition, it is a pole which produces a field of unit strength at a distance of one centimetre from it; but the locus of points distant one centimetre from a pole is a spherical surface, whose area is 4π square centimetres, hence from a point of unit strength spring 4π lines of force, since there is one line per square centimetre of surface. The poles of a magnet, or solenoid carrying a current, are but centres of force at which the whole of the magnetism may be supposed concentrated, magnetism being then regarded as the agent which produces lines of force; in just the same way the whole of the quantity of matter in a body is frequently supposed concentrated at its centre of gravity. It is, therefore, sometimes convenient to speak of "a quantity of magnetism," and "Unit quantity of Magnetism," as that quantity which produces 4π lines of force. If it is desired to measure the quantity of light coming from a gas flame, the total quantity, or number of rays of light sent out in all directions is measured; a lens may make the amount of light emitted in one direction vastly greater than that sent in another, but it does not change the total quantity of light given by the flame. Similarly the lines of force springing from a magnet may be concentrated in one direction, so as to form a very intense field, or may be distorted in any way; but a given quantity of magnetism can only produce a given number of groups of 4π lines of force.

The Moment of a Magnet (M) is the strength of one of its poles (m) multiplied by the distance (l) between them. That is $M = ml$. The expression "magnetic density" is sometimes applied to the surface of a magnet. The Magnetic Density (D) at any point on the surface of a magnetised mass is the quantity of magnetism per square centimetre at that point,—that is, D is the number of groups of 4π lines that emerge per square centimetre at that point.

The degree to which a body or portion of a body becomes magnetised is called its "intensity of magnetisation."

The Intensity of Magnetisation (I) at any point within a magnetised body is the magnetic moment per unit volume at that point. Let v be the volume of a little cube of cross section s cut from around the point so that an edge is parallel to lines of force, then if M be its moment, $I = \frac{M}{v} = \frac{ml}{s^3} = \frac{m}{s^2}$. Now from the quantity of magnetism m there come $4\pi m$ lines of force, therefore I is the number of groups of 4π lines passing through the point per square centimetre. In the case of a uniformly magnetised bar, I is the number of groups of 4π lines emerging from the magnet divided by the area of the end or cross section.

The various definitions given so far do not involve in any way considerations of the magnetising agent; indeed, in the case of a permanent magnet no such agent exists, for having once become magnetised coercive force keeps the molecules in position. Steel and iron are magnetised by various methods, but they all consist of sending lines of force through the metal by some means or other so as to turn the molecules along them in the desired direction. In the case of steel, and even to a certain extent in the case of soft iron, a blow or continued vibration appears to temporarily loosen the molecules and enables them to turn more readily; just as when examining the shape of a magnetic field by means of filings a tap on the card or surface on which they are placed makes them lie in greater numbers along the lines of force. A piece of soft iron is usually magnetised by placing it within a helix, the whole forming an electro-magnet as soon as the current passes; steel may be magnetised in the same way, or by putting it in front of an electro-magnet. In the two definitions which follow the inducing field may be regarded as that produced by a helix, its strength H being the strength of field within the helix when filled with air only.

When different substances are placed in a magnetic field of a certain strength the intensity of magnetisation induced differs considerably, and depends on the "susceptibility" or "coefficient of magnetisation" of the substance in each case.

Susceptibility (k) } Is the intensity of magnetisation per strength of inducing field.
Coefficient of Magnetisation.

That is $k = \frac{I}{H}$. When the coil was empty H lines per square centimetre passed through

it; the iron having been inserted it became magnetised to the intensity I , and, therefore, added $4\pi I$ lines of force per square centimetre. Hence kH is the quantity of magnetism produced in the metal by the field of strength H , per square centimetre of cross section. Closely allied with the susceptibility is the "permeability," or "co-efficient, of magnetic induction." Permeability (μ) is the ratio (Co-efficient of magnetic induction) between the number of lines of force per square centimetre passing through the metal and the strength of the inducing field. The number of lines of force added per square centimetre has just been shown to be $4\pi I$, so that the total number is $H + 4\pi I$, hence

$$\mu = \frac{H + 4\pi I}{H} = 1 + 4\pi k, \text{ and } k = \frac{\mu - 1}{4\pi}$$

The difference between susceptibility and permeability is roughly this: Susceptibility involves the idea of the metal adding magnetism to the system; permeability that of the metal multiplying the lines in the original field. Either can be calculated from the other by means of the above formulae.

The reader may be reminded that we have adopted the theory that electricity is an incompressible continuous fluid permeating alike all matter and all space, filling it completely. Fluid is not exactly the right word to use, but as there is no right word, "fluid" is used as being the best to be had. Magnetism has been described as portions of this fluid rotating around axes, which form closed curves, threading their way through space and all sorts of materials. Magnetism is measured by the number of these axes or lines of force produced, and the quantity numerically stated by the total number of groups of 4π lines formed. The method of measuring magnetism must not be confounded with that adopted for measuring the strength of a magnetic field, when the number of lines passing through a given area is taken and not the total number of lines in the field. Broadly speaking, then, by a quantity of magnetism we mean a quantity or a number of lines of force.

It is a remarkable fact that when one or two whirls or lines of force is sent into a piece of iron or other magnetic substance it produces a number of other whirls within the mass, which, in turn, are sent out of the substance. This power of multiplying or adding to lines of force, already respectively referred to as permeability and susceptibility, will be discussed more fully in future articles.

The value of μ for air or space is arbitrarily taken as 1. Substances for which the value of μ is greater than 1 are called paramagnetic, or simply magnetic; those for which μ is less than 1 are called diamagnetic.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

116, Cement and Plaster. R. Stone.

The chief point in the process of manufacture which is the subject of this patent consists in treating with petroleum, oil, vitriol, or spirit, the chalky substances of which the cement is composed. By this means the sulphur, an injurious compound in cement, is removed. Several modifications and different parts of mechanism for rolling and grinding the chalky material are incorporated in the same specification.

2,750 and 2,751, Artificial Stone. A. C. Pontou and others.

According to this invention an artificial stone is made by taking fine or coarse aggregates of a silicious nature,—sand, gravels, pebbles, &c.,—and mixing them with a silicious cement composed of silicate of soda or of potash, &c. After the materials are mixed together they are moulded in blocks and subjected to heat, and afterwards staked for use. The second specification relates to the mixing of the substances and the subsequent crystallisation by heat, and claims that artificial stone so prepared may be returned to the moulds without showing any shrinkage or distortion.

6,261, Chimney-pot. F. Meiton.

The chimney-cowl which is the subject of this patent is of octagon shape, and fitted with hanging flaps, which are blown by the wind in such a way as to prevent down-draught, those on the opposite side being open to allow for the escape of smoke.

10,759, Fire-places and Mantel-pieces, &c. E. C. Massey.

This invention is designed to provide open fire-places or grates with fittings of effective appearance and increased radiating power, and the improvements consist in forming upon steel or other metal designs, figures, and ornamentation of porcelain or pottery in flat, relief, or intaglio.

16,774. Carpenters' Pongh and Fillister. H. Madder.

This invention consists in the use of screws passing through the top of the plane into nuts to prevent the sliding bars from slipping when the tool is at work, and the rounding of the forefeet or guide of the plough to prevent jerk whilst ploughing over mortices.

NEW APPLICATIONS FOR PATENTS.

Feb. 3.—1,776, C. Phillips, Metal Dowels.—1,782, R. Ashworth and W. Evans, Self-acting Door-closer.—1,789, T. Thomas, Automatic Flushing Syphon.—1,795, W. Roff, Water-closet.—1,820, H. Gurney, Kilo for Burning Bricks and Tiles.

Feb. 4.—1,829, F. Schmidt, Fittings and Double Windows or Casements.—1,851, J. Stott, Joiner's Tool.—1,900, J. and A. Drexler, Roof Coverings.

Feb. 5.—1,908, R. Wilford, Screw-fastenings for Windows.—1,923, G. Dimmer, Chimney Cowl.—1,934, C. Pihel, Silicious Paving and Building Stone.

Feb. 6.—2,008, R. Eversed and U. Coleman, Flushing Drains, Water-closets, &c.

Feb. 7.—2,020, J. Hatch, Roof Glazing.—2,021, S. and W. Dearden, Stone-sawing Machinery.—2,032, R. Carson, Adjusting and Holding Window-sashes in any desired vertical position.

Feb. 8.—2,077, E. Barlow, Water, Gas, Drain, and other Pipes, and Joints for same.—2,085, A. Hay, Fireproof Doors.

PROVISIONAL SPECIFICATIONS ACCEPTED.

14,177, J. Perry, Sliding and Reversible Casement Window.—20,528, E. Young, Preventing the Rattling and Shaking of Window-sashes.—20,681, A. Myall, Finishing Wood Mouldings.—20,692, J. Couiter, Machine for Dressing Stone, &c.—205, H. Johnson, Window Fasteners.—274, A. Natterer, Electric Bells.—423, W. Silverlock, Ventilating Sewers, &c.—428, A. Wright, Weathered Facing Brick.—711, W. Greenes, Ventilator.—734, W. and J. Rawlings, Syphon Flushing Apparatus for Water Closets.—777, F. Streeter, Water Waste Preventers.—802, J. Harding, Bakers' Ovens.—821, J. and J. Bruce and F. Baker, Shop-window Fittings.—832, G. Hope, Sand Separators.—1,185, C. Hunter, Extracting Cowl.—1,272, T. and H. Moorwood, Canopied Grates and Fire-places.—1,295, C. Shaw, Flushing Apparatus.—1,418, A. and E. Pullman, Fire-grates.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months. 4,432, W. Ingle, Hanging Sliding Window sashes.—5,595, R. Roberts, Prevention of Down Draught in Chimney-pots.—5,644, T. Shouler, Fastenings for Cupboard-doors.—5,846, J. Watkinson and T. Dodd, Gas Brackets, &c.—5,900, H. Legg, Sash-locks.—13,118, A. Clark, Moulding-planes.—18,493, H. Lake, Bricks.—87, D. Hart, Screw-drivers.—257, L. Halliday, Saw-sanges.—258, L. Halliday, Saw-sharpening Machines.—276, A. Boulé, Sash-balances.

RECENT SALES OF PROPERTY:

Table with columns for property address, description, and price. Includes entries like 'ESTATE EXCHANGE REPORT', 'By REYNOLDS & EASON', 'By DEBENTHAM, THWSON, & CO.', 'By W. HOLCOMBE', 'By D. YOUNG', 'By ARBER, RUTHER, & WAGBORN', 'By DEBENTHAM & DALLAS', 'By W. T. MARSH', 'By NEWBON & HARDING', 'By HARDS & BRADLEY'.

MEETINGS.

SATURDAY, FEBRUARY 22.

Architectural Association.—Visit to the Imperial Institute, South Kensington.

Royal Institution.—The Right Hon. Lord Rayleigh, M.A., F.R.S., on "Electricity and Magnetism." II. 3 p.m.

President Institution of Builders' Foremen and Clerks of Works.—Annual Dinner, Holborn Restaurant, 6.30 p.m.

Edinburgh Architectural Association.—Visit to Parliament Hall and St. Margaret's Chapel.

MONDAY, FEBRUARY 24.

Royal Academy.—Mr. A. S. Murray on "Sculpture in Greek Temples." III. 8 p.m.

Surveyors' Institution.—(1) Mr. S. Wood, Q.C., on "The Establishment of a Tribunal for the Trial of Compensation Cases." (2) Resumed discussion on Mr. C. M. Freeman's paper on "Some Suggested Amendments in the Law and Practice of Compensation." 8 p.m.

TUESDAY, FEBRUARY 25.

Institution of Civil Engineers.—Further discussion on the following papers:—(1) "The Shanghai Water-Works," by Mr. J. W. Hart. (2) "The Tyam Water-Works, Hong Kong," by Mr. J. Orange. (3) "The Construction of the Yokohama Water-Works," by Mr. J. H. T. Turner. 8 p.m.

Sanitary Institute (Lectures for Sanitary Inspectors).—Professor H. Robinson, on "Drainage and Construction." 8 p.m.

WEDNESDAY, FEBRUARY 26.

Free Lectures to Artificers and others on Matters Connected with Building.—Professor Armstrong on "The Domestic Fireplace," Carpenters' Hall, London-wall. 8 p.m.

Institution of Civil Engineers.—Students' Visit to the Nine Elms Works of the London and South-Western Railway. 2 p.m.

THURSDAY, FEBRUARY 27.

Institution of Electrical Engineers.—Discussion on the following papers:—(1) "The Theory of Armature Reaction in Dynamos and Motors," by Mr. J. Swinburne. (2) "Some Points in Dynamo and Motor Design," by Mr. W. B. Eason. 8 p.m.

St. Paul's Ecological Society.—Major Heales, F.S.A., on "The Ecological of Denmark." 7.30 p.m.

Society of Arts (London Section).—Mr. W. Sherriff on "The Northern Shan States and the Burma-China Railway." 6 p.m.

FRIDAY, FEBRUARY 28.

Architectural Association.—Mr. W. A. Fife on "Architecture in Oxfordshire." 7.30 p.m.

Royal Academy.—Professor J. H. Middleton on "Florentine Sculpture in the Fourteenth and Fifteenth Centuries." I. 8 p.m.

Sanitary Institute (Lectures for Sanitary Inspectors).—Sir Douglas Galton, F.R.S., on "Ventilation, Measurement of Cubic Space," &c. 8 p.m.

SATURDAY, MARCH 1.

Association of Public Sanitary Inspectors.—Mr. D. Richards on the "Disposal of House Refuse." 6 p.m.

Royal Institution.—The Right Hon. Lord Rayleigh, M.A., F.R.S., on "Electricity and Magnetism." III. 2 p.m.

Miscellaneous.

The Sanitary Assurance Association.—The ninth annual meeting of the members of the Sanitary Assurance Association was held on Monday, the 17th inst., at the offices, No. 5, Argyle-place, W. Sir Joseph Fayrer, K.C.S.I., F.R.S., in the chair. Mr. Joseph Hadley, Secretary, read the annual report, which referred to the work of the Council in promoting the Sanitary Registration of Buildings Bill. To the lectures given by members of the Council on sanitary subjects, and special reference was made to the disclosure of serious sanitary defects in Board Schools and clergy-houses which had been inspected by the Association during the past year. The report concluded as follows:—"Though the important bearing of the work of the Association on the public health is not yet fully appreciated by the general public, the financial statement for the past year proves that the Association is making progress, and that after nine years' experience its work continues to be appreciated. The income for the year was 3987. 8s. 10d., and after meeting all liabilities a balance is carried forward." The Chairman proposed the adoption of the report, and said that the more he saw of the work of the Association and the need for sanitary improvement the more was he interested in its progress, and he expressed a hope that not only might this Association prosper but that others might be formed, so great was the work to be done. Alderman Sir Vincent Kennet-Barrington seconded the adoption of the report, which was supported by Surgeon-General Cornish, Mr. Mark H. Judge, and Mr. Henry Rutherford, and passed unanimously. General Burne, C.B., and Dr. Danford Thomas were re-elected members of the Executive Council, and Sir Joseph Fayrer and Professor T. Rogers Smith, F.R.I.B.A., were re-elected President and Vice-President respectively.

Schools, Leicester.—In a limited competition, confined to local architects, we hear that the Newfoundland School Board have adopted the design of Mr. W. M. Cowdell, of Leicester, for a new school to accommodate 600 children.

Mid-Kent Waterworks.—There are new works being constructed by a company for the purpose of supplying Scotland and West Malling and several villages on the left or west bank of the Medway, between Maidstone and Rochester. The well, which was commenced in July last at Lower Halling, near Rochester, was dug to chalk-water level (12.00 ordnance datum), 50 ft. from the surface, then bored for 315 ft., making a total of 365 ft., at which depth, on Monday last, the 17th inst., water was tapped in the lower greensand. The geological formations passed through were, for the first 140 ft. chalk, then a thin layer of rock, through 220 ft. of gault, and 20 in. of very hard rock into the greensand, which is of a coarse nature. The yield is abundant, as immediately on being tapped it rose to within 37 ft. of the surface, or 13 ft. above chalk-water level, and is estimated to stand at a constant level, pumping over 20,000 gallons per hour.

The bore-hole is lined with 15 in. wrought-iron tubes screwed together in wrought-iron sockets with a steel shoe, and then perforated tube with 5,200 holes 1/4 in. diameter in order to keep the sand from rising. The reservoir, to hold about 200,000 gallons, is built, and only has roof to be put on, and some eight miles of mains are laid. There are several large works, besides a population of about 8,000, to be supplied, and at the request of the West Malling Rural Sanitary Authority, the Company is applying to Parliament this Session for an extension of area, especially on the right or east bank of the River Medway. Mr. Richard Batchelor, of Chatham, who has successfully made six out of the ten borings into the greensand in the county of Kent, was the contractor. Messrs. William Russ, M.Inst. C.E., and Arthur F. Bowker, C.E., F.R.G.S., are the engineers.

The English Iron Trade.—The better feeling in the English iron market which began last week has continued also during the present week, and the outlook would be hopeful if there were not the possibility that the threatened miners' strike may disorganise trade. Although the business done in pig-iron is still chiefly confined to holders of warrants, the fact that better prices have been obtained for them shows which way the tide is turning. The Glasgow warrant-market has been firmer, and there is also more demand for Scotch makers' iron. In the North of England, makers still hold to their former rates, while warrants have gone up 2s. a ton. In Lancashire producers sell very little crude iron, because their quoted prices are still nominally unchanged. In the midland district makers are little inclined to give way. In the north-west, hematite is firmly maintained by makers at its top price, because they are in no need of new orders. Manufactured iron is still quiet, but firmer in price. Steel also is very steady, because of a fair demand. Shipbuilders are booking very little fresh work, but they are fully engaged, and engineers also keep busy, notwithstanding a slight falling-off in the quantity of new work ordering.—Iron.

The Civil and Mechanical Engineers' Society.—At a meeting of this society, held on the 19th inst. (Mr. Henry Adams in the chair), a paper was read by Mr. C. Fairlie Bruce, on "Italian Water Supply." The author briefly described the works at Turin, Milan, Verona, Florence, Leghorn, and Naples, dwelling at greater length on any points of interest involved in them—of these the subterranean service-reservoirs at Capodimonte seemed most striking—they are excavated at a depth of 164 ft. below the surface in the Tugea rock.

Proposed French Exhibition at Earl's Court this Year.—We are informed that at a meeting of the Réunion Commerciale and Industrielle, held at the Palais-Royal, Paris, on the 14th inst., M. Gustave Sandox in the chair, it was unanimously decided to render every assistance in the organisation of the forthcoming French Exhibition, which opens at Earl's Court on May 3. It is stated that some of the most interesting of the attractions of last year's Universal Exhibition in Paris will be shown at Earl's Court.

Architectural Partnership.—Mr. J. F. Wadmore writes from 35, Great St. Helens to say that in consequence of the retirement of his partner, Mr. A. J. Baker (on account of ill health), he has arranged to take his son, Mr. Beauchamp Wadmore, A.R.I.B.A., into partnership, in conjunction with Mr. W. R. Mallett, who has been with the firm for over twenty years. The title of the new firm will be "Wadmore, Wadmore, & Mallett."

Supposed Coalfield in Kent.—For the past two or three years Sir Edward Watkin, the Chairman of the South-Eastern Railway and Channel Tunnel Companies, has been directing his attention to a search for coal at a point on the South-Eastern Railway adjoining the experimental heading for the tunnel. The discovery of a bed of coal is now announced (in the *Times* of February 20) by Mr. Francis Brady, C.E., the engineer-in-chief of the South-Eastern and Channel Tunnel Companies, under whose directions the operations have been conducted. His report says:—

"Coal was reached on Saturday last, the 15th inst., at 1,180 ft. below the surface. It came up mixed with clay and reduced almost to powder by the boring tools. A small quantity of clean bright coal found in the clay was tested by burning and proved to be of good bituminous character. The seam was struck after passing through 20 ft. of clays, grits, and blackish shales belonging to the coal measures, which at this point lie close under the lias, there being only a few intervening beds of sand, limestone, and black clay separating them. The correspondence of the deposits with those found in the Somersetshire coalfield is thus pretty close, the difference consisting in the absence of the red marl at the Shakespeare boring. The lines of bedding in the shale are distinctly horizontal. This is an indication that the coal measures will probably be found at a reasonable depth along the South-Eastern Railway to the westward. I beg to hand you herewith two specimens of the clay containing coal, one taken at 1,180 ft. and the other at 1,182 ft. I also enclose a specimen of clean coal taken to-day at 1,183 ft. 6in. from the surface."

Swimming-Baths, Southampton.—The Corporation of Southampton has decided to erect covered swimming-baths, Turkish baths, and private baths for both sexes, and at their last meeting unanimously adopted the design and scheme as prepared by Mr. W. B. G. Bennett, C.E., the Borough Surveyor, the estimated cost being 7,000*l.* Tenders are to be asked for at once.

PRICES CURRENT OF MATERIALS.

	£	s.	d.	£	s.	d.
TIMBER.						
Greenheart, B.O.	7	0	0	7	15	0
Teak, E.I.	12	0	0	14	0	0
Sequoia, U.S.	0	2	3	0	3	0
Ash, Canada,	0	0	4	5	0	0
Birch "	3	0	0	4	5	0
Elm "	3	10	0	4	10	0
Fir, Bantais, &c.	2	0	0	3	15	0
Oak "	0	10	0	4	10	0
Canada "	5	10	0	7	0	0
Pine, Canada red "	2	10	0	3	0	0
" yellow "	3	0	0	5	5	0
Lath, Bantais,	4	10	0	5	0	0
St. Petersburg "	5	0	0	6	10	0
Walscot, Riga, &c.	0	0	0	0	0	0
Deals, Finland, 2nd and 3rd "	8	10	0	11	0	0
" 4th and 3rd "	7	0	0	8	0	0
Deals—Riga "	7	0	0	9	0	0
St. Petersburg, 1st yellow "	11	0	0	14	0	0
" 2nd "	9	0	0	10	10	0
" white "	6	10	0	10	0	0
" Swedish "	7	10	0	17	0	0
White Sea "	9	0	0	17	0	0
Canada, Pine, 1st "	16	0	0	26	0	0
" 2nd "	11	0	0	17	10	0
" Spruce, 1st "	8	0	0	10	0	0
" Spruce, 2nd "	9	0	0	11	0	0
" 3rd and 2nd "	7	0	0	9	0	0
New Brunswick, &c.	6	0	0	8	10	0
Battens, all kinds "	6	0	0	17	0	0
Flooring Boards, sq., 1 in. prepared, First "	0	11	0	0	14	0
Second "	0	8	0	0	10	0
Other qualities "	0	7	0	7	9	0
Cedar, Cuba "	0	4	0	5	0	0
Honduras, &c.	0	0	4	0	0	44
Mahogany, Cuba "	0	5	0	0	64	0
St. Domingo, cargo average "	0	5	0	0	64	0
Mexican, cargo average "	0	44	0	0	54	0
Tobacco "	0	54	0	0	64	0
Honduras "	0	54	0	0	64	0
Box, Turkey "	4	0	0	13	0	0
Rose, Rio "	15	0	0	20	0	0
Bahia "	14	0	0	18	0	0
Satin, St. Domingo, 1st yellow "	21	0	9	24	1	3
Porto Rico "	0	10	0	1	6	0
Watout, Italian "	0	0	44	0	0	64
IRON.—METALS.						
Bar, Welsh, in London "	0	0	0	0	0	0
" at works in Wales "	0	0	0	0	0	0
" Staffordshire, in London "	8	10	0	9	0	0
COPPER—British, cake and ingot.	53	10	0	55	0	0
Best selected "	55	0	0	56	0	0
Sheets, strong "	63	0	0	0	0	0
Chili, bars "	48	0	0	0	0	0
YELLOW METAL.	48	0	0	51	0	0
LEAD—Pig, Spanish.	12	6	0	0	0	0
English, com. brands "	0	0	0	0	0	0
Sheet, English "	24	10	0	0	0	0
Pipe "	15	15	0	0	0	0
TIN—Strait "	91	5	0	0	0	0
Australian "	91	5	0	0	0	0
English Ingot "	96	0	0	0	0	0
ZINC—OILS.						
Linsed "	22	0	0	22	5	0
Cocunut, Cochia "	22	0	0	0	0	0
Ceylon "	23	10	0	0	0	0
Palm, Lagos "	23	10	0	0	0	0
Rapeseed, English pale "	33	0	0	35	10	0
" brown "	33	10	0	34	10	0
Cottonseed, refined "	22	5	0	0	0	0
Tallow and Oleine "	21	0	0	40	0	0
Lubricating, U.S. "	5	10	0	6	10	0
" refined "	7	9	0	12	0	0
TAR—Stockholm.	1	6	0	0	0	0
Archangel "	0	17	6	0	0	0

COMPETITION, CONTRACTS & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITION.				
Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Pages.
Plan for School, Wood Green	Tottenham School Bd.	Not stated	Not stated.	ii.
CONTRACTS.				
Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Pages.
Works and Materials	Hendon Local Board	S. S. Grimley	Feb. 24th	ii.
Works and Materials	Mortlake Highway Bd.	H. Richards	do.	ii.
Works and Materials	Willesden Local Board	O. Claude Robson	Feb. 25th	ii.
Transit Warehouse, &c.	Stockton-on-Tees Corp.	K. F. Campbell	do.	ii.
Roadmaking and Paving Works	Hammer-smith Vestry	Official	Feb. 26th	ii.
Alterations and Additions to Engine-room	Hackney Union	W. Barnett	do.	ii.
Iron and Concrete Staircase at Workhouse	St. Pancras Guardians	A. & C. Harston	Feb. 27th	xii.
New Ward and Alterations to Mortuary	County of Chester	Stanhope Bull	do.	ii.
Iron Pipes and Castings for Waterworks	Calcutta Corporation	J. Quick & son	Feb. 28th	ii.
Shut-off Valves and Hydrants	do.	do.	do.	ii.
Engine House, &c.	Oxford Corporation	W. H. White	Mar. 1st	xii.
Superstructure of New Bankruptcy Offices	Com. of H.M. Works, &c.	Official	Mar. 3rd	ii.
Works of Drainage, &c.	Fulham Vestry	do.	do.	ii.
Enlarging Brick Sewer	Wimbledon Local Bd.	do.	Mar. 4th	xii.
Works and Materials	Tottenham Local Board	do.	do.	xii.
Kerbing, Tarpaving, Metalling, &c.	Lewisham Bd. of Works	do.	do.	xii.
Works and Materials	do.	do.	do.	xii.
Sloping and Watering, Dusting, &c.	St. Margaret (Westminster) Vestry	G. R. W. Wheeler	do.	xii.
Reflux Valves, Stop Valves, &c.	Manchester Corp.	G. H. Hill	Mar. 5th	ii.
Sondmaking and Paving Works	Widnes Local Board	W. Sykes	do.	ii.
Road Materials	Crathrook R.S.A.	Official	do.	xii.
Married Couples' Quarters at Workhouse	Hornbourn Union	H. Saxon Snell & Son	do.	xii.
Cast-iron Columns, Wrought-iron Roof Trusses	Rating Local Board	C. Jones	Mar. 6th	xii.
Works and Materials	Bath U.S.A.	Official	Mar. 8th	xii.
Painting and Repairs, Kennington-park	London County Council	Official	do.	xii.
New Works at Parish Church, Ruardean	The Committee	Waller & Son	Mar. 10th	ii.
Alterations and Additions to Schools	Wanted School Board	J. T. Bessy	Mar. 14th	ii.
Enlargement of Post-Office, Birkenhead	Com. of H.M. Works	Official	do.	ii.
Work, Materials, &c.	Bath U.S.A.	G. R. Fortune	Mar. 15th	xii.
Buildings on Pier, Douglas, Isle of Man	Isle of Man Herb Com.	H. A. Cneers	do.	xii.
Making-up Roads	G. E. Cartoo	Official	Mar. 17th	xii.
Painting and Repairs, Victoria-park	London County Council	Official	Mar. 24th	xii.
New Church, Romford	do.	do.	Not stated.	xii.
PUBLIC APPOINTMENTS.				
Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Pages.
Surveyor	Widnes Local Board	250 <i>l.</i>	Feb. 26th	xvi.
Nuisance Inspector	Stockton-on-Tees Corp.	120 <i>l.</i>	Feb. 28th	xvi.
Surveyor	Burton-on-Trent Corp.	400 <i>l.</i>	Mar. 1st	xvi.
District Surveyors (4) of Main Roads	East-Sussex C. C.	160 <i>l.</i> each	Mar. 3rd	xvi.

TENDERS.	
(Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.)	
BIRMINGHAM. —For erecting house, Westfield-road, Edgbaston, for Mr. H. Wright, Jun. Messrs. J. P. Sharp & Co., architects.	
J. Harley & Son	21,585 0 0
George Gill	1,880 0 0
Gowing & Ingram	1,671 0 0
B. Whitehouse	1,570 0 0
John Goodman	1,539 0 0
John Webb	1,489 0 0
R. M. Hughes	1,441 0 0
F. Davis	1,400 0 0
E. Giles	1,378 0 0
F. J. Briley	1,351 0 0
Jones & Mason, St. Mary-street, Ladywood, Birmingham	1,345 0 0
*Accepted.	
BROMLEY (Kent). —For erecting house for Mr. E. G. Gardiner, Messrs. Wadmore, Wadmore, & Mallett, architects, 35, Great St. Helens, E.C. 4.	
Crossley, Bromley	22,090 0 0
Armand & Son, Bromley	2,079 0 0
Willshire, Sevenoaks	2,070 0 0
Jones, Tonbridge	2,060 0 0
D. Payne, Bromley	1,985 0 0
Croft, Bromley	1,978 0 0
Holloway Bros., Battersea	1,904 0 0
Roome, Clapton	1,893 0 0
Holt & Son, Croydon (accepted)	2,850 0 0
Allen & Son, Kilburn (accepted)	1,838 0 0
BROMLEY (Kent). —For residence at Bromley, Kent, for the Rev. R. H. Lovell. Messrs. W. A. Williams & Hopton, architects, 156, Regent-street, W.	
Crabtree	21,470 0 0
Esccart (accepted)	1,473 0 0
BROMLEY (Kent). —For additions to residences, Winton-road, Bromley, Kent, for Mr. H. Mitchell, Messrs. W. A. Williams & Hopton, architects, 156, Regent-street, W., and Bromley, Kent:—	
Low	4,994 0 0
Gregory	1,470 0 0
Roome (accepted)	374 0 0
CATFORD. —For additions to Priory Cottage, Catford, for Mr. B. Archer, architect, for Mr. H. Mitchell, 78, High-street, Wisbech	
Laird	4,114 0 0
S. J. Jerrard	121 0 0
Robson, Lewisham (accepted)	268 0 0
DAWLISH (Devon). —For building a dwelling-house, Brookdale-terrace, Dawlish, for Mr. J. Hearn. Mr. Geo. Soudon Bridgman, architect, Torquay	
J. Lamacraft, Dawlish	4,852 5 0
W. J. Hatcher, Dawlish (accepted)	783 10 0
CHELSEA. —For the supply of York paving, for the Chelsea Vestry (annual contracts):—	
Nowell & Johnson, Kensington	£745 16 8
Turner & Son, Chelsea	731 17 6
A. & F. Manuelle, Leadenhall-street	658 5 0
W. H. Wheeler, 11, Queen Victoria-street	658 5 0
For Granite Curbs and Paving.	
W. H. Wheeler, Accepted at per schedule.	
For Broken Guernsey Granite.	
Nowell & Johnson	11s. 4d. per yd.
Mowlem & Co.	14s. 3d. "
W. Griffiths	14s. 3d. "
A. & F. Manuelle	14s. 3d. "
Fenning	13s. 9d. "
*Accepted.	
DAWLISH (Devon). —For building new banking premises at Dawlish, for the Devon and Cornwall Banking Company. Mr. Geo. Soudon Bridgman, architect, Torquay. Fittings not included:—	
C. Stevens, Newton Abbot	£2,156 0 0
J. Shaper, Dawlish	2,109 0 0
Hy. Stevens, Ashburton	2,090 0 0
W. J. Hatcher, Dawlish	2,040 0 0
P. A. Stacey, Newton Abbot	1,800 0 0
H. Webber, Fagton (accepted)	1,665 0 0
DEVONPORT. —For the erection of Board schools at Morrice Town, for the Devonport School Board. Mr. W. Curtis, architect. Quantities by Mr. T. Mullin, surveyor, Plymouth	
Tozer & Son	£4,040 0 0
A. Sanders	4,030 0 0
Healy & Son	3,584 0 0
J. Finch	3,550 0 0
Jenkin & Son	3,479 0 0
S. Roberts	3,408 0 0
Lechbridge & Son	3,335 0 0
Laphorn & Goad	3,307 0 0
Petchick Bros.	3,140 0 0
J. Road	3,098 0 0
W. J. Hatcher	2,946 0 0
A. R. Debnam	2,885 0 0
[* These of Devonport. The others of Plymouth.]	
HANWELL. —For reconstruction of drainage, &c., at Cuckoo-lane Schools, for the Managers of the Central London District Schools. Messrs. Henry Jarvis & Sons, architects, 29, Trinity-square, Southwark, S.E. 1.—	
Water Bockeridge (accepted)	£4,684 0 0
LONDON. —For alterations and additions to the "Well and Bucket," Bethnal-green-road, for Mr. E. I. Rose, Mr. J. C. Regnolds, architect:—	
Mills	£1,650 0 0
Knill	1,883 0 0
Staines	1,438 0 0
Cox	1,250 0 0
Tord	1,254 0 0
Whitehead & Co. (accepted)	1,277 0 0

ELGH (Essex).—For new schools, to accommodate boys and girls, with residences for master and staff, including boundary walls and fences, &c., at Elgh, near Southend-on-sea, for the Leigh School and Mr. Walter J. Wood, architect, 1, Finsbury-square, E.C. Quantities by Mr. Henry Bushell, 1, Finsbury-square, E.C.:

H. Friedel, Greenwich	£5,400 0 0
G. Dobson, Colchester	5,240 0 0
S. Mayes, Southend	4,805 0 0
Overton Richardson, Southgate	4,796 0 0
S. C. Carpenter, Braintree	4,705 0 0
J. Steward, Southend	4,600 0 0
E. E. Woodhams, Southend	4,574 0 0
J. Bell, Braintree	4,547 0 0
C. Orfeur, Colchester	4,435 0 0
Darke & Son, Southend*	4,423 0 0

* Accepted after modifications.
(Architect's estimate, £4,000.)

LONDON.—For erecting new workhouse buildings, at King's-road, Pancras-road, London, N.W., for Guardians of the Poor of Saint Pancras Parish. Messrs. A. C. Harston, architects, 15, Leadenhall-street. Quantities supplied by Messrs. Gordon & Co. by aid Mr. W. T. Farthing:—

Wall Bros.	£84,049 0 0
Shillington, Edmonds	83,947 0 0
Turner, Watford	82,500 0 0
W. Brass	81,473 0 0
Kirk & Knight	81,250 0 0
J. Bell, Braintree	81,040 0 0
Patrick, Chatham	80,000 0 0
W. Johnson	79,500 0 0
Allen, Kibburn	76,842 0 0
Plew & Co.	76,265 0 0
J. O. Richardson	75,250 0 0
Lawrence & Sons	75,144 0 0
S. & W. Patinson	75,438 0 0
W. B. Beckwith, Kensington	75,240 0 0
Kirk & Randall	74,827 0 0
A. Krauss, Bristol	71,400 0 0

(Architect's estimate, £75,513.)

LONDON.—For rebuilding the "Red Lion" public-house, Kibburn, for Messrs. Warman & Co., and for alterations and additions to the "Bon Marche" for Mr. Koper. Mr. W. T. Farthing, architect, 16, Strand, C.

Bon Marche, Red Lion.			
Wall Bros.	£4,297	£38,894	£43,191
Burns	4,177	8,859	12,637
Leslie & Co.	8,863	12,616	21,479
H. L. Holloway	3,990	8,334	12,324
Scrivener	3,890	8,420	12,310
Geoffrey	3,514	8,241	11,755
Shurmer	3,798	8,220	12,018
Bauman Bros.	3,976	8,083	12,059
Spencer & Co.	3,084	8,183	11,867
Osney & Co.	3,767	7,960	11,727
J. Allen	3,777	7,966	11,683
G. Todd	3,630	7,839	11,579

LONDON.—For building the "The White Horse" Tavern, Shepherd's Bush, for Mr. W. G. Watts. Mr. G. Bartlett, architect, 2, New Broad-street, E.C.:

H. Eddie	£6,066 0 0
F. & J. Wood	4,819 0 0
J. T. Chappell	4,499 0 0
Kirk & Randall	4,432 0 0
Patman & Fotheringham	4,421 0 0
Heale & Son	4,369 0 0
Osney & Co.	4,357 0 0
C. F. Kearley	4,218 0 0
Leslie & Co.	4,093 0 0

LONDON.—For proposed alterations to the "Queen Elizabeth" public-house, Bagley-slane, Fulham, S.W. Messrs. Watney & Co., Limited, Mr. J. G. Ensor, architect. Quantities supplied by Messrs. Saville & Arbin, 30 Strand, W.C.:

Prestige & Co.	£1,653 0 0
Kynoda & Co.	1,460 0 0
Patman & Fotheringham	1,306 0 0
Osney & Co.	1,334 0 0
J. T. Chappell	1,276 0 0
Adams & Sons	1,268 0 0

This list was received too late for insertion last week.

LONDON.—For alterations, &c., at the "Chippendale" public-house, Shilhall-road, Faddington, for Mr. Mills. Mr. C. Young, architect:—

Colman	£2,770 0 0
Langridge	2,700 0 0
Leslie & Co.	2,547 0 0
Satt	2,544 0 0
Godfrey & Son	2,490 0 0
Mowlem	2,447 0 0
Godson	2,337 0 0
Higgs	2,497 0 0

This list was received too late for insertion last week.

LONDON.—For paving, kerbing, and road-making for Camberwell Green, Mr. J. C. Reynolds, Surveyor:—

Landells-road, Dulwich.

Higgs	£1,452 15 4
Gatty	1,272 0 0
Mowlem & Co.	1,185 12 8
J. Stowell, Camberwell	1,189 19 4

Tell-grove, Dulwich.

Higgs	£509 1 8
Gatty	498 10 0
Mowlem & Co.	468 9 7
J. Stowell, Camberwell	458 19 0

Scute-street, Nunhead.

Higgs	£299 1 10
Wheeler	174 18 0
Gatty	167 0 5
J. Stowell	163 12 9
Mowlem & Co.	159 3 10

Peris-road.

Higgs	£568 18 4
Wheeler	379 15 0
Gatty	325 14 2
J. Stowell	294 17 6
Mowlem & Co.	281 10 8

LONDON.—For rebuilding the "Swiss Hotel," Old Compton-street, W., for Mr. C. Glatfield. Messrs. W. A. Williams & Rupton, architects, 150, Regent-street, W. Quantities by Mr. Wm. Mills:—

Andes	£8,360 0 0
Ryder	5,422 0 0
Low	5,295 0 0
Allen	5,170 0 0
Gregory	5,100 0 0
Roome (accepted)	4,800 0 0

LONDON.—For alterations at the "Prince Albert," Notting-hill, W. Mr. Young, architect:—

King	£1,720
Ransell	1,597
Stower	1,430
Colman	1,440
Goodall	1,395
Godfrey	1,390
Higgs	1,377
Salt	1,323
Oodson	1,167

LONDON.—For erecting shops, stables, &c., and executing various repairs, at Nos. 18 and 20, High-street, Camden Town, for Mr. J. Bryan. Mr. Robt. J. Beale, architect, Westminster:—

S. R. Lambie, Kentish Town	£1,007 0 0
Gould & Brand, Camden Town	1,019 0 0
G. Prior, Walthamstow (accepted)	961 0 0

LONDON.—For alterations, &c., at 28, Wormwood-street, E.C., for Messrs. Horniman & Co. Mr. Albert Vicars, architect, 151, Strand:—

Kiddle & Son	£289 0 0
Fold	578 0 0
Osney & Co.	948 0 0
Asby Bros.	690 0 0

LONDON.—For alterations and additions to stables, &c., at "Rosedale," Walton-on-Thames, for Mr. P. Riddell. Mr. F. Le Rossignol, architect and surveyor. No quantities:—

J. Langham	£269 0 0
E. J. Lucram	683 0 0
H. Faulkner	665 0 0
B. Ingram & Co. (accepted)	565 0 0

LONDON.—For part rebuilding Nos. 30, 31, and 32, Sandys-row, Middlesex-street, Whitechapel, E. Mr. J. O. Cook, architect. No quantities supplied:—

Battley	£270 0 0
Sharpe	715 0 0
J. O. Richardson, Peckham	714 0 0

LONDON.—For alterations and additions to No. 16, King's-road, Chelsea, S.W., for Messrs. Lester & Co. Mr. J. William Stevens, architect, 21, New Bridge-street, London, E.C.:

Prestige & Co.	£405 0 0
W. Buckenidge, Kensington	465 0 0
Peppiatt	460 0 0
Leslie	456 0 0

LONDON.—For fittings, &c., to smoking-room, "Cyprus" Restaurant, Cheapside, E.C., for Mr. W. Kirkland. Mr. Walter Graves, Winchester House, E.C., architect:—

Siegmann	£250 0 0
Nightingale	240 0 0
Shaw	247 0 0
Sage & Co. (accepted)	240 0 0

LONDON.—For pulling down the enclosure wall at the Chapel-of-Ease, Holloway, reconstructing same, and fixing an iron railing, for the Churchwardens of St. Mary, Islington. Mr. William Smith, architect, 65, Chancery-lane, W.C.:

Builders' Work.

Holton & Co.	£480 0 0
Patman	471 15 0
Patton & Sons	465 5 0
Philp & Son	412 17 6
Whiton	335 0 0
Ruffell	337 0 0
Wilkinson Bros.	295 0 0
Jones & Co.	296 10 0
Hart	281 5 0
Bulford	250 10 0
Figg & Co.	240 0 0
Brown	220 0 0

Ironfounders' Work.

Potter & Sons	760 7 0
Tatton	515 0 0
Burbridge	448 10 0
Bridgewater	395 0 0
Jones & Co.	387 0 0
Dunaway	362 12 0
Hart	357 6 0
Hill & Smith	354 19 0
St. Pancras Iron Works	345 0 0
Peeg & Co.	344 0 0
Philp & Son	318 12 6
Chas. Smith & Sons	245 0 0

(This list was received too late for insertion last week.)

LONDON.—For erecting shop and executing various repairs at No. 80, High-street, Camden-town, for Mr. R. C. Widdicombe. Mr. Robert J. Beale, architect, Westminster:—

E. Toms, Camden-town	£339 0 0
S. R. Lambie, Kentish-town	332 0 0
Gould & Brand, Camden-town*	319 0 0

* Accepted.

LONDON.—For laying Linneer Asphalt in Ferris-road, from Oakhurst-grove to Tyrrell-road, for the Vestry of St. Giles, Camberwell. Mr. J. C. Reynolds, Surveyor:—

Val de Travers Company	£268 5 0
Linneer Asphalt Company	185 0 0
French Asphalt Company	185 0 0
Bradshaw & Co., 62, Queen Victoria-street, London, E.C. (accepted)	181 18 4

LONDON.—For erecting shop and executing various repairs at No. 78, High-street, Camden-town, for Mr. Henry James. Mr. Robert J. Beale, architect, Westminster:—

Gould & Brand, Camden-town*	£191 0 0
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* Accepted.

LONDON.—For alterations and repairs at the "King John's Head," Southwark-street, for the Cannon Brewery Company. Clerkenwell, E.C. Mr. Jno. C. Reynolds, architect, 30, Canberwell-green, S.E.:

Tyerhall	£1,097 0 0
Cocks, Jno. & Hy.	1,096 0 0
Whitehead	1,095 0 0
Smith	933 0 0
Drew & Goldman (accepted)	938 0 0
Kenalway	790 0 0

LONDON.—For alterations, &c., to the "Waterman's Arms," Nine Elms-lane, for the New London Brewery Co. Mr. E. E. Niblett, architect:—

Gregory, Clapham Junction	£624 0 0
Burman & Sons, Kennington	419 0 0
Dearing & Son, Islington	610 0 0
Spencer & Co., Lambeth (accepted)	584 0 0

LONDON.—For alterations at the "Warwick Arms," Whitcross-street, E.C., for Mr. E. Hicks. Mr. B. E. Niblett, architect, Hackney, E.:

Burman & Son (accepted)	£175 0 0
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LONDON.—For alterations and additions to refreshment-rooms in Battersea-park, for the London County Council. Mr. T. Blashill, architect:—

Hollway Brothers	£360 0 0
Lathey	355 0 0
Laphorne	277 0 0
Hammond	270 0 0
McLachlan	247 0 0
A. & W. Garnat, Peckham	220 0 0

LONDON.—For the erection of a billiard-room at Addison-road, Kensington, for Mr. F. Bally. Mr. F. Le Rossignol, F.S.I., architect and surveyor, 1, Greenham-buildings, Basinghall-street, E.C.:

J. Langham (accepted)	£249 0 0
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LONDON.—For alterations to and fitting up offices, Nos. 62 & 63, Mark-lane, for Messrs. Osborne, O'Donnell, & Osborne. Mr. F. Le Rossignol, architect and surveyor:—

A. Walker (accepted)	£244 7 2
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LONDON.—For two new shops at Bowyer-terrace, Clapham, for Mr. W. Gray. Mr. J. W. Stevens, architect:—

Macey	£735 0 0
Prestige & Co.	627 0 0
White	620 0 0
Peppiatt	595 0 0
Whitehead & Co. (accepted)	595 0 0
Creed	553 0 0

LONDON.—For repairs and redecorations at Hanover Chapel, Eye-lane, Peckham. Mr. Thos. Thompson, surveyor, 388A, Old Kent Road, S.E.:

Young & Lonsdale	£204 0 0
Welford	200 0 0

LONDON.—For erecting new boundary wall and erecting van lodge, at the Anchor Brewery, Lewisham, for Messrs. H. & V. Nicholl, Limited. Mr. Albert L. Ouy, architect, 78, High-street, Lewisham:—

Kenard Bros.	£322 0 0
S. J. Jerrard	318 0 0
Pritchard	282 0 0
Hoare	258 0 0
Robson, Lewisham (accepted)	223 0 0

LONDON.—For shop fronts and fittings at 127, King's Cross-road, W.C., for Messrs. Alworthy & Wood:—

S. Yardley & Sons (accepted)	£330 0 0
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(Received too late for insertion last week.)

LONDON.—For show-cases and fittings to lobby and hall, for Mr. James Perriman, 160, High-street, Camden Town:—

S. Yardley & Sons (accepted)	£145 0 0
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(Received too late for insertion last week.)

LONDON.—For alterations to premises, new strong-room, shop front, and interior fittings, at 18, Forchester-road, Baywater, for Mr. E. W. Thompson:—

S. Yardley & Sons (accepted)	£485 0 0
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(Received too late for insertion last week.)

LONDON.—For show-cases, counters, and interior fittings for the Army and Navy Co-operative Stores, Limited, Westminster:—

F. Sage & Co.	£892 0 0
Drew & Cadman	873 0 0
S. Yardley & Sons (accepted)	860 0 0

(This list was received too late for insertion last week.)

MILFORD HAVEN (S. Wales).—For pulling down and rebuilding the "Palms" Tavern, Milford Haven, for Mr. J. Vaughan. Messrs. Burtin & Wood, architects, Milford Haven. Quantities by Mr. Henry Bushell, 1, Finsbury-square, E.C.:

Stimmons, Milford Haven	£1,063 4 8
Cole, Milford Haven	657 0 0
William, Milford Haven	645 0 0
Phelps & Co., Milford Haven	558 15 0

MITCHAM.—For alterations and additions to the "Gardener's Arms," Mitcham, for Messrs. Truman, Hambury, & Co. Mr. E. J. Capell, architect:—

Hobbs	£286 0 0
Whitehead & Co.	285 0 0

ORINGTON.—For the erection of the Village Hall at Orington, Kent, for Mr. A. Brown. Mr. St. Pierre Harris, architect and surveyor, 1, Basinghall-street, E.C., and Orington:—

E. Lawrence & Sons, London	£3,755 0 0
H. Smartford & Son, Clapham	4,371 0 0
D. Payne, Bromley	3,329 0 0
Holt & Son, Epsom (accepted)	3,150 0 0

PLAISTOW (Kent).—For alterations to the "Prince Frederick" public-house, Plaistow, Kent, for Messrs. H. & V. Nicholl, Limited. Mr. Albert L. Ouy, architect, 78, High-street, Lewisham:—

C. Robson	£592 0 0
Hoare	500 0 0
Pritchard	493 0 0
Kenard Bros.	450 0 0
Knight	423 0 0
D. Payne, Bromley (accepted)	382 0 0

PLYMOUTH.—For rebuilding premises, No. 14, Cambridge-street, Plymouth, for Mr. J. C. Holland. Mr. Archd. D. Shortridge, architect.—

Palmer	£555 0 0
Debnam	489 0 0
Sweet	454 10 0
May	459 0 0
Laphorne & Goad	430 0 0
Palk & Partridge	422 0 0
Sheppard (accepted)	383 0 0
[All of Plymouth.]	

PLYMOUTH.—For rebuilding premises, No. 35, Frankfort-street, Plymouth, for Mr. J. M. Sercombe. Mr. Archd. D. Shortridge, architect.—

Laphorne & Goad	£249 0 0
Palk & Partridge	438 10 0
Debnam	429 0 0
May	425 0 0
Sheppard (accepted)	376 0 0
[All of Plymouth.]	

PLYMOUTH.—For additions to Mount Pleasant Temperance Hotel, Plymouth, for Mrs. Kernick. Mr. Archd. D. Shortridge, architect.—

Laphorne & Goad	£241 0 0
Finch	409 0 0
Palk & Partridge	429 0 0
Debnam	459 0 0
May	414 0 0
[All of Plymouth.]	

POTTERS BAR (Herts).—For the enlargement of the Vicarage House, Northw. Potters Bar, for the Rev. W. B. Bondage. Messrs. Charles Kirk & Sons, architects, St. Paul's. Quantities supplied by the architects:—

Robert Williams, Barnet	£1,182 0 0
T. & W. Savage, St. Albans	1,055 0 0
John Carron, Barnet	452 10 0
Gabriel Warboys, Bessingbourn	938 0 0
C. Miskin, St. Albans	933 0 0
Road & Son, Grantham (accepted)	925 0 0

ST. LEONARDS-ON-SEA.—For the erection and completion of a private residence, Daner-road, for the Trustees of the Everdell Estate. Mr. Frank H. Humphreys, architect, 6, Trinity-street, Hastings. Quantities by the architect:—

No. 1.	No. 2.	
Eldridge & Crutenden	£5,408	£283
T. Salter	5,320	190
H. E. Crutenden	5,265	186
C. Hughes	5,229	214
A. H. White (accepted)	5,130	260
[All of St. Leonards-on-Sea.]		

* Extra in fitting dining and billiard rooms in oak.

STREATHAM.—For alterations and additions to the "Horse and Groom," Streatham, for Mr. J. Pettigill. Mr. J. C. Reynolds, architect:—

Cox	£2450 0 0
Drew & Cadman	424 0 0
Warne	408 0 0
Farker	380 0 0
Whitehead & Co.	345 0 0
Smith (withdrawn)	317 0 0

WATFORD.—For erecting new stable at Watford, Herts, for Messrs. R. White & Sons. Mr. C. W. Lovett, architect:—

A & W. Garner, Peckham	£500 0 0
Judge, Watford	518 0 0

WICKHAM (Kent).—For alterations and additions to the "Foresters Arms," Wickham-lane, Wickham, Kent, for Messrs. Mitchell & Beasley. Mr. J. O. Cook, architect, Woolwich, S.E. No quantities supplied:—

Battley	£291 0 0
Foreman	115 0 0
J. O. Richardson, Peckham	440 0 0

WOOD GREEN (Middlesex).—For erecting London Provincial Bank, Wood Green, N. Mr. A. R. Barker, architect. Quantities prepared by Messrs. Young & Brown, Henrietta-street, W.C.:—

Landow	£3,632 0 0
Yardley & Sons	3,580 0 0
L. & W. D. Patman	3,440 0 0
Messum	3,279 0 0
Shepherd	3,185 0 0
S. Jerrard	3,080 0 0

[This list was received too late for insertion last week.]
Alterations at the "Kenilworth Castle."—The lowest tender in the list for this job, published in the Builder last week, p. 124, was sent by Messrs. G. Mowar & Son, not by anyone named "Moore." The mistake was not ours.

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TO CORRESPONDENTS.

W. H. "Studio" [we could not give any certain reply without seeing the structure. We may observe, however, that official surveys generally understand their local objects very well.—F. B. "Quoniam" (we believe that what you intend to say, as far as we can gather, is true enough; but unfortunately your letter is too cloudy in diction to serve any good purpose in publication). H. G. C. (next week).
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.
Norz.—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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SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS.
Six lines (about fifty words) or under

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* STAMPS must not be sent. All small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, Green-wich, W.C. DOUGLAS FOUNDRY, Publisher.

Advertisements for the current week must reach the Office before THREE o'clock p.m. on THURSDAY, but those intended for the front page should be in the hands of the printer on WEDNESDAY.
SPECIAL ADVERTISEMENTS IN STANDING ADVERTISEMENTS OR ORDERS TO DISCONTINUE same must reach the Office before TEN 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 of the letter COPIES ONLY should be sent.
PERSONS advertising in "The Builder" may have Replies addressed to the Office, 46, Catherine-street, Strand, W.C. Enquiries are sent, together with sufficient stamps to cover the postage.

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Deal Dadoes, from 1s. 2d. per ft. super.
Oak Dadoes " 1s. 11d. "
Walnut Dadoes " 1s. 11d. "
Gak, 1 inch Parquet Floors, laid and polished, from 27, 10s. a square.
Solid 1-inch Oak, straight boards, laid and polished, at 28, 18s. a square.
Solid 1-inch Oak Parquet for covering Deal floors, laid and polished, from 25s. a square.
Oak Wood Tappery Dadoes, from 1s. per foot super.
Walnut or Mahogany, from 1s. 3d. per foot super.
Ditto with Heavy Mouldings, 4d. ft. extra.
Ditto, ditto, with Carved or Painted Panels, prices according to sketches.

Price given for all Interior Work, Doors, Architraves, Over-doors, Chimney-pieces, Stores, and Hearths. Architects' and Surveyors' attention particularly called to the above Quotations for

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CORSHAM DOWN. FARLEIGH DOWN
BOX GROUND. COMBE DOWN
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SATURDAY, MARCH 1, 1896.

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The Report on the Glasgow Mill Disaster.



THE report on the causes of what has been known as the Templeton mill disaster at Glasgow, by Col. Malcolm and Mr. Robertson, the Commissioners appointed to inquire into the cause of the fall of the building and report thereon to her Majesty's Secretary for Scotland, is dated January 23 of this year, but does not appear to have been communicated to the press in any way, or the fact of its having been sent in made public, till two or three weeks after that date. The opinion expressed in it as to the main cause of the disaster must be rather a surprise to those who paid attention to the evidence as given at the public inquiry. The opinion we expressed immediately after the disaster was that it was a lesson on the necessity of designing and constructing buildings so as to be safe in process of construction as well as after their completion; that walls 185 ft. long and 70 ft. high without cross walls could not be considered safe against a gale, as long as they remained practically in the form of an empty and unroofed shell; that the floors should have been filled in and completed as the building went up, and that the walls should have been strengthened by buttresses such as would have formed a portion of any Medieval cathedral or other wall of the same length without cross walls. The evidence at the public inquiry, as published in the *Glasgow Herald*, appeared as a whole to justify our previous remark that it was not likely the inquiry would elicit anything which would materially modify the above view as to the cause and moral of the calamity. It came out in the evidence that the back wall, the one furthest from the wind, was built on columns (or rather, as now appears, on H-shaped standards); but though this wall was thus undoubtedly less stable than the front wall, it seemed hardly reasonable to think that the fall of a building from the pressure of a violent blast of wind should result from the weakness of the back wall, which was more or less sheltered from the wind, rather than from that of the front wall which was exposed directly to the full force of the gale.

One fact, however, appears in the final report of the Commissioners which did not

appear in the original evidence of the public inquiry, and which they appear to have arrived at by independent investigation subsequently. The H-stanchions referred to above had spreading bases, 3 ft. by 2 ft., and 1½ in. thick, resting on the concrete footings. The stanchions supported a series of cast-iron lintels 2 ft. wide, on which the back wall was carried. The wall, 66 ft. high above these, was 2 ft. thick in the lower story, and 18 in. in the upper stories, the reduction in thickness being made entirely on the inner side of the wall; the method which would no doubt occur to ninety-nine people in a hundred as the most natural manner of reducing the thickness, at a floor level, instead of letting the reduction show externally. It cannot be said, however, that this was the most reasonable or scientific method of doing it, as the result, of course, would be to bring a major portion of the weight of the wall outside the central line of the beams and stanchions, and to a certain extent injure the equilibrium which it is so doubly important to maintain when a great weight is carried on thin iron supports. The special fact, however to which we have alluded, is that not only were the stanchions tilted over towards the outside (which would naturally be expected when the superstructure fell in that direction) but five of the base-plates were found to be fractured, "the projection on the east or outer side being broken off."

The Commissioners attach great importance to this fact as bearing on the cause of the accident. They evidently regard it not as one of the results of the overturning of the back wall, but as mainly contributing to the catastrophe. The stanchions, they say, were no doubt amply sufficient to bear their load as long as it was stationary, "but as soon as an oblique pressure came upon them, in consequence of even a slight oscillation of the wall above, they were insufficient. The base-plate projecting 6 in. beyond the solid part of the stanchion, without stiffening or gusset pieces, gave way in one-third of them at the time of the accident, and, we believe, contributed materially to the failure." The following is the Commissioners' summary of their view of the manner of the failure:—

"The back wall and the stanchions on which it rested were distinctly the weakest part of the whole building. The westerly gust which prevailed at the time of the accident gave precisely the conditions which would test this part of the structure to the uttermost, and take it at the greatest disadvantage. We must conclude that the weakest part of

the structure, under the conditions existing at the time, was that to which the failure was due, and now we believe we are in a position to submit a correct explanation of the accident.

The first gust caused the whole building to oscillate, an action which is inevitable in a structure of considerable height, and which should not damage a properly designed construction, but this oscillation severely strained the back wall, especially towards the centre of its length, and the oblique pressure which accompanied it fractured one or more of the base plates of the stanchions. The second gust, acting with increased force on the somewhat weakened structure, caused a greater swaying of the building, broke more of the base-plates, and probably tilted some of the stanchions, causing the grinding of the wheels which was observed in the weaving-shed.* The third and strongest gust was probably that which caused the catastrophe. Under its impulse the already weakened wall, deprived of a portion of its effective support by the fracture of the base plates swayed beyond the narrow limits of its stability, and in its fall not only deprived the front wall of the support of the joists, but actually by their connexions assisted to drag it over. The result was the simultaneous collapse of both front and back walls, as already described."

The evidence of witnesses of the catastrophe (not numerous, it may be observed) was clear to the effect that the whole fall was instantaneous, and therefore allowed no room for the theory advanced by one witness that the upper and more solid portion of the front wall, where no flooring-joists had been set, was first blown over upon the joists and so dragged the whole down: a theory improbable in itself, and obviously not in accordance with the ascertainable facts.

The opinion of the Commissioners as set forth in the above quotation is of much interest, and "undoubtedly" suggests a new idea as to the manner in which this deplorable catastrophe was brought about. That it may very possibly have happened in the manner here set forth cannot be denied; but we should think the conclusion drawn is much more open to doubt than the report seems to imply. In the first place, it seems rather a curious way to put it to describe a gale blowing against the west wall of the building as giving "precisely the conditions which would test to the uttermost" the weak portions of the wall on the east side. It is assumed, of course, that a great deal of the wind pressure on the west wall was transmitted to the east wall through the joists; but these did not go into either of

* The axes of the wheels being, we conclude, connected with the stanchions.

† For the sake of brevity we define the two sides as west and east, though they were not precisely facing those points of the compass.

the walls, nor, from the manner in which they appear to have been secured, does it seem probable that they even butted against them, though there was another kind of connexion in the way of tie, to be described presently. The wind may, as we suggested before, have made a kind of swoop into the interior of this great unroofed shell, and so have fairly hurst the walls out, which would account for part of the west wall falling outwards. The east wall, carried on its row of iron sticks, would no doubt have been the readiest to fall; and its faulty construction accounts for the fact of its falling, although not on the side directly exposed to the gale; but we are distinctly of opinion that the west wall fell to the force of the wind, mainly, if not altogether; and as it is unquestionable that this was a strong and very well built wall,—all the witnesses are agreed on that point,—this is, as we before said, the lesson of the disaster: that a long wall strong enough for a covered and floored building may not be strong enough while the building is uncovered and open. Had there been a series of heavy transverse girders built into each wall, and the east wall built as strongly as the west one, we believe both would have mutually supported each other, and the whole have remained standing; but it does not appear that the method of laying the flooring-joists constituted such a tie as to render the two walls either mutually supporting or mutually destructive. There seems to be no kind of proof that the base-plates of the stanchions failed before the fall of the walls; and it appears to us that the stress laid by the Commissioners on the structural weakness of the wall that was on the leeward side of the building, and its effect on the disaster, rests more on assumption than on anything like proof (as they would perhaps admit), and that it tends rather to draw attention aside from the main source of danger, the building of walls of "unlimited" length without sufficient buttresses, and which therefore only become safe against violent winds when the roof, floors, and openings are all closed in.

That it has this tendency to withdraw attention from the main point we see from an article which appeared in a Glasgow paper simultaneously with the publication of part of the report a few days ago, in which, while much is said as to the practical lessons to be drawn from the report, the question of the behaviour of long unsupported walls, as such, is entirely ignored. The Commissioners do not entirely ignore this point; but they merely refer to it in a passing sentence at the close: "It is probable that if the roof, floors, and windows of the building had been completed, no wind pressure which has been observed in this country would have been sufficient to destroy it": almost the very words we used in our comment at the time; and that is the real point of the matter. They add that "it is to be hoped that one result of this disaster will be to ensure that greater attention shall be paid in future to the security of buildings under construction"; a hope which we also expressed, but we also suggested the desirability of building long walls in such a manner as to be stable in themselves, instead of depending on floors, when the floors should rather depend on them.

A great deal was said at the inquiry, a good deal of which was nonsense, in regard to the method of joisting the building and connecting the floors with the walls. The method actually employed was this: the main beams ran longitudinally, parallel with the main walls, and carried on a series of cast-iron columns; the joists were placed transversely, but were not built into the walls, but rested on wall-beams 9 in. by 8 in. supported on stone corbels built into the walls, the beams being anchored into the walls by iron straps. Every third joist crossed the building in a single piece, but how the joists were secured to the wall-beam we do not find precisely stated anywhere; we do not gather that there was anything in the way of straps or ties hindering them to the wall-beam, though the latter was apparently well anchored to the wall. This method of laying the joists

was objected to by some witnesses as unsafe, as not tying the walls together; it was urged that the joists should have been built into the walls. The Commissioners, and we entirely agree with them here, dismiss this objection as frivolous. No better tie would be got by building a number of ordinary joists into a wall than by laying them bearing on a beam or corbels as described; the walls would be to a certain extent weakened and the hold of the joists would amount to nothing of any importance; everyone accustomed to buildings knows what a large proportion of ordinary flooring-joists are quite loose in the walls. Therefore we think the criticisms that were passed about this method of securing the joists were perfectly mistaken and groundless. But we also think that flooring joists so laid, though with the advantage of not weakening the substance of the wall, were quite inefficient as a tie; and one of our reasons for questioning the opinion of the Commissioners as to the manner in which the building fell is just this—that we do not see, for all the information we can get about the fixing of the joists, that the latter had any such connexion with the wall, or rather with the wall-beam, as would enable them to exert any important pull in dragging over a heavy and well-built wall-like what the west wall of the building is described to have been: the joists would have parted from the wall-beam before that. The mistake lay not in this or that way of forming the bearing of the joists, but in the radical error of laying the joists transversely and the girders parallel, instead of the opposite arrangement. Here is a long comparatively narrow building with two walls the long way, without any support or buttressing from cross-walls,—with little or no buttressing of any kind in fact, and it is desired to fix the floors in so as to assist the stability of the whole structure. The theoretical importance of the floors in this respect, under the circumstances, was referred to and recognised again and again in the course of the inquiry. And if this was an object, does it not stand to reason and common sense,—constructional common sense,—that the proper course to take was to fix the large girders transversely, one to each pier, building them into the walls and thus obtaining the important assistance of their mass and weight and strength in connecting the walls together? To neglect this in such case, to lay the main beams longitudinally and only lay the light joists from wall to wall, is a mode of proceeding which seems to us entirely at variance with practical common sense. The Commissioners touch upon this point, but in a remarkably mild manner, and in terms which seem very nearly self-contradictory. In regard to the way in which the floors were actually constructed they say:—

"The mode of supporting the joists at the walls which has been already described was severely commented on by some witnesses, who maintained that the joists should have been carried into the walls. Other witnesses expressed the opinion that the method adopted is superior to the other. This is one of several instances in which experienced practical men have taken diametrically opposite views on points raised in this inquiry. We have no hesitation in expressing our view that the method adopted, which is recommended by most competent authorities, and which certainly leaves the wall stronger than the other does, is to be preferred, and should be adopted in most cases, care being taken to preserve the 'tie' between the front and back walls. This latter point seems in the present case to have received careful consideration, and we have come to the conclusion that the mode of supporting the joists did not in any way contribute to the accident."

We cannot discover any statement in the report or in the published newspaper accounts of the inquiry as to how the joists were connected to the wall, but we agree that the method of supporting them did not contribute to the accident. The report proceeds:—

"An important point raised was as to the most efficient arrangement of the floor-beams in such a building. Here again there was a difference of opinion among experts. We are disposed to agree with those witnesses who held that the best arrange-

ment for the general stability of the building is that the beams should run transversely, so as to connect the front and back walls at every bay and on every floor, rather than those who maintained that a better connexion was secured by placing the joists transversely, as in the case of this mill. The point is one of general interest, but is not of importance in this inquiry, as from the circumstances of the case we have concluded that this point had no material influence in determining the fall of the mill."

Considering the weak construction of the back wall, perhaps this may be so; but if the two walls had been equally well built, though they had been each weaker than the west wall actually was, their mutual stability would have been materially increased by having the main girders built into and connecting them; and we must express surprise that the opinion on this point is given in so doubtful and tentative a manner in the report.

The Commissioners also express in very mild terms the opinion, which many who read the evidence would be disposed to express in much stronger terms, that the inquiry disclosed lamentable inefficiency in the constitution and action of the official building authorities of Glasgow. These consist of a Dean of Guild (who we believe need not necessarily be a man of any expert knowledge in construction at all—he appears to be an ornamental official), a legal assessor, and eight persons called "liners," who are supposed to supply the Dean of Guild with the practical knowledge which he does not possess himself. It appears from the evidence in this case that plans of such a building as the mill in question may be passed by the official authority, though there is no adequate or distinct indication on them of the precise method of construction to be employed; and that one method may be implied and accepted by the authorities on the drawings, and another method employed in construction, without any official interference being aroused. The report says:—

"The plans submitted in this case, which were doubtless in accordance with practice such as are required by law, seem to us of a somewhat meagre description. They were so vague as, *e.g.*, to leave doubtful the mode of supporting the joists, the Court believing by reasonable inference from the plans that one method of construction was intended, while the architect has shown that his intention, though not expressed on the plans, was to adopt a different method, *viz.*, that which was carried out. The plans certainly showed the dimensions and construction of the back wall, which we have considered a material factor in the destruction of the mill, but they did not, and being on a small scale, could not show the details of the iron stanchions, which we have also considered as materially contributing to the disaster.

"Again, in the matter of inspection, it appears that although a different method of supporting the joists was adopted from that which the Court understood that it had approved, and this without the authority of the Court or of any one connected with it, no notice was taken of this important deviation, as it should have been considered, from the approved plans."

The question of building the joists into the walls or not, as we have observed and as the Report admits, was of little practical consequence in the matter; but it is evident that if it had been, the indifference of Dogberry would have been just the same. One of the "liners," indeed (the general "practical" insight of these gentlemen, we may say, comes out delightfully in the evidence), finding that his court was not making a brilliant show in the inquiry, attempted to make capital out of this by saying solemnly, "If when these plans came before us in the Dean of Guild Court, the plans had shown corbels and beams, I for one would never have passed these plans." Unfortunately the decision of the Commissioners that the matter was of no practical importance rather takes the point out of this bit of tardy official virtue.

Another very regrettable feature in the inquiry is touched upon, though lightly and in a somewhat indulgent spirit, by the commissioners *viz.*: the conflict as to responsibility between the architect and mill engineer who were jointly consulted by the building owners. The statement of the latter was that they employed the engineer as a specialist to

make a plan specially adapted for the machinery, driving-gear, supporting pillars, &c., to give the architect information as to these special subjects, the latter being otherwise left to carry out the building as he thought best. There seems to have been room for some misunderstanding between the two as to their respective share in the work. But the architect in his evidence repudiated his client's view entirely, maintaining that he was not responsible for the construction in any way, although he had signed the plans for the Dean of Guild Court; drawing from Colonel Malcolm the very natural remark that he did not know what the value of a signature might be if there was not some responsibility attaching to it. In the progress of the evidence there were further attempts on the part of each professional man to disclaim responsibility and to throw it on the other. In the case of a terrible accident involving serious loss of life, we must say that the spectacle of the two professional men employed each endeavouring to elude responsibility and throw it on the other, is from whatever point of view we regard it, not an edifying one.

Serious blame, however, for the calamity has not been attached to any one concerned, to the extent of direct responsibility for it, still less of criminal negligence. It is a terrible incident in the chapter of accidents, arising from unforeseen and unusual circumstances which were not provided against. But it can hardly now be called an accident if a similar calamity is ever allowed to happen again.

NOTES.

THE Institute of Architects publishes with its last circular an important and suggestive list of points for consideration in regard to building legislation for the County of London. These are grouped under various heads. Among "Definitions" are to be considered "virgin soil," "site" of a building, "centre" of a roadway, "story" of a building; all points on which there are constant misunderstandings. The heading "Erections" which are not to be deemed buildings, but to be under control" promises opportunities for better definition of a building; and under the heading of "Exemptions" it seems to be suggested that there may be some means of escape suggested from a hard-and-fast law which often bears very unfairly or at least inconveniently on the erection of small structures such as greenhouse adjuncts &c. Other headings are "Limits of a Building"; "Walls and Floors," including the consideration of the question of lifts penetrating floors and roofs of separate buildings (a new subject for legislation arising out of modern conditions of life in cities); "Roofs," including "access to roofs"; "Frontage Lines"; "Courts of Appeal"; "District Surveyors," including considerations as to limits of fees; "Light and Air"; "Working of Act"; and "Miscellaneous," under which heading are included considerations in regard to "notice boards and hoardings"; "pilasters and cornices of shop fronts wholly of incombustible materials" (it will probably be for the good of street architecture as well as construction if this subject receives some attention); "direct control of District Surveyors over materials and construction," perhaps one of the most important subjects noted, as in fact the practical efficiency of building legislation largely depends on this.

ALIVELY discussion arose at the Railway Rates Inquiry, last week, out of a demand for certain information on behalf of the cotton trade. Different branches of trade are now submitting their views to the Court. In turn, but points of general interest frequently arise during the hearing of the case of a particular industry. The cotton traders desired to have returns of cotton traffic, showing the tonnage rate per mile independent of terminal charges. The companies at once scented danger, the nature of which Mr. Pope, who is representing the London and North-Western Railway, proceeded to ex-

plain. He commenced by assuring the Court and the traders that the companies wished to deal with them with perfect frankness and courtesy, but confessed to a certain amount of alarm at being called upon to furnish a return "which would be of questionable utility now, and might be available for other purposes hereafter." Mr. Balfour Browne denied in the strongest terms that the traders, in asking for these returns, had any concealed motive, or that they wished to use them for any ulterior purpose. The fear of the companies is that the information given may afterwards be made use of by competitive interests,—notably, the Manchester Ship Canal,—and this suspicion will account for their disinclination to furnish it. The magnitude of the traffic may be gathered from the fact that 500,000 tons are annually sent from Liverpool to Oldham. Several instances were given in which sidings were provided and terminal services performed by the trader, but charged for by the company, and the Court should certainly provide for rebates under such circumstances.

WE referred a fortnight ago to the discussion in the Liverpool Town Council in regard to the continuation of Mr. Stirling Lee's series of sculptured panels for St. George's Hall, and to Mr. P. H. Rathbone's offer to bear the cost of the remaining panels of the series, on condition that they were to remain for at least five years, to give time for a matured public opinion on their merits. The question, as noted at the time, was referred to the Finance Committee, which appears to be (perhaps appropriately enough in these days) the final arbiter in matters of taste. The following extract from the *Liverpool Daily Post* of Saturday last gives the result of the reference:—

"**THE ST. GEORGE'S HALL PANELS.—ACCEPTANCE OF MR. RATHBONE'S OFFER.**—At the ordinary meeting of the Finance Committee yesterday, under the chairmanship of Alderman Radcliffe, the recommendation of the Council referring to them Mr. Rathbone's offer to complete the St. George's Hall panels at his own cost came up for consideration. Mr. Rathbone, in his letter, said that it was not fair to judge the series by the first two panels of Mr. Stirling Lee, and he stipulated that the remaining four should be placed *in situ* for at least five years, after which, if it was decided by the Council that they were not worthy of their place, they could be removed. The designs of Mr. Lee for the new panels were submitted, and were approved of by several members. Mr. J. B. Smith moved that Mr. Rathbone's offer be accepted, and that he be thanked for his munificence. This was seconded by Mr. Holder, Alderman Livingston proposed, and Mr. J. B. Moran seconded an amendment that the Council, having already expressed an adverse opinion on the bas-reliefs, it was not expedient to proceed further in the matter. On a division, four voted for the amendment and seven against. The proposition was then declared carried."

We congratulate both Mr. Stirling Lee and the Liverpool official authorities on the result, and we have little doubt the Committee will discover in the end that they have no reason to regret the decision so tardily arrived at.

AT a meeting of the British School at Athens, on Friday, February 14, Mr. E. A. Gardner read a paper on the technical processes in Greek sculpture, with special reference to a number of unfinished statues which have been found in various degrees of progress, and which are now collected together in the Central Museum at Athens. Mr. Gardner principally concerned himself with the methods of fourth-century sculptors, most of the examples being of that period, but he first noticed a specimen of the early straight-limbed Apollo type, which was found in the quarries at Naxos. This was in the first stage of progress, the figure having been merely rough-d out. He showed how this had been done, much as a beginner would proceed to work at the present time, the sculptor first tracing the lines of the figure on the face and sides of the block and then proceeding to rough out the limbs by cutting off the marble in planes parallel to the face and sides. The surface clearly indicated that this

had been done with a pointed punch. In this connexion Mr. Gardner said that the squareness of the early statues need not necessarily be traced to a wood tradition, and he was not inclined to accept the theory that most of the early *Xoana* were of that material; he showed that the meaning of the word did not imply this, and mentioned several which were known to have been of marble. He argued that roundness rather than squareness of section was characteristic of wood, and he thought that the square appearance of early marble figures might more naturally proceed from the material itself, the rectangular block of marble on which the sculptor set to work. He then proceeded to trace the processes of execution in the fourth century, and the nature of the tools employed, basing his remarks principally on a statue from Rheinea, which showed different degrees of progress on the various portions of the figure, but referring also to the others as he went on. Beginning with the rough marble block, he showed how they first roughly shaped out the figure with a punch driven with a hammer, and not with a pointed axe or hammer, as had sometimes been assumed; how they afterwards dressed down the lines more carefully with a similar but smaller and sharper instrument, and how, when they had got the figure thus blocked out, they proceeded to model the limbs by cutting down the surface gradually with a curved chisel; and he pointed out on the statue small flat cup-shaped sinkings showing the beginning of this process. The general surface was then finely worked over in detail with a claw-shaped chisel, the form of the limbs being carefully worked up, and the folds of the drapery were drilled out with the running bore. He mentioned, as an instance of a different treatment, an early archaic figure from Delos, where the use of the saw could be distinctly traced in the narrow sunk lines of the parallel folds of the straight hanging drapery. He went on to show how the forms of the muscles were afterwards accurately mapped out or outlined, and how the whole figure was again gone over with a finer claw chisel, and finally finished off with a flat one. He had come to the conclusion, from a careful study of these statues, that the sculptor did not work from a finished model, although he may have had a rough study beside him, but rather that he worked quite freely, developing his ideas as he proceeded.

SELEDOM has a town shown so much activity in building as Leipzig has shown recently. The new Booksellers' Exchange, the Conservatoire, the Public Slaughterhouse, and the Workhouse are only just completed; and we find already a large number of other public buildings are nearing their completion. Among these we see an extensive "police headquarters," designed by the architect to the town, "Baudirektor" Hugo Licht, showing highly-interesting elevations and an exceedingly practical plan; an "artisans' school," by the same artist, showing some original detail in the façades; a new "central market," chiefly in iron; an extensive library for the University; and a new building for the "art and science schools," which, although it has very poor elevations, and its interior arrangements are not much better, must, at all events, be mentioned on account of the extent of the building. The competition designs, dispositions, cost, &c., of these buildings, and, above all, of the new Imperial Law Courts (which also are progressing rapidly), certainly have at their time interested the average Leipzig citizen; but never before has the whole community taken such a lively interest in an architectural matter as at present in the "Rathhaus" scheme. There has been much difference of opinion in reference to the demolition of a fine old architectural relic, between architects and lovers of art on the one side, and the ordinary layman on the other. Leipzig may well be proud of having such an interesting and grand old Town-hall as the one built by Hieronymus Lotter

in the middle of the sixteenth century; and yet, now that accommodation is wanting in the old place, a large number of the good burghers seem to have a great desire to pull it down, and to erect in its place and on the sites adjoining an unyielding edifice, containing the offices of the fiscal administration and a town-hall combined. Opposed to this scheme, and backed by the published opinions of the leading architects in Germany,—such as Professor G. Hauberrisser, Regierungs-Baumeister Hoffmann, Oberbaurath v. Schmidt, and Bauath Wallot—we find a design (worked-out and drawn by Herr Reg.-Baumeister H. Solf, according to the ideas and sketches of the above-named town "Baudirektor") which not only saves the old Rathhaus, but also the old Booksellers' Exchange adjoining, and which brings these two buildings very cleverly in connexion with an excellently-planned extension containing all the offices and committee-rooms required. In no way wishing Leipzig to stop its activity in the erection of new public buildings, we certainly in this case hope that the citizens will be satisfied with an extension and a thorough repair of the old Rathhaus; and, seeing that the Town Council contains several members of the architectural profession, we may also hope that these gentlemen, in carrying out work, will unite in the cause of archaeology as far as practical considerations render it possible to do so.

STRASBURG CATHEDRAL is the first German Catholic church in which electric lighting has been applied. It had been feared that this new and strong illumination would spoil the solemn and mysterious effect of the interior, and would at the same time modify the colour effect of the beautiful reddish "Vogesen stone" used in the building; but it has been found that although the groups of incandescent lights attached to the piers and columns certainly light up the latter very brightly, the interior as a whole looks quite as well, if not better, than before. Arc lights have been used outside the building, and these show off the details of the façade exceedingly well.

SOME interesting information which would prove highly valuable to engineers has been recently put before the English-speaking branch of the profession in the "Proceedings of the Institution of Civil Engineers." The town of Cueno, in Italy, has been recently enlarging its water supply, and Mr. G. Ponzio, the engineer in charge of the work, has been largely using cement-made tubes in the formation of an aqueduct. He is loud in the praise of cement for such purposes. It is advantageous in regard to economy, in rapidity of construction, in impermeability, and in facility of adaptation to any form. It also preserves the freshness and purity of the water in a most satisfactory degree. The cost of cement tubes is not more than about 40 per cent. of that of iron pipes. At Cueno the new cement pipes were laid in the open channel which formed the course for the old water supply. There is a fall of 77.8 ft., and the new supply having to be under a pressure due to this head, the tubes having a diameter of 9½ in., the thickness should have been, according to the usual formula, 7½ in. Before constructing his tubes, however, Mr. Ponzio made some experiments in order to determine the correct proportions required, and he found that a thickness of tube of 3.15 in. was amply sufficient. The material used was Casle cement, and the cost was 5s. per yard, including labour; or 6s. 9d. per yard including all contingent charges. During the winter the cement set in twelve hours, but later, when two qualities of cement were blended, the setting was perfect in less than seven hours.

DR. BOHME has communicated to a German publication some details of experiments made with volcanic sand from the Eifel Mountains in Germany, in order to determine its value for making mortar. The

percentage of silica was about 52.0, of alumina 14.0, of lime 11.0, and of magnesia 7.0. The results appear to have been in some instances really remarkable. As compared with the standard sand, it was found that in every case the volcanic sand gave a higher tensile and crushing strength. A mortar composed of one part Portland cement with three parts of standard sand gave a standard strength of 34.15 kilogrammes per square centimetre (485.71 lb. per square inch) when immersed in water for one year, while a similar mortar when made with volcanic sand attained a strength of 50.15 kilogrammes per square centimetre (713.28 lb. per square inch) in the same time. The crushing strength of the same mortars under similar conditions was 320.8 kilogrammes per square centimetre (4,562.66 lb. per square inch), and 499.1 kilogrammes per square centimetre (7,098.58 lb. per square inch) respectively. Mixtures of different varieties of rich lime and volcanic sand were also far superior to mortars made with standard sand. With proportions of sand higher than those stated the superiority of volcanic sand was still more marked, both for cement and lime mortars. In the matter of adhesion and resistance to frost, also, the volcanic sand gave higher results.

MR. HOWORTH asked a question in the House of Commons on Tuesday as to alleged injuries and mutilations to the Beni Hassan tombs in Egypt, mentioning a report that twenty-five names of kings had been erased and the heads of the principal figures abstracted. Sir James Fergusson knew nothing of it, but promised that inquiry should be made of Sir E. Baring. Beni Hassan is too important a chapter in ancient history for dunces to be allowed to erase at their pleasure.

IN regard to Wrexham Tower, of which we published a view last week, a correspondent writes:—"The statement has been ventured that the tower of St. John's, Cardiff, was by the same architect. The Vicar of Wrexham came thence, but the tradition I mention long ante-dates. Having seen the tower of St. John's, I cannot say there is much to compare. Knowing also the tower of Wrexham from a time when all was considered too perfect for restoration, I recollect that one only of the four pinnacles is original, decidedly a Somersetshire feature. Still, Welshmen have a right to be proud of the tower. There are images of saints on three sides, but none on the north. As to the church, there are internal evidences that the clearstory is additional; also the absence of old wood-work may be the saddest evidence of fire. The doorway and window at the end of the north aisle are new compared to the rest. The window-seat alongside the door comes over joint-over-joint work of a doorway now transposed. Access to a gallery, removed at restoration, led to this alteration, and the four-foil panelling beneath the first weather-mould now ornaments the interior. The windows to the last bay of the clearstory, as well as of the aisle, differ from the remainder. The chancel, 'so called,' quite shows that all was chancel until the east window was broken away for the annexation of an insignificant adjunct to a collegiate church."

UNDER appointment of Mr. Justice Stirling, in the suit of Clark v. Clark, the house, No. 14, at the south-western corner of Buckingham-street, Strand, was put up for sale by auction at the Mart, on Tuesday last, and was bought for 10,500l. This freehold property, covering nearly 4,000 ft. superficial, and yielding an aggregate rental of 860l. a year, or, say, 680l. net, stands on the site of a house occupied by Samuel Pepys during the period 1684-1700, and wherein, as their President, he was wont to entertain the members of the Royal Society. Pepys was Secretary to the Admiralty from 1684 to 1688, when Phineas Bowles succeeded him; he was elected P.R.S. in 1684, and held office for two years. In the year 1689 he had for his opposite

neighbour, at No. 15, Peter] the Great. The Buckingham-street of Pepys's day had been built in 1675, after the sale for 30,000l. of York House, together with its grounds, by the second Duke of Buckingham, who removed hence to College-hill, in the City. Of York House, Hollar made a drawing in 1630, whereof Herbert published a print in 1808. Pepys's house can be identified in a plate of Boydell's "Views" (1778); but a better view of it, and of the Czar's lodgings, may be seen in one of the several Thames-side paintings, by James, circa 1756, in, or lately in, the Queen's Presence Chamber, at Hampton Court Palace. When Hatton compiled his "New View of London" (1708), Pepys's house served, as we gather, for the Royal Wardrobe, under the mastership of Ralph, first Duke of Montagu. No. 15 yet remains; No. 14 has been rebuilt. The present house was inhabited by Clarkson Stanfield, R.A., in his earlier career as a scene painter; and, after him, by William Etty, R.A., who, removing hither in or about 1824, resided in it until about fifteen months before his death in his native city, York, on Nov. 13, 1849. We may add that the property has a south frontage of 82 ft. to the private enclosure known as Villiers-wall; and the purchaser is entitled to acquire, by private treaty, the adjacent plot, No. 19, Villiers-street.

THE subject of Westminster Hall was again before the House on Tuesday evening, and the discussion again showed the correctness of our predictions as to what would be thought and said of this piece of archaeological tinkering when completed. This time the carriage drive as well as the staircases came under consideration, and one member observed that "Outside had been provided an extraordinary pit for members' carriages, which recalled the lions' den into which Daniel was thrown. It was a kind of *descensus Averni*, a decline down which no carriage could be driven with safety, and in the shed itself it was almost impossible to turn a carriage round. The shed might do very well for bicycles, tricycles, and wheelbarrows; but it was useless for members' carriages. When two carriages were in a third could enter only by backing down the incline." Mr. Marjoribanks might have read something very like this in the *Builder* before the work was ever carried out, just as all the other objections which are now so violently thought justly made by excited members were made in our columns before any of the work was carried out, and all that Honourable Members have discovered when it is too late they might have discovered before any of the work was done if they had looked for information to those who could give it. Mr. Shaw-Lefevre seems to have abated very much of his former tone of self-satisfaction over the work he did his best to promote, and, after an admission that "there was no doubt great difference of opinion as to the artistic merit of the work done in Westminster Hall" (he has discovered that at last, apparently), contented himself with a mild protest that the money now asked for in "Supply" was only for the purpose of properly laying-out the ground westward of Westminster Hall; and that of course must be done anyhow: so the vote of 2,000l. was agreed to.

ON the same evening, in Supply, the money for the purchase of the land between Prince's-gate and Queen's-gate, from the Commissioners of the Exhibition of 1851, was voted, after a short debate in which the only reasonable objection raised was one in which we rather sympathise, viz.: that before voting large sums for a site and separate new buildings at South Kensington, the original buildings of the South Kensington Museum should be completed. Their incomplete state for so many years is a discredit to the nation.

An "Engineers', Electricians', Builders', and Ironmongers' Exhibition," is announced to be held at the Royal Agricultural Hall, Islington, from March 17 to 29.

LETTER FROM PARIS.

MUCH has been said recently in the Paris press in reference to a supposed new masterpiece by Rembrandt discovered at Pecq, a little town near St. Germain, and which a well-known dealer had purchased for some millions of francs, at a sale of effects of the deceased owner. It was also reported that the new possessor of the picture (of which the subject is "Abraham at table with the Angels"), from motives of patriotism, had refused most advantageous offers for it in order to give the State the option of purchasing it for the Louvre. As, however, the manufacture of "old masters" is at present carried on more extensively than ever in Paris (there was an exhibition very recently, at the Georges Petit Gallery, of a whole set of fictitious Raphael cartoons purporting to have been found in Russia, and said to be far superior to those of Hampton Court!), the artists and the more enlightened portion of the public did not take much interest in this "discovery" of a new Rembrandt, though, as may easily be imagined no pains have been spared to get up an excitement about it. This attitude of scepticism appears to be now justified, as in the opinion of such judges as M. Gérôme and M. Bonnat the picture, though signed and dated, is of very unequal and in part of very bad execution, and cannot be regarded as genuine. M. Bonnat, it may be said, is a kind of expert in regard to Rembrandt, of whose drawings he possesses a remarkable collection. The Louvre is already rich in undoubted Rembrandts, and is not likely to consider any offer for the purchase of a doubtful example.

It is to be hoped that the State will also decline the offer of Manet's "Olympia," which it appears was purchased by the subscription of some artists and amateurs (as noted in our last letter) with the object of presenting it as a gift to the Louvre. Manet was no doubt a remarkable artist in his way, and exercised a great influence on the modern school; but if he is to be represented in the national collection (which seems rather premature) it should at all events be by some work less eccentric than the "Olympia"; though as the picture is offered by persons of considerable position in Paris, there may no doubt be some hesitation about declining it under the circumstances.

At the Hôtel de Ville the second competition for the decoration of the "Siège de Paris" room has just been decided. Five artists were selected to compete again with studies of a portion of each design, the size of the ultimate execution. M. Arus selected a sad enough incident in the combat of Buzenval, M. Adolphe Binet has also chosen a military subject, a battery of artillery; MM. Baudouin and Delance have, on the contrary, painted the sufferings and dangers of the population in Paris during the Siege; while MM. Gilibert and Dupray, who are collaborators in one design, have illustrated the scene of the despatch of one of the balloons which was to convey information of the state of Paris to the provinces. The fine colour of M. Binet's work, and the animation of his figures, captivated the judges from the first, and they have commissioned him to execute the work. M. Arus receives a premium of 4,000 francs, and each of the other competitors 3,000; 80,000 francs has been voted for the execution of the work.

The Committee for the decoration of the Hôtel de Ville has received with great satisfaction the series of sketches by M. Galland for the decoration of the gallery adjoining and parallel with the three Salons à arcades. M. Galland, who has in this scheme fifteen small cupolas, and two pediments to decorate, has elaborated a scheme in which the principal trades of Paris are typified. The artist has been working at this scheme for three years; and as he will be able to commence the work this month, this piece of decoration, on which 120,000 francs will be expended,* may be expected to be completed at the close of the year.

What specially characterises the work of M. Galland is the respect he observes for the lines and details of the architecture,—a matter greatly neglected by many decorators of the present day, and the committee has become painfully aware through many of the sketches of schemes submitted to them; and the process of dividing up the decoration of many of the rooms among

several artists is not likely to improve matters in this respect, as there can be no *ensemble*, no prevailing motive or principle, among several decorators working each in his own way in various portions of the same apartment.

The twelfth exhibition of the "Aquarellistes" represents artists belonging to both the sections into which the Salon disensions have divided the art-world of Paris. Among the best works exhibited are those of MM. Clairin, Duez, Roger Jourdain, and Maurice Leloir, the Spanish scenes of M. Worms, the remarkable drawings by M. Zuber, the illustration designs of M. Boutet and M. Monvel, the flower-paintings of M. Eugène Morand & Co. M. Vibert has this year abandoned his eternal cardinals for a scene in which he represents himself as a "Médecin malade." M. Besnard, talented as he is, exhibits water-colours the colour quality of which becomes more and more incomprehensible. On the other hand his designs for windows for the "Ecole de Pharmacie" are very interesting.

The new Salon, which is now currently recognised as the "Salon Meissonier," in distinction from the "Salon Bouguereau," has been definitely accorded the use of the Palais des Beaux-Arts for its first exhibition to open on the 15th of May. The bureau of the new Society is constituted as follows:

President—M. Meissonier.
Vice-President—M. Puvion de Chavannes.
Presidents of Sections—Painting, M. Carolus Duran; Sculpture, M. Dalou; Engraving, M. Braquemond.
Secretaries—MM. Billote and Jean Béraud.
Sub-Committee of Painting—MM. Daguau-Bouveret, Lhermitte, Cazin, Gervex, Renouard, Baron, Courtois, Guignard, Besnard, Duez.
Sub-Committee of Sculpture—MM. Rodin, A. Lenoir, and Desbois.

The old Salon will retain its old quarters at the Palais d'Industrie, but important modifications are being made in its regulations: the "exempts" are to be suppressed, and all exhibitors are to pass the ordeal of the jury. The rule which limits each exhibitor to two works, however, remains in force.

A committee presided over by M. Jules Comte, Directeur des Bâtimens Civils, has decided to institute a general return of the examples of tapestry which form part of the "Mobiliier national." There are about 600 pieces in the Paris stores of this department, to which it is proposed to add those which are now scattered about in various localities in the provinces, in the palaces at Pau, Versailles, Fontainebleau, and Compiègne, &c. Including the textiles lent to the different embassies of France, there is probably a total of 1,100 examples of tapestry of the first order, and which would form when united a splendid collection. As soon as the inventory is complete, the Gobelins establishment will be charged with the repair of the specimens which are mutilated or damaged, after which the finest examples will be selected for a museum of tapestry to be established at Paris, which will enable the public to become acquainted with artistic treasures of the existence of which it is at present almost in ignorance.

The monument to Paul Baudry, of which we have already given a description, has just been inaugurated at Père-la-Chaise. M. Bartholdi has just completed the model for a monument to Gambetta which a group of inhabitants of Alsace-Lorraine are about to erect near his memory at Avray; it will be placed near the house in which he died. The whole monument will be about 15 metres high: at the foot will be two groups representing Alsace and Lorraine taking refuge at the altar of "La Patrie." At the summit of the monument will be the figure of Gambetta standing and holding the tricolour flag, which he is supposed to have saved, but with the flagstaff broken. It is stated also that M. Bartholdi has for a long time past had a scheme for a monument to be erected on the Place St. Pierre, at Montmartre, to commemorate the services of the aéronauts during the Siege of Paris, but the difficulty was to manage the balloon so as to give it importance in the design. His last idea is that the balloon should be represented by a great globe of thick polished glass which would contain a powerful electric lamp to light the Place St. Pierre. The monument, if it is ever really executed, will certainly be one of the curiosities of Paris, though it may be doubted whether the effect will be as satisfactory as surprising. M. Bartholdi, who has made a kind of speciality of "original" monuments, has not been always very happy in his originalities,

witness the bronze lion on the Place Denfert-Rocherau; and he might contrive to symbolise the aéronauts by something more capable of decorative treatment than a balloon.

While on the subject of colossal monuments we may mention the crusade that has been preached by the Bishop of Verdun in favour of Jeanne d'Arc, in whose honour a great national subscription is proposed for a colossal monument at Vaucouleurs. The pedestal of this monument is to be nothing less than a representation of a Medieval chateau, flanked by four solid towers, and fortified with machicolations, battlements, a drawbridge, &c., all constructed according to the rules of ancient military architecture. The chateau will be dominated by a *donjon* raised at least 40 metres higher, on the summit of which will be placed a colossal group representing Jeanne d'Arc on horseback led by two armed men. Such a scheme will demand money of course, and the Bishop of Verdun commenced on a recent Sunday a series of preachments and collections in the Madeleine in furtherance of this object, which he proposes to continue in a tour through France. The project has, however, been much opposed, as there has already been commenced an important monument at Domrémy, the birth-place of the heroine, designed by M. Paul Scäille; and a commemorative group of sculpture, now nearly finished, was commissioned in 1880 from M. Allar. This monument was interrupted in 1884 for want of funds, and 350,000 francs are still required to complete it. The success of the Bishop of Verdun's appeal would therefore probably prevent, for an indefinite time, the completion of the Domrémy monument.

The Institut de France has received an important legacy from the late M. Piot, a learned collector of works of art, who has left the bulk of his fortune to the Académie des Inscriptions et Belles Lettres. The Fine Arts section is also left an annuity of 2,000 francs, intended to be bestowed alternately on a painter and a sculptor. The Louvre has also benefited by M. Piot's will, and among other objects receives a picture by Raphael and a terra-cotta by Donatello.

Each member of the Institut has received recently a copy of a medal presented to the Duc d'Aumale in commemoration of his gift of Chantilly. The medal is a remarkable and artistic work of M. Chaplain, bearing on the obverse the profile of the Duc d'Aumale and on the reverse a view of the Chateau of Chantilly.

The question, long discussed, as to a diploma for architects has entered on a new phase; and, on the proposition of M. Charles Garnier, as President of the Société Centrale, the Government has appointed a Commission charged to make a study of the legal conditions under which the profession of architecture is exercised, the system of studies by which entry is gained to the profession, and the nature of existing diplomas of any kind in sanction of these studies. A scheme of questions prepared by the Société Centrale, and which deals with both the practical and theoretical side of the question, has been submitted to this Commission, which held its first meeting on February 11, under the presidency of M. Larroumet, Directeur des Beaux-Arts.

At the Ecole des Beaux-Arts, the Jury of Architecture, under the presidency of M. Ginain, has considered the forty-four designs sent in competition for the "Edmond Lahare" prize, of which the subject was "Le Siège d'une Grande Commandement Militaire," a very fine and one would think an inspiring subject. The prize has been decreed to M. Despradelle, pupil of M. Pascal; and "mentions" to M. Eustache, pupil of M. Ginain; M. Heubès, pupil of M. Pascal; M. Majon, pupil of M. Guadet; M. Huguet, pupil of M. Blondel; and M. Louvet, pupil of MM. Louvet and Ginain.

The death of a well-known art critic, M. Ernest Chéreau, is to be recorded. He was one of the Inspecteurs des Beaux-Arts under the Empire. He leaves several works on painting of considerable value; among others "L'Art et les artistes modernes en France et en Angleterre;" "La peinture Française au XIX^{ème} Siècle;" "Les Nations Rivalises dans l'Art." We have also to notice the death of M. Duruy, one of the many architectural engravers who worked on the *Revue Générale de l'Architecture* and on the *Motifs Historiques* of M. César Daly. For some years past, however, M. Duruy had entirely devoted himself to the work for the large Dictionnaire for the Académie Française.

* 4,800, on the decoration of one corridor of a great public building. What a satire on the ways of our English State and municipal authorities regard to art: what a chorus of indignation would arise from "economic" members if such a proposition were made at Westminster or Spring-gardens!—Ed.

ROMAN ARCHITECTURE.*
BY PROFESSOR AITCHISON, A.R.A.

Palaces.

I THOUGHT I might as well say a few words on the Imperial Palaces of the Romans, as they are the most glorified form of houses. They were vast in size, their rooms were large and sometimes colossal, and designed to be worthy of the magnificence of the Masters of the World, with the exception of the Palace of Augustus, which was small in extent, and whose rooms were modest in size. If we were fortunate enough to have the plan of Nero's Golden House, it would, I think, be the plan of the largest palace in the world.

The plans of some of the palaces show great ingenuity, and there is an evident desire to make the State-rooms, of those built after the days of Augustus, as magnificent as possible, by grandeur of size, by ornamental shapes, and by sumptuous decoration.

The scraps of precious marbles, and of carving, would show how magnificent their linings were, both inside and out, even if we were without express statements of their sumptuousness in the Roman writers.

Beyond their plans, the costly fragments, and the loose descriptions of their magnificence, all is darkness,—a darkness, too, hitherto impenetrable to our eyes and our researches. Pliny's letters, through the studied elegance of their language, have come down to us, and in them we find a rough description of two of his villas, and thus know something of the arrangement and use of the rooms. We get, too, a glimpse of the decoration of one room, with its carved marble dado, and its painting of birds and foliage above.

In the palaces, alas! we know nothing of the uses of the rooms—we can but guess at the uses of a few; and the historians merely speak of the gold, ivory, and mother-of-pearl, of the costly marbles and gems lavished on the interior of Nero's. Here and there amongst the ruins the painted decoration of some upper-servants' rooms have been found, which are just enough to whet our appetite for the lost magnificence of the master's halls. We can scarcely imagine that it never entered the head of a court-painter, usher, or chamberlain to write a book on the arrangement and adornment of the Court; but it is not common for such persons to acquire a style that will make their hook a treasured possession when the ceremonies have ceased and the palace is in ruins. Such descriptions are generally slipshod and bombastic, and soon find their predestined end at the hands of the pastycook, the grocer, the hutterman, or the stoker. A dining-room, baths, fountain-rooms, and some of the meanest offices proclaim their use, but to find out the destination of the bulk of the rooms seems to defy our attempts, as we neither know the officers employed, nor the usual ceremonial, so that each room can only be described as a fine large oval, circular, square, or oblong room, with columns, niches, recesses, or windows. The value of the architect's and sculptor's work is, however, not wholly lost to posterity; we can often trace the plan, when excavations are made, even when the structure has been pulled down, from the bottom of the walls being mostly covered by rubbish, which has by concealing them prevented their total destruction, and can thus judge of the architect's skill in planning, and of the elegance or coarseness of his moldings. A few scraps may reveal to us the sculptor's genius, skill, care, and knowledge; but it is only through exquisite verbal descriptions that the past can be sufficiently preserved to enable us to re-create and re-people it.—I say exquisite verbal description, for if it be not exquisite it perishes too, so true is Horace's remark:—

"Many, many have lived, who were vallant in fight,
Before Agamemnon; but all have gone down,
Unwept and unknown, in the darkness of night,
For lack of a poet to hymn their renown."

The first of the Royal palaces, after the Republic, was that of Augustus, on the Palatine. We know from Suetonius that he first bought the house of Hortensius, the orator, and used it for his residence. (Suet., "Aug.," 72.)

We also read that his house on the Palatine was burnt down and rebuilt by the sub-

* Being the fifth Royal Academy Lecture on Architecture this session, delivered on Monday, February 10, (For the four previous lectures, see the *Builder* for Feb. 1, 8, 15, and 22 respectively.)
† Hor., *Lib. IV.*, ode 9, canto 7. Sir T. Martin's translation.

scriptions of the veteran soldiers, the judges, the tribes, and the people ("Aug.," 57); but whether it was the same house of Hortensius we do not know. Still I think that if that which is called the house of Augustus were his, it must have been built or rebuilt for a palace, as so many of the rooms are evidently designed for State purposes. I think, in fairness to this autocrat, we ought to admit that he had some public virtue. Suetonius ("Aug.," 21) says:—"By the character which he thus acquired, for virtue and moderation, he induced even the Indians and Scythians, nations before known to the Romans by report only, to solicit his friendship;" and as Lucian makes Dionysius, the Sicilian tyrant, get off from being tied to the back of the Chimera through Aristippus "alleging that he had been ready and judicious in his pecuniary gifts to several men of learning" (Lucian's dialogues, "Menippus"; or, the Oracle of the Dead), we also should make some allowance for the patron of Horace, Virgil, and Livy, and for the rule of a despot that allowed the works of Sallust, Ovid, Tibullus, Propertius, and Cornelius Nepos to be published. But whether we condemn him as a tyrant who riveted the chains of slavery on the Roman people, or absolve him by saying the time had come when Rome was unable to govern itself, we must allow he had a williness and astuteness that were almost superhuman, which induced him to show as little arrogance and ostentation as possible. With this object in view, he made his palace small in size and of common materials, so that it by no means equaled in magnificence the greatest houses of the nobles. The space covered on the ground-floor was but about 253 ft. wide by 213 ft. deep, but it was about as deep as wide on the first floor, viz., about 252 ft., or more, where its front was on the higher ground. Its south front is not half the length of that of Diocletian's, 592 ft.; it is less than Blenheim, which is 323 ft.; and less than Castle Howard, which is 292 ft. On the ground-floor it consists of an entrance corridor, from a street at the side of the Circus Maximus, leading into a peristyle. At the opposite end, next the peristyle, are three rooms of unique shape, and with all the characteristics of Byzantine work, and the only light they get, except through the doors, is from circular openings through their vaults into the rooms above; the two side rooms are octagons, with four semicircular niches on the slanted sides, and three oblong recesses, with a niche at the back of each on the three square sides, the fourth side being the door. These two halls look like audience chambers; the centre one is called by Guattani the Chalcedicum, and is supposed to have been used by Augustus when hearing cases. The Chalcedicum seems to be a square vaulted chamber, with a large semicircular niche on the right and left sides, and an oblong recess with a niche at the back, opposite the door. On each side of the niches are passages, the front one leading right across that end of the building to an open court on one side, intercepted only by the two other halls, which are entered through their niches; the passages on the further side of the niches in the Chalcedicum lead into a suite of three rooms with closets at each end. If you consider that each passage had a curtain where it abutted on to the Chalcedicum, you will understand that no arrangement could be more safe or convenient; the two back rooms next the passage could be filled with guards, and another with such lawyers or friends as he might wish to consult, and he could slip through the curtains, enter these back rooms, or he could go into either of the halls on each side, by the front passage, or to his private apartments, either on the ground or first floor, as there are staircases by the sides of the open courts. The two flanks of the peristyle contained the rooms belonging to the baths, an open court, and perhaps other rooms,—certainly one large room on each side, nearly of the proportion of a Triclinium, shown by Guattani without window or door openings; so that we are led to the conclusion that the walls were destroyed to the level of the ground when the Abbé Rancourell had the palace excavated. The whole plan is perfectly symmetrical on a centre line drawn through the centre of the entrance to the centre of the Chalcedicum. Taking, therefore, the front on one side of the entrance, we find, adjoining the peristyle to the south, two oblong rooms with the corners cut off, separated by an oval room at right angles to them, whose semicircular ends project beyond the width of the former rooms, thus form-

ing a sort of Greek cross. Towards the front are two circular chambers, with passages round two of their sides, that communicate with the front and the oblong chambers before mentioned; between the passages of the circular chambers, the oval room, and the front, is a small oblong room. There are no rooms that would answer to the ordinary dining-room (Triclinium), except the two on the flanks before mentioned, which are shown without either door or window openings.

Augustus was a spare eater, and may have preferred a circular dining-room, only admitting of eight persons at the most; but this could not have been the case when he had the fancy-dress supper-party representing the twelve gods and goddesses of Olympus, where he played Apollo. He may, and probably did, dine on the first floor. We also know that the Empress Livia passed some of her time spinning amongst her maids; and his sister and two grand-daughters, who probably passed much of their time in the palace, used to spin too.

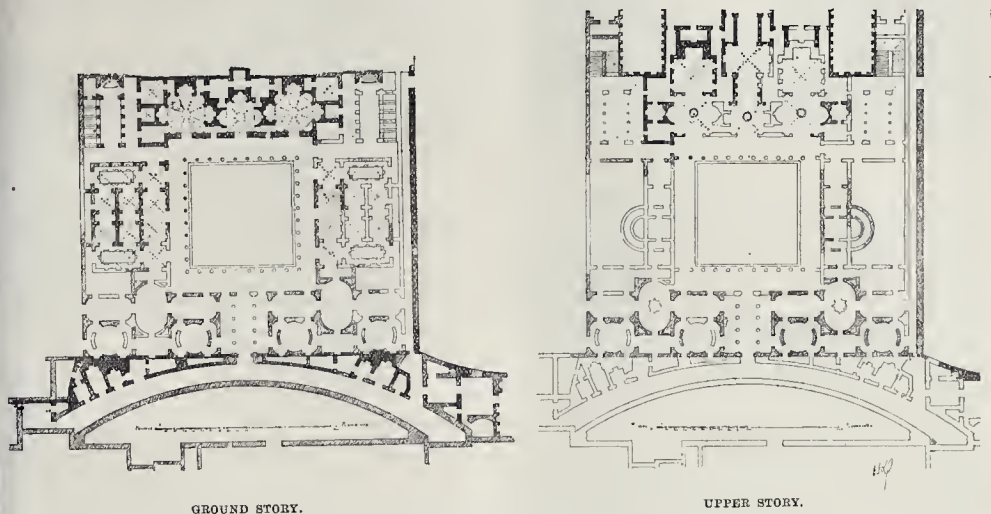
Suetonius ("Aug.," 7) tells us, "He seldom wore any garments, but what were made by the hands of his wife, sister, daughter, and grand-daughters." So there must, one would fancy, have been rooms for weaving, fulling, and dyeing, not to speak of the rooms where he dictated to his secretary, his workshop, or museum (Suet. "Aug.," 72), the rooms where his grandsons, his own philosopher, and his grandsons' tutors lived, and the kitchens and pantries; not to speak of the rooms for the chamberlain's pages, ushers, and guards.

On the first-floor the palace was entered from the north, i.e., from what was the back on the ground-floor; the two staircases from the ground-floor land there. The back part above corresponds precisely with the rooms of the front part below. On the flank there are only two narrow oblong rooms, and one of moderate size, with a semicircular end projecting in front of the former rooms, with an outside passage all round it.

The back part below, as I said before, becomes the front above, entered from the back of the grounds of the Temple of Vesta, and it seems thus laid out.—First, there was a lobby with two calls on either side, probably for porters or guards; the lobby led into a small Atrium with a small Tablinum at the back, opening on to a room over the Chalcedicum, and possibly two small Triclinia to the right and left, with passages and an ample space between for guards, servants, and for serving tables, the ends of the Triclinia opening out on to two rooms, if I may so call them, over the halls of audience beneath. Nowadays we should fancy them to be rooms adorned with flowers and shrubs, because they could not well have been used for much traffic, seeing there were marble gratings in the middle, some 6 ft. in diameter. It is possible that the Triclinia were so small because these end rooms served for the mountebanks or buffoons to perform in. Suetonius says ("Aug.," 74) he "introduced buffoons and stage players, or even low performers from the circus, and very often itinerant humorists, to enliven the company."

The plans given are enlarged from those by Guattani. In 1775, the Abbé Rancourell discovered these remains and had them excavated, and the plans taken by the architect Barbani, from whom Guattani had them, and published them in his "Monumenti Antichi Inediti" (1784-5). The Abbé was very jealous of any one seeing the ruins, much less taking dimensions; but Guattani says Piranesi paid some of his people to take them at night, at the risk of their lives, for fierce dogs were kept there as well as watchmen; and I believe Piranesi published plans which M. Deglaine has accepted, but they differ somewhat from Guattani's. From Guattani's statement, the architect Barbani, who could measure and plot them at his ease, is much more likely to be correct than Piranesi's people, who had to get them by stealth.

When the Italian Government has this palace re-excavated, we shall know which plan is right, for after the Abbé had had the palace excavated, he had it filled in again. The site had been previously searched by the Spada family, who found there the antiquities still adorning their palace; but the former search must either have been superficial or incomplete, for the Abbé found the Apollo Sauroctonos, now in the Vatican Museum, two statues of Leda, one of which is in England, a head in metal, other heads, busts, and parts of figures, as well as numerous fragments of capitals, cornices, friezes, &c.



GROUND STORY.

UPPER STORY.

Plans of the Palace of Augustus on the Palatine: after Piranesi.

(Reproduced from the Gazette Archéologique.)

On the ground in front of the palace, on the first floor, Augustus constructed a vast portico with upwards of fifty fluted columns of Giallo Antico, and enriched the portico with statues of the Danaïdes between the columns, and in front of the columns with fifty equestrian statues of the sons of Egyptus the husbands of the Danaïdes, all of whom were killed by their wives, with the exception of Lynceus the husband of Hypermetra, who succeeded Danaus as King of Argos. Although these murders are said to have been condoned, the poets make the Danaïdes condemned to draw water in leaky vessels after they had crossed the Styx.

At the north end of this portico, Augustus built and dedicated a temple to Apollo, commonly called the Palatiae Apollo, on a spot that had been struck by lightning. Once before, when in Spain, he had escaped, when the slave who carried a torch before his litter was killed by lightning, and in consequence he dedicated a temple to Apollo Tonans. (Suet., "Aug." 29.)

The Sibylline books were kept by Augustus's orders in two gilt coffers in the pedestal of the statue of the Palatiae Apollo, according to Suetonius, ("Aug." 31), though the originals were burnt when the Temple of Jupiter Capitolinus was destroyed in the wars between Marius and Sulla, but fresh copies were obtained from Greece, Italy, and Asia Minor. Between this temple and the palace was a circular temple to Vesta, which only projected enough to break the peristyle surrounding the Temple of Apollo; there are grounds to the Temple of Vesta, as well as a grove, and a house for the Vestals, and to the right of it, and nearly in a line with the portico of the Temple of Apollo, was the celebrated library of Augustus, called the Apollinean Library, filled with the Greek and Latin authors, and where the Senate occasionally met.

Tiberius built a palace to the left or west of that of Augustus, and, according to M. Deglaine, considerably to the north of the north front of Augustus's Palace, so as to avoid the houses of Livia and Germanicus and the Temple of Jupiter Victor. In the grounds at the front of this temple, which faces the south, Tiberius seems to have built his libraries, with peristyles at the back of them, which abut on the flank of Augustus's Palace. I may here remark that Thon's, Canina's, and M. Deglaine's plans so greatly differ from one another that they cannot be reconciled. My description is from M. Deglaine's plan, which is from the latest excavations.*

To the north of the Palace of Tiberius, and

* This plan was given as a lithograph in the last number of the Builder.

extending beyond it to the east and west, Caligula built his palace, and there was a passage to the north of the house of Livia that ran along the east side of the Palace of Tiberius, in which the demented tyrant, Caligula, is supposed to have been killed; subsequently Nero built his Golden House nearly from the Circus Maximus at the south end, to the Quirinal Hill at the north. Some of the lower chambers of his palace are under the Theatridion of Titus's Baths. Vespasian built the Colosseum on a part of the Golden House; and a part of it was seemingly demolished to make room for the Basilica of Maxentius—at least it is so shown in Pirro Ligorio's drawings, and it extended eastwards to the ground in front of the Coelian Hill.

A plan of the former palaces and some of Nero's Golden House is given in C. Thon and Ballan's work on the Palace of the Caesars (Fol. Rome, 1823, with text in 8vo.) and in Canina's plan of Ancient Rome.

When my old friend, M. C. Lucas, the well-known French architect, heard I was going to touch on the palaces of the Caesars, he was kind enough to mention it to M. A. Levy, the Editor of the "Gazette Archéologique" and "Le Moniteur des Architectes." M. Levy, with that magnanimity which so distinguishes our brothers across the Channel, not only presented me with M. Deglaine's article and plans of the palaces of Augustus and Domitian, but gave me leave to publish the plans, and offered to lend me the plates. As it is entirely through the kindness of these gentlemen that I have been able to give a description of the last discoveries and restorations of the palaces of the Caesars, I take it for granted that I may return your thanks with my own to Monsieur C. Lucas, M. A. Levy, and M. Deglaine.

The palaces of Augustus, Tiberius, Caligula, and Nero being built, the only spaces left were two pieces of ground, the first extending from the grounds of the Temple of Jupiter Stator to the Libraries of Tiberius, and the other from the Library of Augustus to the south front of his palace. From the first plot at the north end a piece had to be left for the grounds of the Temple of Jupiter Stator, and a wide road between it and Tiberius's Palace, as an approach to the back of the Temple of Jupiter Victor. There was thus left an oblong site, extending southwards from the grounds of the Temple of Jupiter Stator to Tiberius's Libraries, and from west to east from the road to the Temple of Jupiter Victor to the enclosures of the temples of the Apollo Palatine and Vesta, and the west flank of Augustus's house.

The second plot was on the east side of Augustus's Palace, extending lengthwise from the Apollinean Library to the Circus Maximus,

and crosswise from the east flank of Augustus's house to a part of Nero's Palace, supposed to have afterwards been restored by Septimius Severus. On the first-mentioned plot Domitian built some State-rooms; in the middle was a large open peristyle, to the north was a magnificent hall, called by M. Deglaine the Tablinum, and by Professor Middleton the Throne-room. It is divided lengthwise into five bays by six columns, with piers at the back of each column, forming recesses, and at the back of each recess is a square niche; the ends are divided into three bays by four columns; at the north end is an entrance to the middle, and a recess on either side the doorway. At the south is a flat apse in the middle, and two doors on either side; in the apse the Emperor is supposed to have sat on his throne; to the left is a Basilica, where it is supposed he gave judgment; and at the back of it a passage, staircase, and small room.

On the right of the Tablinum is a Lararium, or private chapel, a staircase, and a room nearly square. The east side of the peristyle touches the wall of the grove of Vesta; to the left or west side are a series of five rooms, a circular one in the middle, with semi-circular rooms at either end of it, and at each of the extreme ends is a shallow oblong room, also with one semi-circular end; the semi-circles do not touch one another, but are joined by a wide passage forming an oblong recess to each semi-circle. You see by the plan that there are spaces between the outer walls and the semi-circles which are formed into four rooms or recesses in the shape of lunettes. At the south end of the peristyle is a magnificent Triclinium or dining-room, with a Nymphaeum, or fountain room, on either side, and at the back of the western Nymphaeum a few small rooms.

You at once see the change that had come over the people and the Emperor. Augustus tried to avoid ostentation, and to house himself and family modestly. Tiberius, when he was made Emperor, said he had a wolf by the ears. Nero himself is supposed to have perished through building such an enormous palace; but Domitian built four or five State rooms on a site that is bigger than that of Augustus's Palace: the Throne room, about 115 ft. by 89 ft., would nearly occupy a fourth of Augustus's Palace; and you must remember that Domitian had all the other palaces for habitation as well.

On the other plot Domitian built a Stadium with a large apse or hemicycle in the middle, in which he probably sat. He seems, like Nero, to have been passionately fond of the games, and is reported by Suetonius to have had girls run for prizes. There are some small rooms at the south end, as well as at the back of the

hemicycle. The latter are said to be the *Therma* connected with the Stadium. Domitian also made a curved portico to screen the south front of Augustus's Palace. The magnificence of his palace was such that when Plutarch describes the Temple of Jupiter Capitolinus, rebuilt by Domitian, he says:—"But, after admiring the magnificence of the Capitol, if anyone was to go and see a gallery, a hall, or bath, or the apartments of the women in Domitian's Palace, what is said by Epicharmus of a prodigal,—

'Your lavish'd stores speak not the liberal mind,
But the disease of giving;'

he might apply to Domitian in some such manner as this:—*Neither pity nor magnificence appears in your expense; you have the disease of building; like Midas of old, you would turn everything to gold and marble.*" (Plutarch's "Publicola." Langhorne's Tran., 8vo. Lond., 1801.)

According to Martial, Rabirius was the architect of Domitian's Palace, which was called the *Parthasian*, because it was supposed to be on the site of the palace built by Evander, the Arcadian or Parthasian, when he emigrated to Italy and became a king.

Looking at the generality of Roman buildings, it seems unlikely that this palace was so enormously high, but the diseased vanity of tyrants makes them admire the most fulsome and absurd flattery, and Martial was quite ready to fool this tyrant to the top of his bent; he meanly revenged himself for his own servility by abusing Domitian after his death, and it is thought by some that Trajan looked upon him with disfavour on account of this marked characteristic of sycophants, and that in consequence he left Rome and died in poverty at his native town of Bithilis in Spain.

This is his epigram (Lib. VIII., 36):—

Smile, Cæsar, at the pyramids' loud fame;
Memphis, no more thy barb'rous wonders name;
Th' Egyptian works reach not the smallest part
Of the Parthasian court's majestic art:
No such illustrious piece the day does show;
Nor Sol In's universal travels know.
Seven vast pavilions, like seven mountains, rise,
Seven vast pavilions, like seven mountains, rise,
Pæon on Ossa could not so the skies;
Thunder and clouds beneath, th' aspiring top
Enters the heavens, and gainst the stars does knock;
The sun salutes it with his early ray,
On highest hills 'tis night, when here 's the day.
Thy palace, 'bove th' Olympian though renown'd,
Unto its lord is not yet equal found. —Anon. 1695.

In front of the building, to the south of the Library of Tiberius, M. Deglane shows a building which he calls the *Pædagogium*, or dwelling of the Court pages, oblong in form, with a slanted side next the *Circus Maximus*. The building consists of a long and narrow peristyle, with four rooms on either side; and, in addition, in the centre of the north side is a hemicycle, and corresponding with it on the south side is a large room with a segmental back. There are corridors at both ends, the west one returning round a part of the south side. At the back of the east corridor are two good-sized rooms, and a large one in the middle of them; and in front of this, to the east, is a deeply-recessed portico opening on to a grand staircase.

The *pædagogus* was originally a trusted slave, to whom the sons, and sometimes the daughters, of the house were given in charge to be taken to and from school and the gymnasium. The main duty of the *pædagogus* was to keep them out of mischief; he was the same sort of person in Roman times as the tutor was here in the last century, whom Horace Walpole irreverently called a "bear leader." We read about the *pædagogus* in the "Bacchides" of Plautus; but under the Emperors the court-pages were the sons of freedmen citizens.

It got to be a fashion amongst the great to choose their pages, who were mostly slaves, for their beauty, and to dress them in the most magnificent manner.

Pliny (N. H. Lib. XXXIII., cap. 12), in speaking of gold with which the women bedizen themselves, says:—"Much more becomingly do we accord this distinction to our pages, and the adorned beauty of these youths has quite changed the features of our public baths." We read in Pliny the Younger (Lib. VII., lit. 27) that the pages had an apartment to themselves in great houses called the *Pædagogium*; in telling us of Roman strip rapping, which then took the form of hair-cutting, and of the ghosts that remind one of a story in the tales of old Japan, he says:—"I have a freedman Marcus, not an illiterate man. As he and his younger brother were lying together in the same bed, he fancied

he saw somebody sitting on the bed moving a pair of shears to his head, and cutting the hair off from the top of it. When it was light, the hair from the top of his head was found to be cut, and the hairs were found lying about. A short time after this, an event of a similar nature gave credit to the former story. A lad was sleeping in the *Pædagogium* with the rest. As he relates, two in white shirts came through the windows and sheared him as he was lying, and returned by the way they came. The day showed that he also had been sheared, and his hair spread about."

Augustus merely assigned places to the *pædagogoi* at the games, immediately behind those of their young masters, but Suetonius speaks of Nero's houses (*Pædagogia*) for pages who were free horn.

The Palace of Diocletian at Spalatro* is one of the few palaces of which any exact outline is left, and if Robert Adam is to be trusted, the outline is pretty clearly defined; some of the towers still remain, as well as the Temple of Jupiter, the Temple of *Esculapius*, a circular hall, and enough of the walls to enable the restoration to be made with fair accuracy. Within the palace walls about half the modern town is enclosed.

Adam gives the width as 592 ft. by a depth of 698, including the angle towers, and about 532 ft. by 638 ft. to the outside of the walls.

To the north is the *Porta Aurea*, or Golden Gate, flanked by two octagon towers, which admits into a sort of guard-room lobby; from this lobby a straight street, about 35 ft. wide, with a covered passage on either side, leads up to the steps of a tetrastyle portico. At right-angles to this, and in the middle of each of the enclosing flank walls, is a street of the same width with the same covered walks, going from the east to the west gate, which are called respectively the *Bronze Gate* (*Porta Ænea*) and the *Iron Gate* (*Porta Ferrea*). All round the inside of the walls up to the *Palæto* itself are a series of cells with a covered walk in front of them, probably barracks for his guards, with a pair of staircases by each gate to lead to the ramparts. [See Lithograph plan.]

Illyria and Dalmatia were notorious for piracy, and nothing could have offered a greater temptation than an emperor's palace to plunder, with beautiful women and handsome pages to be sold in the slave-markets, had not the Palace been well garrisoned.

In the two islands to the north, formed by the crossing of the streets, are two large blocks of buildings, detached from the covered walk of the harracks by open streets about 30 ft. wide, their southern walls form the back of the covered walks to the cross streets, and their eastern and western of the main street, near the *Porta Anrea*.

To the south of the cross streets are two open squares, walled in on three sides, and screened off next the street by an arched colonnade to each. In the area of the east square is the octagon temple of Jupiter, and in the west square is a small temple to *Esculapius*;—at least, these are the names given them by Adam.

Severus Alexander, who lived some sixty years before Diocletian, had two private chapels in his palace: one dedicated to the Virtues and the other to the Talents. In the first he put statues to Alexander the Great, Abraham, Orpheus, Apollonius of Tyana, and Jesus Christ.

In the other he had statues of Achilles, Cicero, Virgil, and of other famous men, and offered sacrifices to them every day.

From the portico before-mentioned the body of the palace is entered by a doorway in the centre of the back wall of the portico, and leads into a circular chamber about 38 ft. in diameter, with four niches from which you enter a hall (possibly) of audience, about 98 ft. long, by 80 ft. wide, but divided into a nave and two aisles by six columns, leaving the nave about 45 ft. wide. Opposite the entrance is a door to the enclosed portico or cloister facing the sea; in the upper or north corners are two closets about 12 ft. square, and the same spaces are cut off at the south or lower end, and contain circular staircases. In each side of the hall, near the upper end, is a doorway leading to a passage which communicates with the other rooms of the palace; this hall was probably an Egyptian one, as it has no windows. Just as in the house of Augustus, each side of the Palace to the right and

* It is now spelt Spalato, but I give the name from Robert Adam's "Ruins of the Palace of the Emperor Diocletian at Spalatro in Dalmatia." (Fol. 1764.)

left of the great hall, is exactly alike, and leads one to believe that one side was devoted to the ex-Empress and her suite, for there is a suite of bath-rooms on each side.

In his restoration, Adam shows four doors to each of these passages, one to the great hall, one opposite into a long room without windows, one at the north end, opening into a square room, and one at the south end into a hall parallel with the sea, about 88 ft. by 59 ft. The first square room to the north communicates with similar square room to the west, both of these rooms having openings 26 ft. wide into the court of the Temple of *Esculapius*, and this court was probably a garden. After Diocletian's abdication, Maximianus, his former partner in the Empire, tried to persuade him to resume the reins. His celebrated reply is well known:—"You should see the vegetables I grow in my own garden, cultivated with my own hands, and you would not talk to me of empire." And he also said, "An honest, cautious, and excellent Emperor is sold."

The room into which the south end of the passage leads seems to be another Egyptian Hall, for Adam shows it without windows, though I am inclined to think the room from which the passage is cut off must have been an open court. At the south end of the last is one door leading into a large oblong peristyle, with a large apse to the north end, which Adam supposes to be the swimming-bath; but which bears a strong resemblance to the *sterquilinum* of the house of Augustus, beyond this are two rooms 31 ft. and 25 ft. wide, and 64 ft. long, which Adam calls the *spheristerium*, and *comatio*. At the back of them, beginning at the west and working east, there is a passage, five rooms, and a staircase; the first room from the passage is trefoil shaped, which he calls Diocletian's bed-room, and the other four rooms baths.

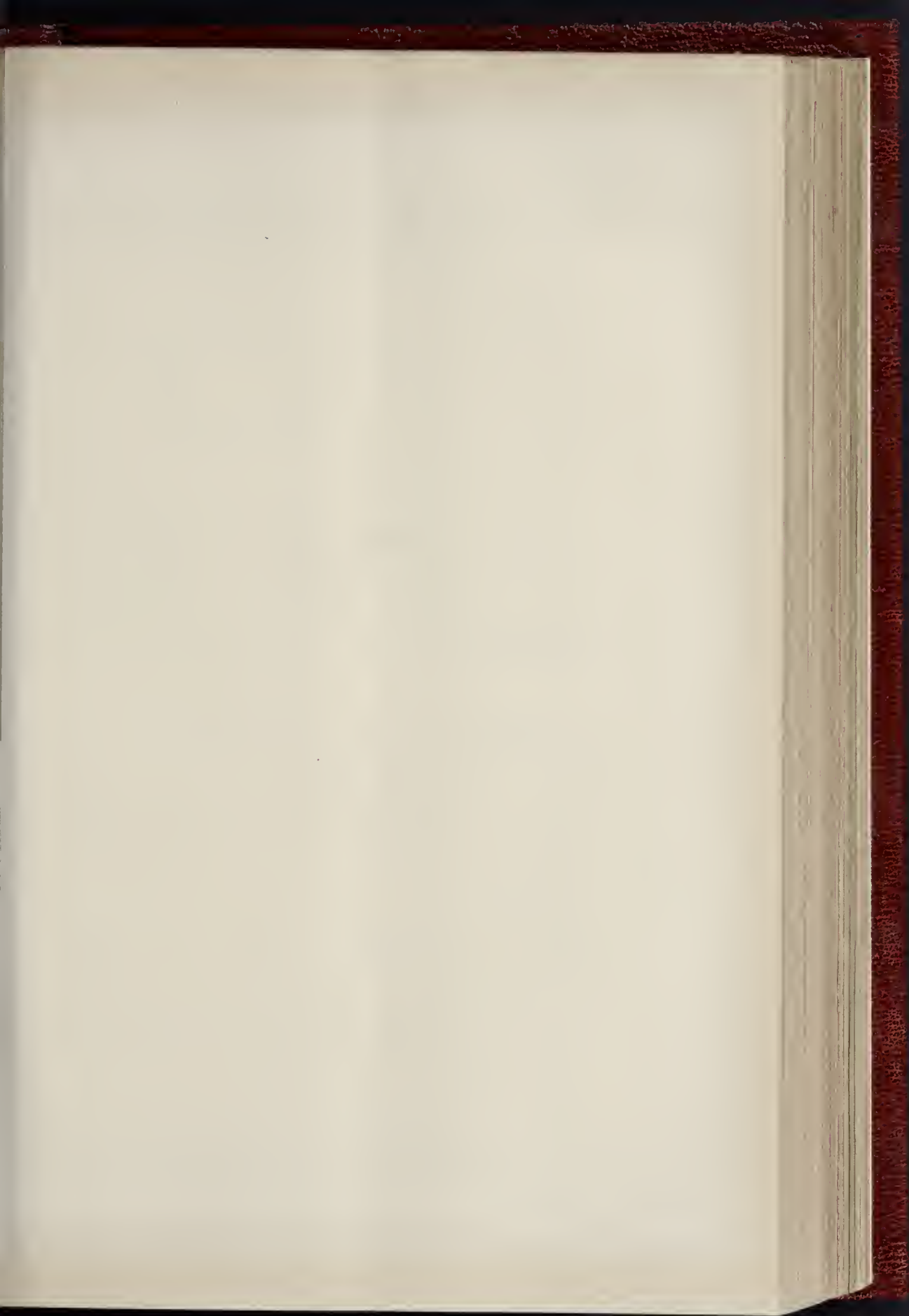
We must thank Adam for what he did, not blame him for what he possibly could not do. Probably additional information could be obtained if the Emperor of Austria would be at the expense of excavating, and put the work into the hands of some of his learned architects; at any rate they should find the hanging floors of the bath-rooms, probably the fine and water-pipes; but as it is the rooms are arbitrarily named, I may here say that in this, as in the house of Augustus, the repetition of the halls and baths certainly points to male and female sides of the house.

Nothing remains now but to examine the two blocks of buildings in the North-East and North-West Islands; the remains of the North-West show an open peristyle with two long galleries on the east and west sides and two short ones at the north and south ends. Adam, in his restoration, calls it "Gynæceum, Textorium, seu Conclave, apartments for matrons and young women," literally the women's apartment, the weaver's shop, or the cage.

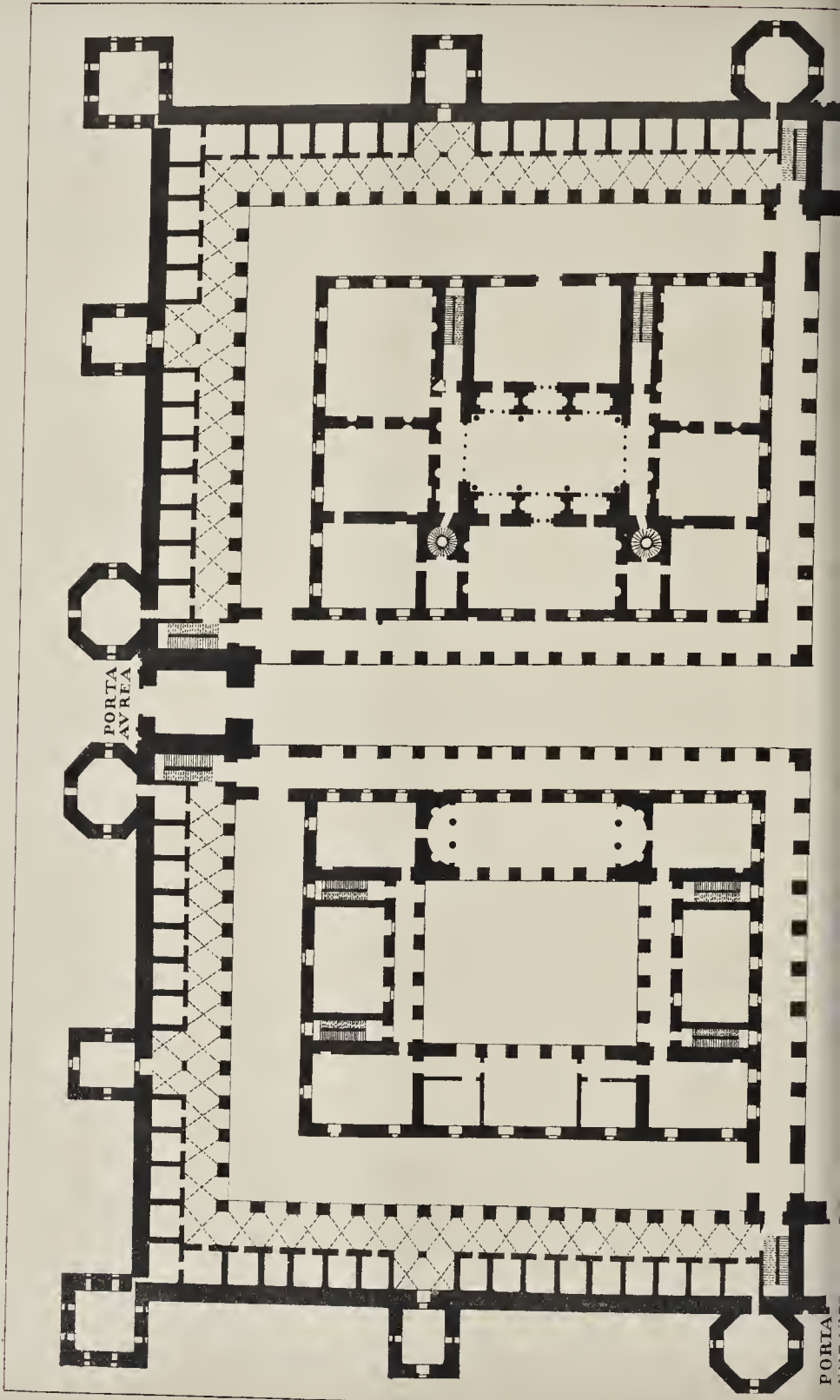
The one in the North-East Island he calls the *Alceum*, or apartments for courtesans. Diocletian had his palace in 303, abdicated in 305, and died in 313. As he was unable to protect his daughter Valeria, the widow of Galerius, from being banished to the deserts of Syria by Licinius, I fear his courtiers, if he had any, were merely dependents, and it is possible it was the *Pædagogium* or the *Hospitium*.

It was customary for the wealthy to have an *Hospitium*, or part of the house set apart for the lodging and entertainment of foreigners who had rights of hospitality with them. We know something about it in the Greek house of from Vitruvius (Lib. VI., cap. 7, p. 4), but nothing about it in the Roman house, except from stray passages in the Classics. When Trimalchio at his dinner-party describes his house he mentions this part. His description is as follows:—"I built this house. As you know, it was a cottage, now it is a temple; it has four dining-rooms, twenty rooms, two marble porticoes, above a series of many cells, a bedroom in which I sleep, the dwelling-place of this viper (his wife), an excellent porter's box, the guests' quarters (*Hospitium*) take a hundred guests. In short, Scæurus, when he comes here, is never unwilling to put up; yet he has by the sea his paternal guest-chambers, and there are many other parts, which I will show you." (Pet. Sat., cap. 77.) This *Alceum* Alcuicornus may have been the guests' quarters; and, as we are absolutely ignorant of how the guests were accommodated, it may be that they were lodged in a kind of barrack.

This block has also an open peristyle in the middle, three rooms to the north, and three to the south, a room on either side of the peri-



THE BUILDER, MARCH 1, 1890.



PORTA
AVREA

PORTA

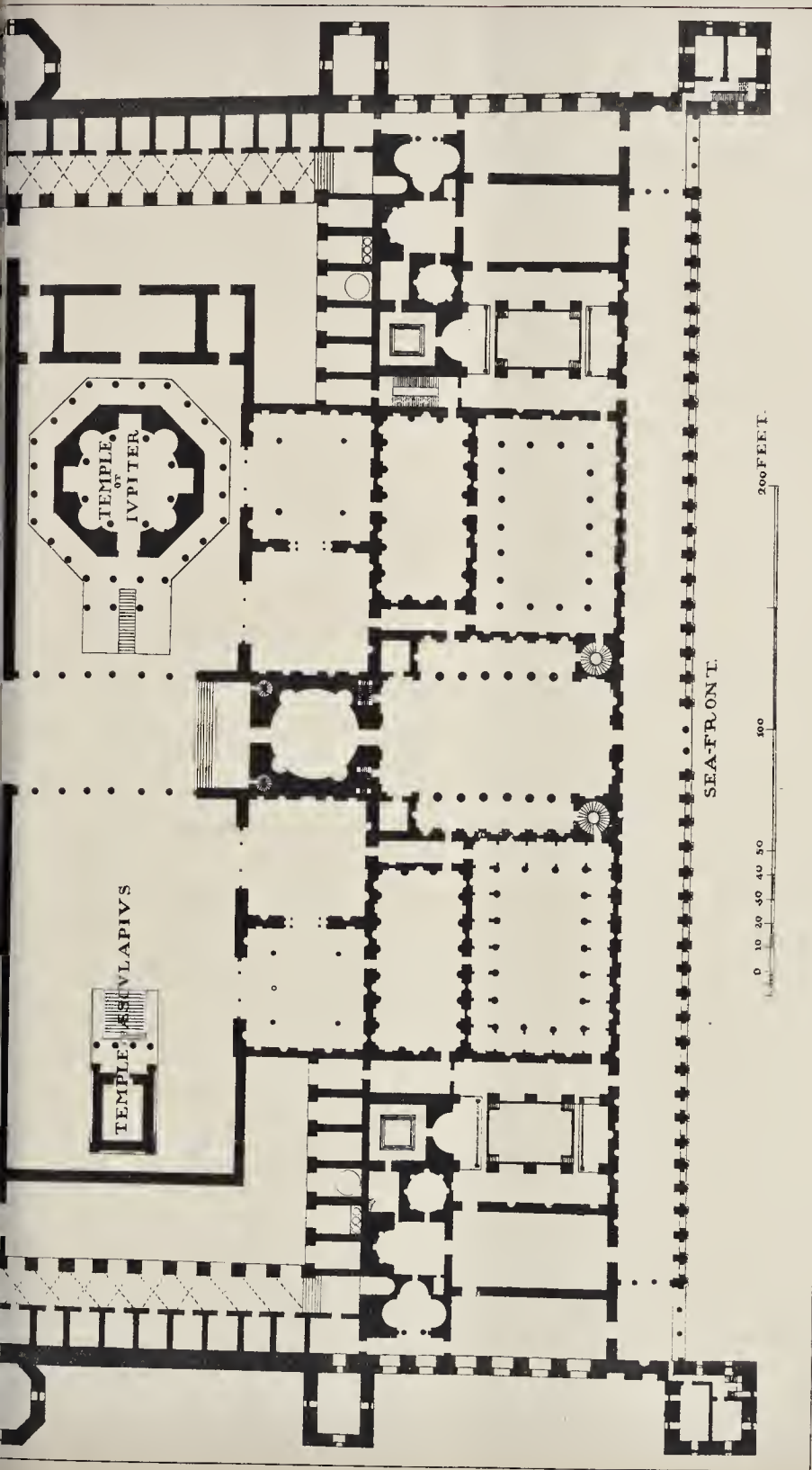


PHOTO LITHO SPANISH & CO. S. MARINE (PAR. 44-10) ST. ANTON. E.

PLAN OF DIOCLETIAN'S PALACE AT SPALATO

284-313 A.D.

(In Illustration of Professor Aitchison's Lectures.)

yle to the east and west; two passages with arcades at each end, the west ones circular, and two closets, 14 ft. by 6 ft., to the west. The dam makes the peristyle like the *Tepidarium* of a bath.

The plan of this palace is a commonplace, and, as far as we can judge without knowing to what purpose the buildings to the northeast and north-west islands were devoted, not particularly convenient.

The square hall to the south-east, too, cannot have had much light, as its window is within 1 ft. of the portico surrounding the Temple of Jupiter, unless, indeed, the room shown at the back was an open court. The architectural proportions are generally odious, the mouldings are coarse and commonplace, and the floral sculpture is hardly equal to the productions of the commonest plasterer of Drury-lane; but, for all this, Diocletian's palace is one of the most interesting buildings in existence, and the most interesting with hope for the architects of the present day.

In the first place, we see the work of independent thought in many parts of the building, quite as strongly as its want of taste. In the entrance portico the architect wanted a central entrance, so he bent the whole entablature into a semicircular arch, resting on the two central columns. He wanted to hide the temple as little as possible by the screens, and so made the arches spring directly from the capitals of the columns. He wanted to ornament the upper piece over the doorway of the *Porta Aurea*, between the two towers, and put an arcade resting on columns that were carried by corbels; and lastly, he wanted to build a dome without centering. Why it is so encouraging to the architects of the present day is readily explained: it shows that to however low a state architecture has fallen, the seeds of a new style may be planted so soon as men begin to think for themselves, and to act boldly and logically on their convictions; for here we see an architect who was halting between two opinions, who adhered to his precedents so long as he could do so without damage to the effects he wanted, but who boldly threw them aside when they interfered with his conceptions. This palace is the halfway house between the Hellenistic architecture of Rome and the Roman architecture of Byzantium, when it was freed from the trammels of a style that did not suit its constructional advance.

SCULPTURE ON GREEK TEMPLES.—I.

ROYAL ACADEMY LECTURES.

MR. A. S. MURRAY, Keeper of Greek and Roman Antiquities in the British Museum, delivered the first of a course of three lectures on "Sculpture on Greek Temples" at the Royal Academy on the evening of Monday, Feb. 17.

Mr. Murray commenced by quoting a passage from the play of *Ion*, by Euripides, to show that usually the sculpture on a Greek temple was disposed in the pediments, metopes, and frieze. But there were some important exceptions to that rule. There were columns which, instead of being merely fluted, were partly sculptured. It happened that the only examples of sculptured columns, known either from ancient literature or from actual remains, were those of the Temple of Diana at Ephesus. The site of that temple was some years ago largely, though not completely, explored by Mr. J. T. Wood, at the instance of the British Museum. Among much that rewarded his unrewarded labours, the first thing that attracted general attention was the large sculptured drum of a column, now to be seen in the British Museum, with other parts of similarly sculptured drums. These sculptured drums had belonged to the last temple of Diana,—the one which was erected in the time of Alexander the Great, and which lasted down into Christian times. It was a building of immense size, great wealth, and a source of much profit to the citizens of Ephesus at various periods of its history. The character of the sculptured drum referred to was sufficient to determine its date; besides, we had the statement of a Roman writer that a certain number of the columns of that temple had been sculptured,—*columnæ celsæ*, as he called them. It was supposed that these sculptured columns had been placed in the front and at the back of the temple. But points of more interest, perhaps, were—(1) how and up ere they sculptured? and (2) on what sort of base did they stand? With regard to the first question we had a certain amount of

evidence on a coin of Ephesus, which gave a view of the front of the temple. That coin was quite clear and explicit on the point that the columns were sculptured only on the lowermost drum; but in view of the diversity which existed among the pieces brought to the British Museum, it had been argued that the sculptures had reached higher up the column, though it was not easy for us to reconcile our tastes to such a prospect. One would rather suppose that among the sculptured columns there had been some difference of dimension. That was not impossible, and in that event the different sizes of the sculptured fragments would be accounted for. Then came the question of the base. We possessed in the Museum a number of square sculptured blocks from Ephesus. On the top surfaces of these blocks a circular bed had been made to receive, evidently, the base of a column; and it was a singular fact that these circular beds were just the size to receive the columns of the temple. If four of these square blocks were placed back to back, so as to form a cube, and if on the top of them were set the large sculptured drum, it would be found that the latter fitted on to the prepared bed. But the effect was questionable. The square blocks were sculptured in very high relief, and when they were immediately surmounted by a sculptured drum in comparatively low relief, there was a striking effect of conflict and confusion, in an artistic sense. To some extent that effect would be lessened by interposing between the two sets of sculptures a simple architectural base, as the late Mr. James Ferguson proposed. But even then it was doubtful if the result would be nearly satisfactory, and on the whole, perhaps, a sculptured column would be better without a sculptured base to stand on. Since Mr. Wood's discoveries at Ephesus we had become acquainted with the results of the German excavations at Pergamon, which was not far from Ephesus. The sculptures there found were of a later date, but they agreed with those of Ephesus in having an equally strong tendency towards the colossal. They included a large series of colossal reliefs, above which rested an extensive colonnade with fluted columns of the Ionic order. A glance at the German publication illustrating the remains at Pergamon would show that that extensive sculptured base, supporting a long colonnade of simple fluted columns, had an admirable effect. Guided by it, he (the lecturer) some time ago tried the experiment in the Museum of placing above two of the square sculptured blocks a cast from a simple fluted column found by Mr. Wood on the site of the temple at Ephesus. It fitted excellently, and so far as he had learnt the opinion of competent judges, the effect artistically met with general approbation. Reverting to the sculptured drum from Ephesus, the subject represented was believed to be Alcestis being led to the lower world by Thanatos, the god of death, and by Hermes, the guide of souls on their journey thither. The youthful figure on the left was not exactly what we expected in Thanatos, and yet it was not altogether unsuitable. But no better explanation of the subject had yet been found. As regarded the sculpture itself, the lecturer said he hesitated to say that he was no great admirer of it; but it was necessary to give an opinion, because some authorities, entitled to every respect, had expressed themselves otherwise. They appeared to have been influenced by the tradition that one of the columns of the temple had been sculptured by no less an artist than Scopas. But even if that tradition had been quite explicit, which it was not, it would not follow that Mr. Wood had found that particular column; the chances were rather the other way. Nevertheless, a distinguished German was prepared to recognise in that sculptured drum, if not the work of Scopas, at least the influence which his presence in Ephesus was likely to exercise, supposing he had been in Ephesus. That was an easy way of arguing, and it might mean much or it might mean little. But we were fortunate in knowing the style of Scopas from several fragments that had survived, and we could see that it was immeasurably above that of the Ephesian drum. We had, on the one hand, two mutilated heads from the sculpture of a temple by him at Tegea, in Arcadia; of these, casts were to be seen in the British Museum. On the other hand, we also possessed in the Museum part of a marble frieze, representing a charioteer, which belonged to the Mausoleum at Halicarnassus, and which, it was generally felt, must be part of the

work of Scopas on that monument. With these limited materials it might seem that we had too little to furnish an adequate notion of his style; but it was to be remembered that what was known of him generally pointed to a peculiar gift, which would show itself best of all in the faces of his figures. It happened that in these surviving sculptures the heads were remarkable for the excellence with which they rendered a particular type of youth which Nature employed when she desired to reveal in the face some permanent mood or pathos in the soul. So far as the general conception of such a type of youth was concerned, that might be said to have been attained some time before Scopas in the heads of many of the youths on the Parthenon frieze. The tendency of Scopas was to develop that type throughout the whole structure of the face and head. It was a task requiring the utmost refinement of observation and delicacy of execution, side by side with a preservation of all that was essential to strength and power. In one of the heads from Tegea, and in the charioteer from the Mausoleum, the throat was strongly marked, and stood out in contrast to the softness of the cheek and the almost pathetic expression of the eye and its socket. In the other head from Tegea there was a pervading pathos combined with the greatest refinement of execution, as in the eye, cheek, nostril, and mouth. The lips were marked along the inner edge with an incised line, as in bronze sculpture. When we attempted to compare these fragments of the work of Scopas with the sculptured drum from Ephesus, we were met at first by the negligence of execution which pervaded the Ephesian sculpture. On mere negligence of execution one would not lay any great stress (that was a failing that might be accounted for in many ways), provided the work altogether was of a high character of conception. But he (the lecturer) could see no such high character of conception in the Ephesian sculpture. The draped figure of Alcestis in the middle of the group was little more than a study of drapery,—like many of the terra-cotta figures from Tanagra, but hardly so fine as some of them. The faces and nude forms of Hermes and Thanatos had nothing to raise them above the level of the work of a well-trained sculptor in the latter part of the fourth century B.C. No doubt there was considerable difficulty attendant on sculpture on a round surface. In that respect the sculptor had displayed a good deal of talent, and was entitled to full credit for it. Before leaving the Temple of Diana at Ephesus, the lecturer discussed the sculpture on the huge square blocks, which, as, before stated, in very high relief. Mr. Wood had assigned these blocks to the frieze of the temple, but there were several insuperable obstacles to their location there, not the least being the fact that among these blocks there were at least five corner-stones, whereas a Greek temple was content with four corner-stones in the frieze. For purely ocular purposes one would gladly place these very high reliefs very high in the building. But it was quite certain that they were placed low down, and that they supported columns. Some defence would be looked for of that proceeding of giving very high relief low down, on the level of the eye, or nearly so. Such defence, he thought, was to be found in the fact that the base of a large temple like that of Ephesus must at the first sight have conveyed an impression of vast solidity and strength, and if the artist or architect must have sculpture on it, he had no choice but to give his sculpture very high, strong relief; and having decided on that, what could he do better than choose for the subject of his sculptures the labours of Herakles, the strongest of all Greek heroes? If sentiment could help him, it was there in abundance. The lecturer said he need not describe the various labours of Herakles represented in those reliefs, but the fact was worth bearing in mind that on the part of the temple at Ephesus, where an impression of the greatest possible solidity and strength was necessary, we found sculptured the labours of Herakles in high, powerful relief.

The lecturer next went on to speak of some earlier sculptured fragments (including parts of columns) found at Ephesus, belonging to the temple which was burnt down by Hierostratos. An artistic peculiarity of this temple was that the cimatium of the cornice was sculptured, not with a plant ornament, as in the later temple and in most others, but with groups of figures, in low and delicate relief, between the

lions' heads which served to carry the rain from the roof. The lecturer then directed attention to the figures called Telamones or Atlantes, which were employed in the Greek Temple of Zeus at Agrigento, in Sicily, and, in conclusion, referred to the Caryatides of the Erechtheion at Athens as forming another notable exception to the general rule as to the situation of sculpture on Greek temples.

[We hope to give reports of the second and third lectures in our next.]

Illustrations.

COMPETITION DESIGN FOR NEW YORK CATHEDRAL.

THIS is a design submitted in the competition for the proposed cathedral at New York, by Mr. R. W. Gibson, an English architect, who has migrated to and settled in New York.

As will be seen from the drawings, the design is purely Mediæval in plan and architectural character, but of an unusually rich type. We understand that there was an impression among the competitors that the promoters of the competition wished for what may be called an ecclesiastical design; an impression which appears to have been to some extent a mistaken one, but which may be taken to justify the adoption of the purely Mediæval type by competitors, as it would be of no use to offer people in a competition what they did not want. The result of the competition appears to have shown that the promoters have more modern views than was anticipated. If so, we think they are in the right, and that a leading city in the new world should endeavor to strike out a new type of cathedral. But this does not alter the fact that Mr. Gibson's design is a fine and rich architectural conception on the model of a Mediæval cathedral.

We understand from the architect that he forwarded us a detailed description of his design, but this has unfortunately not reached us, and we can only therefore leave the design to speak for itself.

CENTRAL TOWER AND CHAPTER-HOUSE, LINCOLN.

The illustrations of these well-known features of one of the finest and at the same time most finished and artistic in style of the English cathedrals, are from the set of sketches by Mr. John Begg which have gained for him this year the Pugin Travelling Studentship of the Institute of Architects.

PLAN OF DIOCLETIAN'S PALACE AT SPALATO.

This plan, giving the palace as restored by Robert Adam, is reproduced from one of the diagrams illustrating Professor Altchison's fifth Royal Academy lecture on "Roman Architecture," and is referred to and described in that lecture, which we print in full in our columns.

The English Iron Trade—The English iron market has had another relapse this week, mainly the result of the speculative influences which have been upsetting the ordinary conditions of trade during the past month. There is, on the contrary, less apprehension of a disturbance of business from a general miners' strike, as there is some prospect—which, we trust, will not be falsified by subsequent events—of a peaceable settlement of the pending dispute. The pig-iron trade is especially affected by speculation. The Glasgow warrant market has been flat, and the effect has been to further depreciate Scotch makers' iron. In the north-west also makers have reduced their quotations of mixed numbers of Bessemer iron by 2s. a ton. In the latter district, as well as in the north of England, the difference between warrant prices and those quoted by makers is still about 6s. to 7s. a ton, and for hematites as much as 10s. The southern pig-iron markets are likewise weaker. This tendency is less pronounced in finished iron and steel; nevertheless, prices have given way to some extent, without, however, interfering with their general steadiness. The orders booked for new ships are still scarce, and engineers are beginning to report a similar experience.—*Trom*

THE ARCHITECTURAL ASSOCIATION: SOME TYPICAL GREEK BUILDINGS.

IN the course of the discussion which followed Mr. R. Elsey Smith's paper on this subject,* Mr. Stannus, in moving a vote of thanks to Mr. Elsey Smith for his interesting paper, said that Mr. Smith was to be congratulated upon the good use which he had made of his opportunity as Greek Travelling Student of the Institute. He was to be envied for the opportunity he had had of visiting Athens, as well as commended for the good use he had made of his time, and they could not sufficiently thank him for the trouble he had taken in so generously bringing before them some of the results of his visit. He thought Mr. Smith had done well to confine his attention to two or three typical buildings. The plan of the Propylæa at Athens† was an exceedingly interesting one, and Mr. Smith had been able to lay before them the newest lights on the subject, thanks to the kindness of Dr. Dörpfeld. The manner in which Mr. Smith had explained the beautiful and exceedingly complex plan of the Erechtheion was very instructive. That and the other buildings on the Acropolis at Athens furnished together an admirable illustration of the elasticity of the Greek style. People had long had an idea that in Greek architecture everything must be rectangular or on one axial line, and that everything must be on the same level. The light which had been thrown on the buildings of the Acropolis of late years had dispelled that idea. He need not remark on the admirable refinement of detail which characterised the Greek work; but strong as might be our admiration for it, it did not follow that it would bear exact reproduction in this country. The delicacy of Greek work was not suited either to our duller climate or to the coarser materials in which we built. Dr. Temple (now Bishop of London), in one of the essays which appeared in "Essays and Reviews" many years ago, referring to the early Christians, said that we should do, not what they did, but as they did. Similarly he would say with regard to Greek architecture, that we were not called upon to do what they did (and if we were called upon we could not do it), but we ought to strive to work in their spirit. In conclusion, Mr. Stannus spoke highly of the admirable way in which the paper had been illustrated by drawings and photographs hung on the walls, and by photographic lantern-slides thrown on to a screen.

Mr. H. O. Crosswell seconded the vote of thanks, and also expressed his appreciation of the way in which the paper had been illustrated.

Mr. Owen Fleming said that the plan of the Palace of Tiryns was exceedingly interesting as a specimen of the domestic architecture of the ancient Greeks, a subject in which there was a great deal of latent interest. In the writings of Homer we found the palaces of the kings and primitive heroes described fairly fully, although, no doubt, with some poetical licence. A study of Homer in conjunction with the plan of the Palace of Tiryns suggested many interesting questions. He cordially supported the vote of thanks to Mr. Elsey Smith.

Professor Roger Smith said the subject was one of great, and he was happy to think, of increasing interest. It was very satisfactory to see that more and more attention was being paid to Greek architecture, and that mainly because of the extraordinary thoroughness and completeness with which all kinds of Greek buildings were executed. As had been said by Mr. Stannus, we did not want to do Greek work at the present day; and if we did we could not do it. The circumstances were different,—we had not the marble and we had not the Greek sky over our heads, and if we had both those things, the circumstances of to-day were quite different. The extraordinary accuracy and beauty of Greek work, and the pains taken with every detail of it, the attention which was paid to proportion and to every other matter, was remarkable, and full of instruction for us in the present day. There were one or two curious points about the plan of the palace of Tiryns. He was glad to hear the inquiry which had been made about domestic Greek architecture, but this palace was really the first perfect bit of it that had been revealed. There was, he hoped, a good deal more to be learnt from it yet, not merely from

the study of Homer, but from actual buildings, some of which possibly remained to be discovered. At present we had in the palace of Tiryns the only complete example of a Greek domestic building. It was interesting to see how completely the old Greeks separated the men's from the women's parts of the house. Another point to which he would allude was the plan of the Acropolis, which showed that the Greeks were by no means slavishly addicted to placing their buildings at the same angle to one another. It was only necessary to glance at the plan of the Erechtheion to see that regularity was not even adhered to in a single building.

Mr. F. R. Farrow, in supporting the vote of thanks, said that Mr. Smith had practically put before them the results of the most modern investigations of the German and other archaeologists who had done so much to throw light upon questions of Greek archaeology.

The Chairman, in putting the vote of thanks, said that like some former speakers in the discussion, he had not been to Greece, and therefore he could not judge of the effect of these marvellous buildings, although one might realise their effect to a very great extent from the excellent photographs which had been thrown on the screen that evening. Although those enlarged photographs gave them an excellent idea of the general appearance of the buildings, yet they were devoid of that beauty and colour which made them such beautiful objects to look upon even in their ruin. He had, however, been to Sicily a few years ago, and there he saw some remains of Greek temples, which, although very fine, were constructed of a rather coarse yellowish sandstone, not altogether satisfying to the eye. Still the effect was very fine, and having seen the Greek architecture of Sicily he could very well understand how fine must be the appearance of the work in Greece. He was glad to hear Mr. Stannus refer to the fact that Greek architects were not necessarily rigid in their lines, and not tied down to hard and fast rules. The Greeks, who were naturally artists, did practically what they liked, and they could not help doing the right thing. He quite agreed with what had been said as to Greek work. We should study it and learn from it without seeking to directly imitate it; we should rather work in the spirit of the style than attempt to follow it in the letter.

The vote of thanks having been carried by acclamation, Mr. R. Elsey Smith briefly replied, and the meeting terminated.

THE ARCHITECTURAL ASSOCIATION VISITS:

THE IMPERIAL INSTITUTE.

The second seasonal visit of the Architectural Association was made on Saturday afternoon to the Imperial Institute, Exhibition-road, South Kensington, and was attended by a large number of members.

The party was received by Mr. T. E. Collcutt, the architect, who, in addition to pointing out the main features of the structure, gave an interesting description of a series of careful tests which had been applied to the different materials employed.

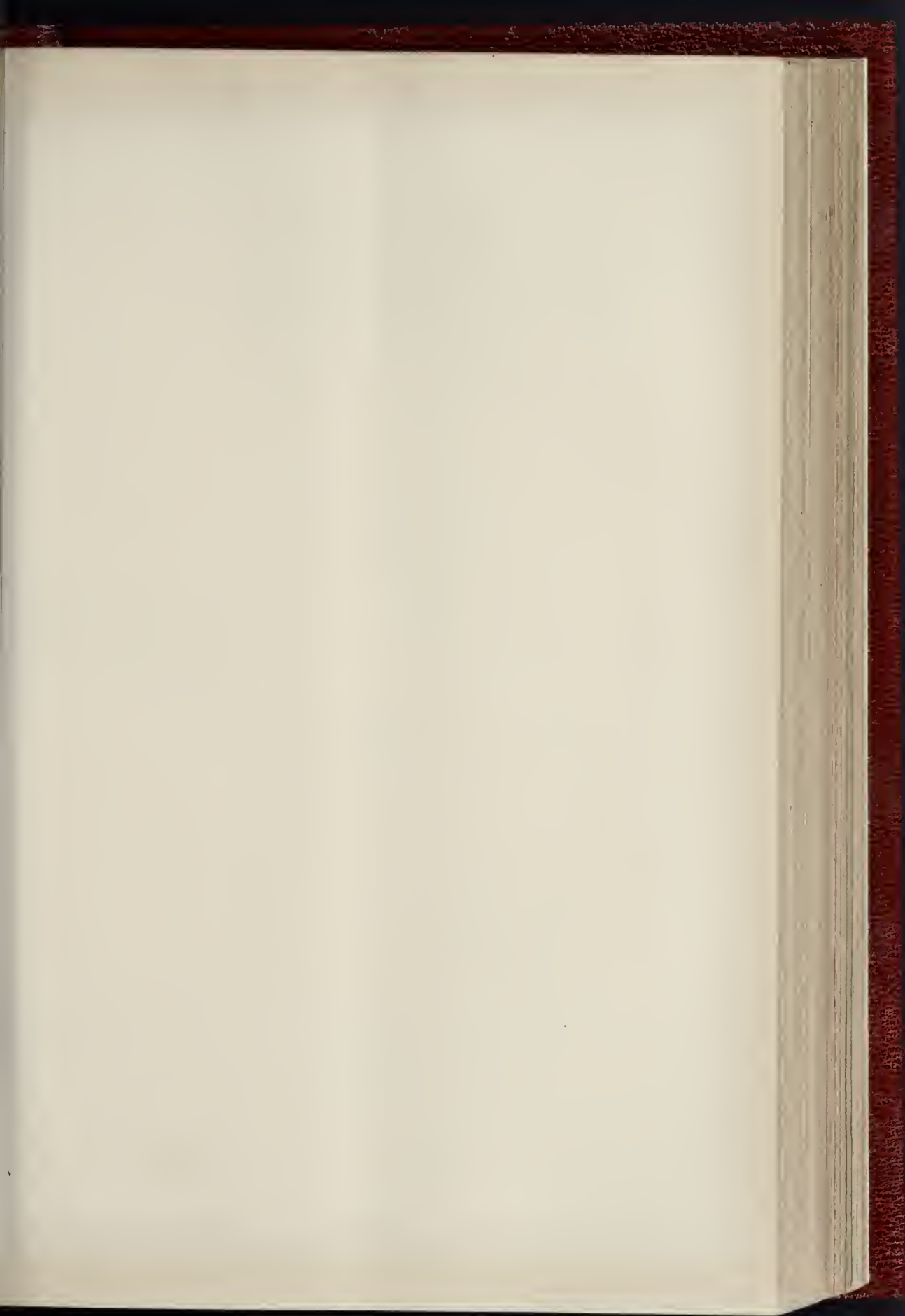
The building, at present confined to the front block, has not been raised much above the level of the first floor, but the inspection of the detail, and the careful workmanship of the Hopton Wood stone internal dressings, excited much interest.

The foundations have been taken down to a stratum of blue clay found at a depth varying from 12 ft. to 26 ft. below the level of the site. The footings and the walls of the ground floor have been built of London stocks and Portland cement mortar, but Jennings's Parkstone wire-net bricks have been used in the body of the central tower, and of those piers which sustain much weight. Portland stone is being used in the elevations.

Official Architecture in Prussia.—According to an official notice, the Prussian Government has, during the year 1888, had the superintendence of the erection or alteration of 503 buildings. Of these works, 44 were churches and 33 vicarages, 96 elementary and 8 high-class schools, 33 buildings belonging to the University system, 8 for scientific collections, and 3 to be used as hospitals; the government and administration required 10 new homes, the town and provincial law courts numbered 22, and 19 prisons had to be taken in hand.

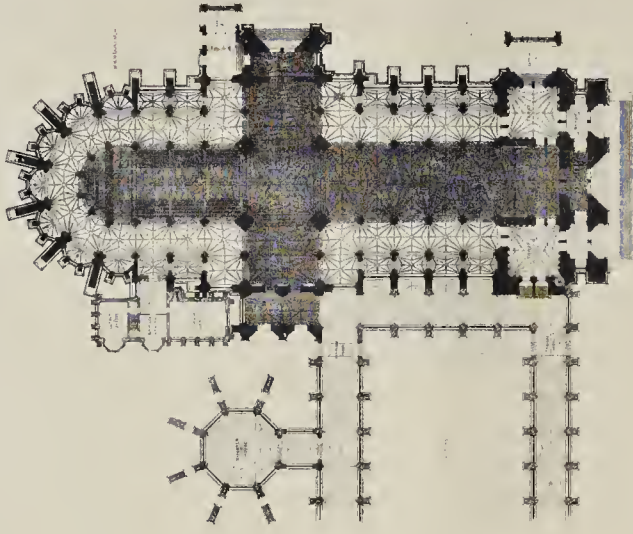
* See *Builder* for Feb. 22, p. 137.

† Given in the *Builder* last week, page 138.

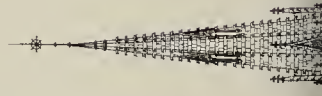


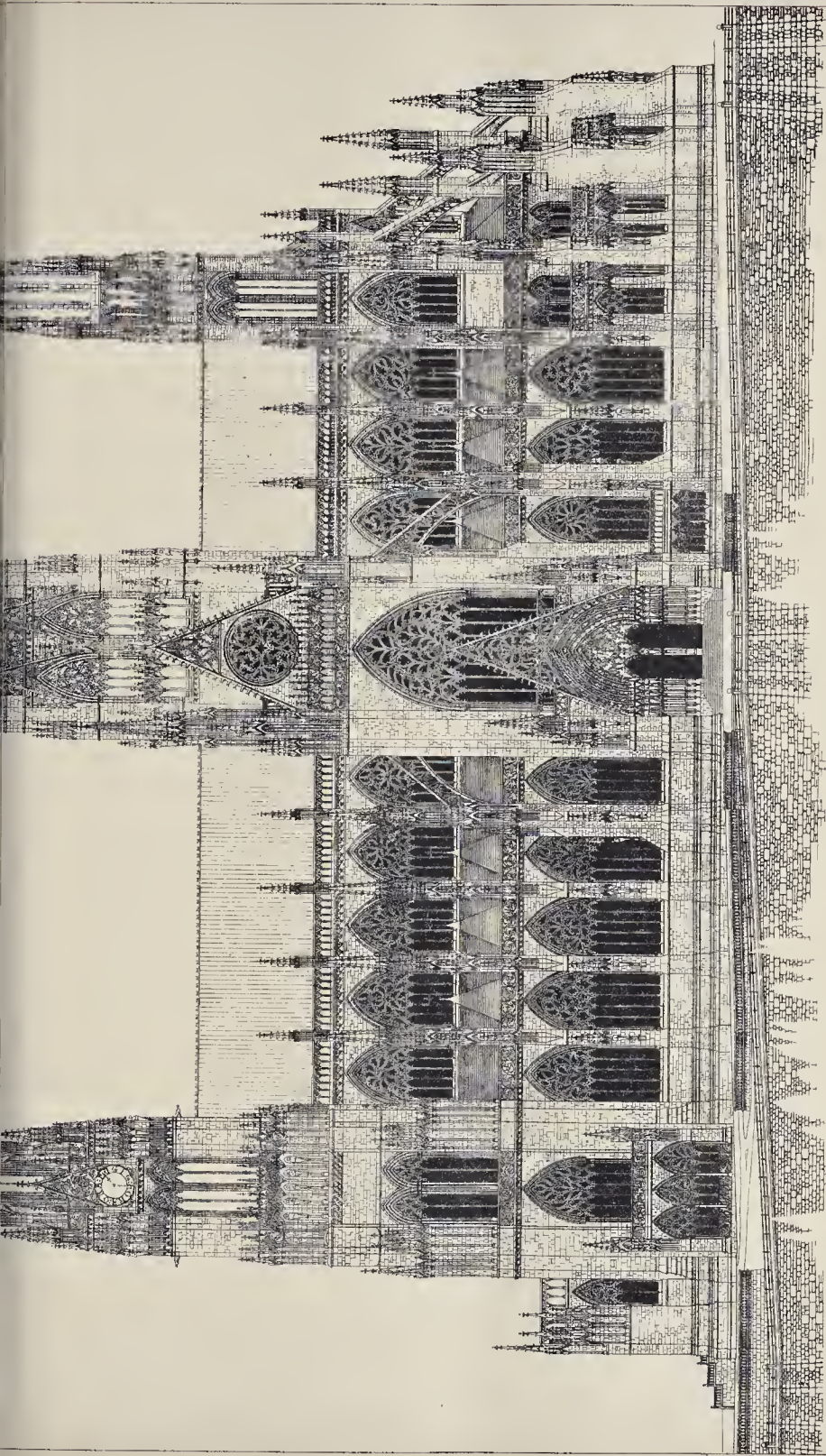
COMPETITION DESIGN FOR NEW YORK CATHEDRAL.
MR. R. W. GIBSON, ARCHITECT.

❖ CATHEDRAL OF ST. JOHN THE BAPTIST, DIVINE PLACE, YORK. ❖



WEST WALL



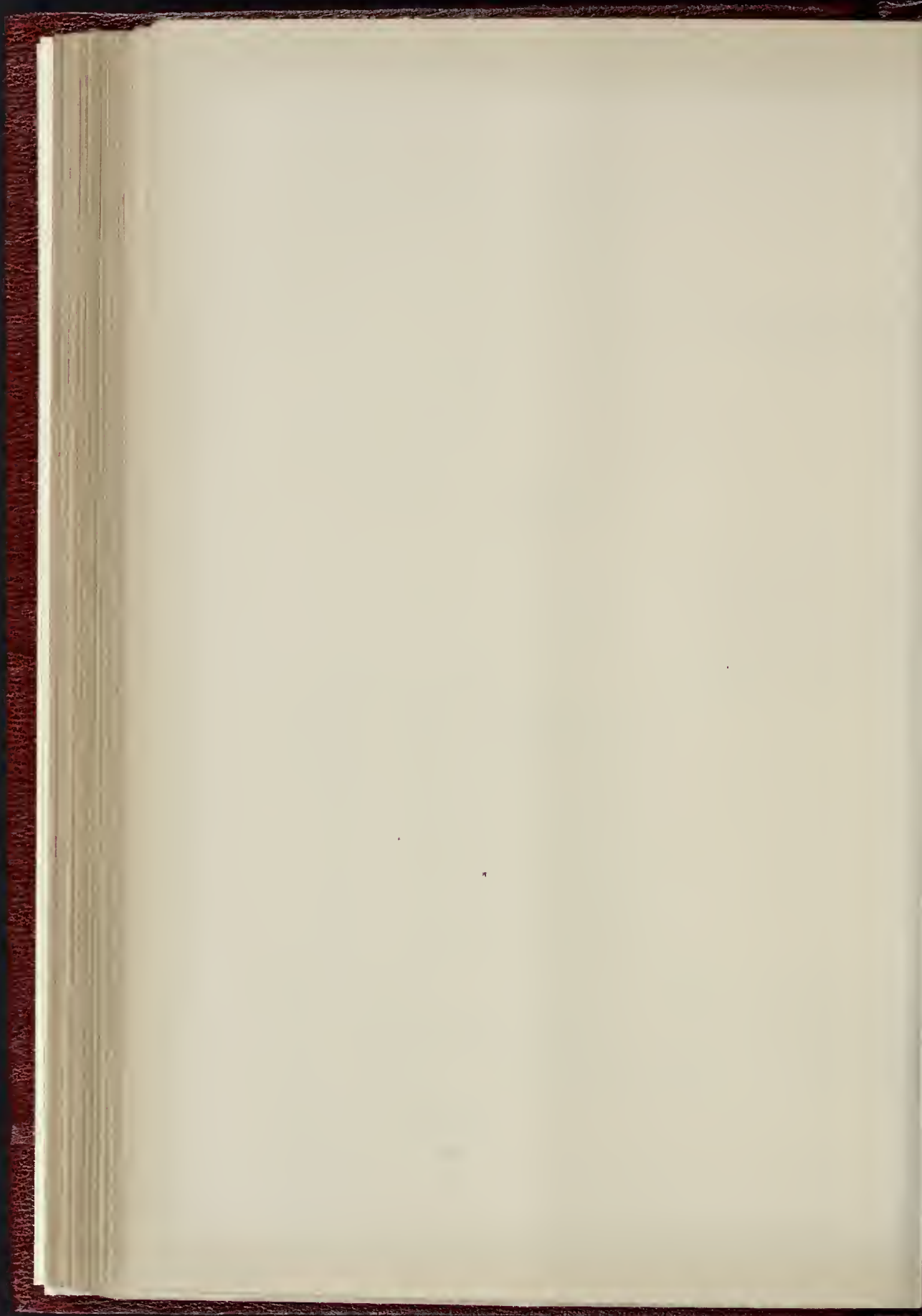


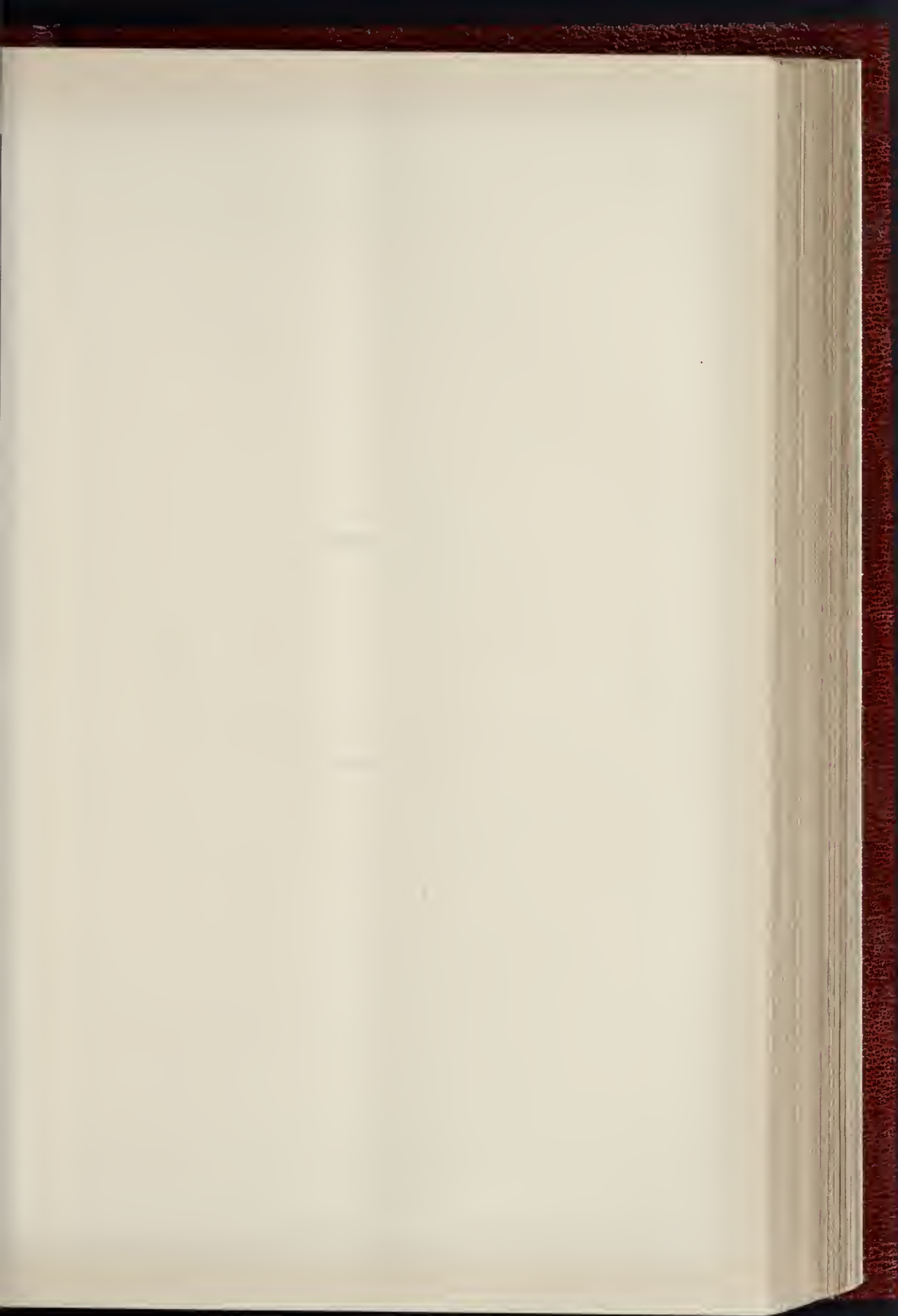
SIDE ELEVATION
PARIS, MORNINGSIDE, PARIS

"JAS. LONGA VITA BREVIS"
R. W. GIBSON ARCHITECT NEW YORK

PHOTO LITHO SIMPSON & CO. 27 HARTING LANE - LONDON E.C. 4

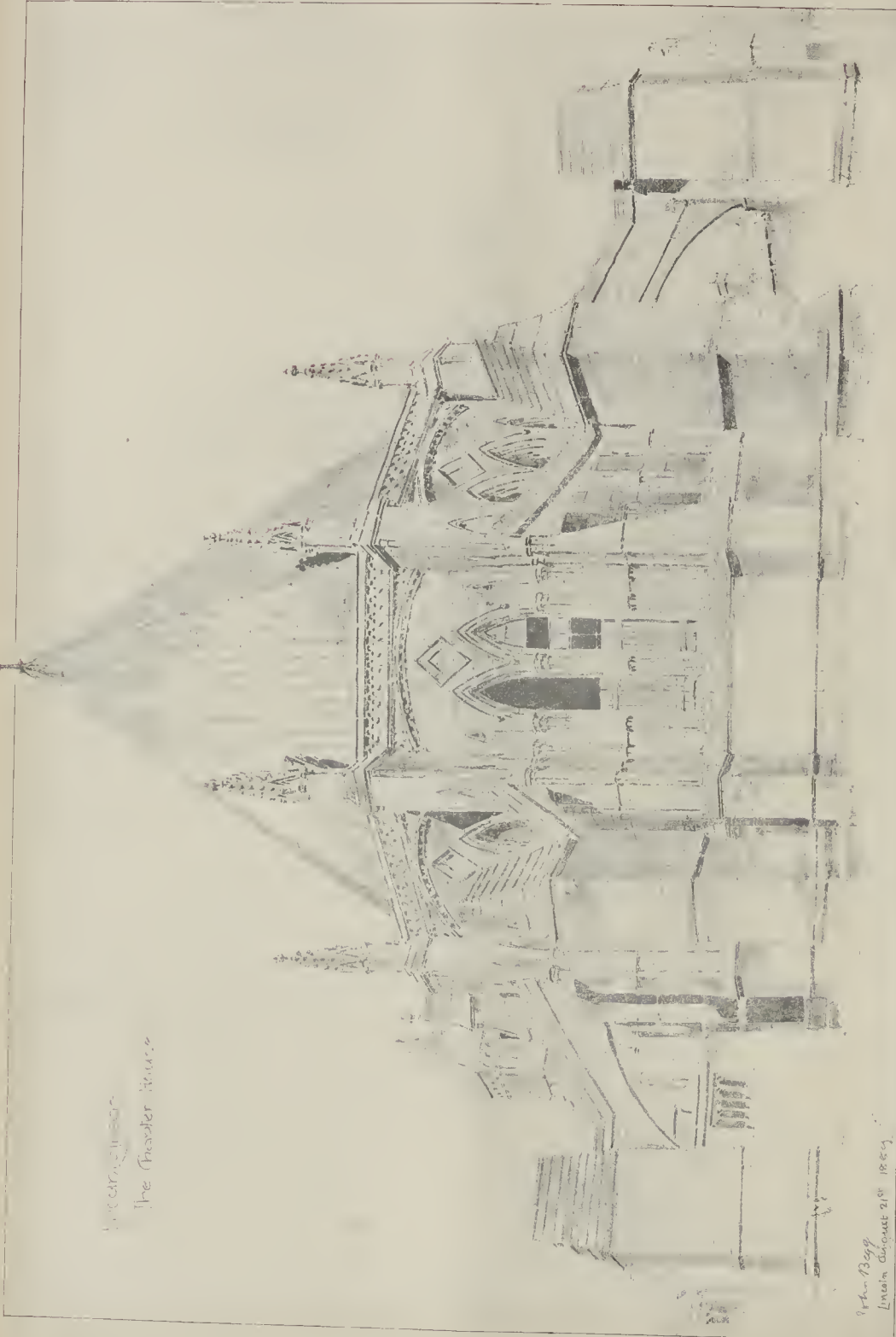
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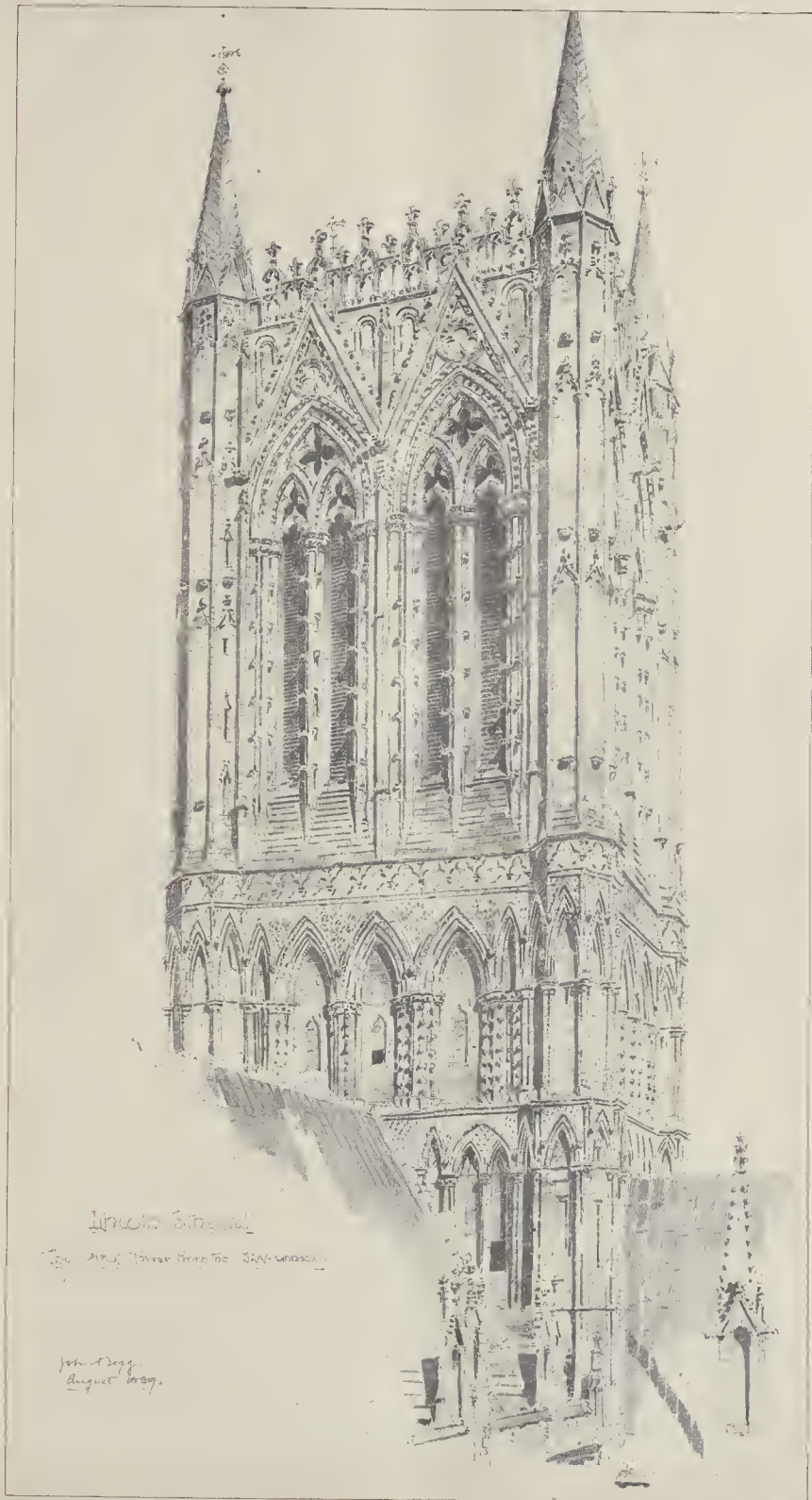


THE BUILDER, MARCH 1, 1860.

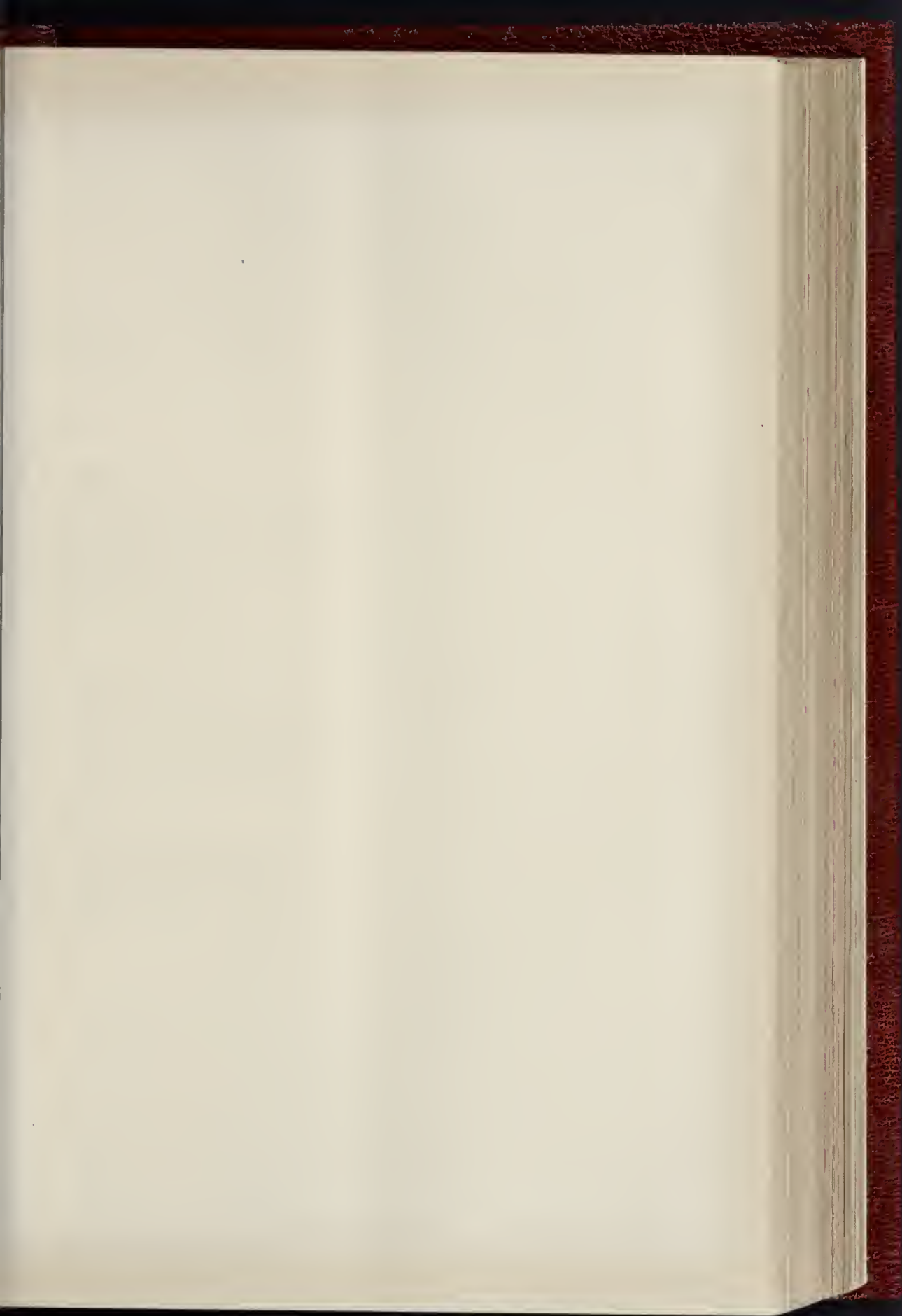
Interior of
The Theatre Royal



John Begg
London August 21st 1859



THE BUILDER, MARCH 1, 1890.



THE BUILDER, MARCH 1, 1890.



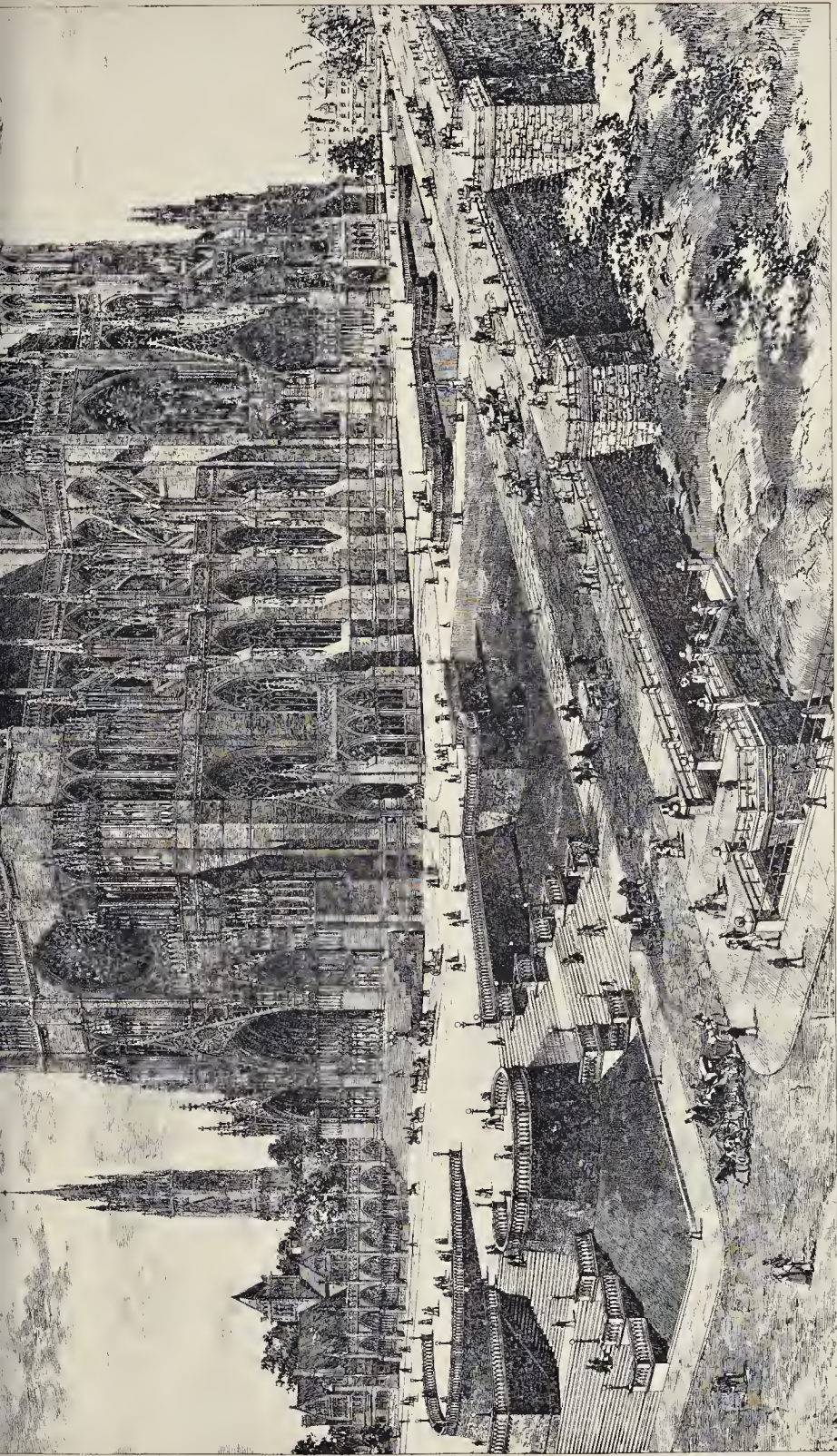


PHOTO LITHO. SIMMONS & CO. 27, SOUTH BROADWAY, N. Y.

COMPETITION DESIGN FOR NEW YORK CATHEDRAL.—MR. R. W. GIBSON, ARCHITECT.
PERSPECTIVE VIEW

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of this Council was held on Tuesday afternoon in the Council Chamber of the Corporation of London, Guildhall, Lord Rosebery in the chair.

The Proposed Blackwall Tunnel.—The Bridges Committee presented the following report:—“The Thames Tunnel (Blackwall) Act, 1857, and the report of Mr. Wolfe Barry have had the most anxious and careful consideration of your Committee. For many years the people of the east and south-east of London pressed upon the Metropolitan Board of Works their claim to have provided by the central authority some means of permanent inter-communication commensurate with the important interests on both sides of the river. As far back as August, 1852, Sir Joseph Bazalgette prepared, by order of the Board, a report which deals with the whole subject, going very fully into the question of ferries, bridges, and tunnels: this report concludes with the statement that a tunnel is the only suitable means of effecting a permanent crossing at Blackwall. After much consideration, the Board took the same view. Much time was spent in preparing the details necessary before going to Parliament, and a Bill was promoted in the session of 1857. It was referred to a Committee, when the scheme, which was opposed by railway companies and other owners of property, was supported by some of the ablest engineers of the day, viz., Sir J. Bazalgette, Sir F. Bramwell, and Mr. B. Baker. The Committee reported in favour of the Bill, and it was in due course passed. Specifications were prepared and tenders advertised for, and the action of the Metropolitan Board of Works in accepting in the last month of its existence a contract for this important work, instead of leaving the Council unfettered, will be fresh in the recollection of the Council. Your Committee on taking up the matter were placed in considerable difficulty, the Council being without a Chief Engineer, and the advantage of having the same engineer to prepare the specifications and carry out a work of this character will be obvious. The technical aspect of the questions arising as to size, boring or borings, practicability of scheme, &c., were by order of the Council referred to Mr. J. Wolfe Barry, and a copy of his report has been forwarded to each member. Mr. Barry, though suggesting certain modifications, considers a tunnel practicable, but suggests a high-level bridge. Your Committee are of opinion that, as a bridge at this point would have to be of such a height as to admit of all ships passing under it without any alterations in their masts, and as ships with masts 200 ft. above the water are stated to pass at this point, the road of the bridge would have to be at least 210 ft. above Trinity High Water Mark. When the low level of the land on both sides of the river is considered, a bridge of this height is, in the opinion of your Committee, out of the question. They therefore recommend—

(a) That the Council do proceed with the formation of the tunnel authorised by the Thames Tunnel (Blackwall) Act, 1857.

(b) That the Bridges Committee be authorised to nominate an engineer of experience in tunnelling with a pneumatic shield, to prepare the necessary plans and specifications for carrying out the works, submitting the whole to the Council.

The adoption of this report was moved by Mr. O. W. Osborn, Chairman of the Bridges Committee.

Mr. Arthur Arnold moved, as an amendment—

“That the Council doth disagree with the recommendation of the Committee, and is of opinion that the report of Mr. Barry should be adopted so far as it is opposed to the construction of a tunnel at Blackwall, and that the best efforts of the Council should be directed to providing such other means of communication as may appear most desirable.”

After a long discussion, in the course of which opinions strongly adverse to the tunnel scheme were quoted as having been given by Mr. Wolfe Barry, General Sir Andrew Clarke, R.E., and other engineers (not on account of engineering difficulties, but on account of the ill-chosen site of the tunnel and its necessarily long approaches), it was agreed to adjourn the further consideration of the subject to a special sitting to be held on Friday next, March 7. We may add that in the course of the discussion an extension of the ferry service, as now working at Woolwich, was advocated.

Having transacted other business, the Council adjourned.

SURVEYORSHIPS.

London (St. Martin's-in-the-Fields).—Mr. Charles Mason, Assoc. Inst. C.E., Assistant Borough Surveyor of Leicester, was last week unanimously elected Surveyor to the Vestry of St. Martin's-in-the-Fields, Westminster. There were eighty-five applicants for the appointment who were reduced to the following eight for the final, viz., Mr. Mason (Leicester); Mr. Monson, St. James' Vestry, Westminster; Mr. Waddington, Assistant-Surveyor to the Islington Vestry; Mr. Wright, Assistant-Surveyor to the Battersea Vestry; Mr. Garthwaite, Engineer's Office, Corporation of London; Mr. Burgess, Stockton-on-Tees; Mr. Dickenson, York; and the Assistant-Surveyor, St. George's, Hanover-square.

Wimbledon.—At a meeting of the Wimbledon Local Board, held on the 19th ult., Mr. O. H. Cooper, A.M.I.C.E., Assistant-Surveyor, was appointed Surveyor, in the place of Mr. William Santo Crimp, who lately obtained the Assistant-Engineership to the London County Council.

THE CENTRAL ASSOCIATION OF MASTER BUILDERS OF LONDON.

The eighteenth annual meeting of this Association was held at the offices, 31 and 32, Bedford-street, Strand, W.C., on Wednesday, the 26th February, Mr. J. T. Chappell, President, in the chair.

The Secretary, Mr. E. S. Henshaw, read the following report:—

“The Committee have the pleasure to place before the members their Eighteenth Annual Report.

It will be remembered that the last annual general meeting the President, Mr. Jno. T. Chappell, and the then Past-President, Mr. H. H. Bartlett, were requested to confer with the solicitor, and if considered advisable by them to take the necessary action with reference to the Classification and Schedules of Rates and Charges proposed by the railway companies under the Railway and Canal Traffic Act (1888), and lodged by them with the Board of Trade.

A Commission was appointed by the Board of Trade to hear any objections on behalf of traders to the propositions of the railway companies. As the statements prepared by the President showed that these propositions injuriously affected the building trade, the Committee employed an expert, who drew up formal objections and prepared elaborate tables, showing the enormous increase which the railway companies were asking the powers to enable them to charge for the carriage of building materials and plant: in some cases the proposed increase on the present rate being as much as from 200 to 300 per cent.

In addition to the individual opposition of this Association, the Committee are also opposing the railway companies through the Mansion House United Association on railway rates.

The Board of Trade having issued a circular asking objectors and the railway companies to meet and endeavour to come to some arrangement which would be satisfactory to both parties, the Secretary met them, but without any satisfactory result.

The expenses incurred are very heavy, and a special fund has been started by the Committee to meet this increased expenditure, and the Committee trust the members of the Association will respond liberally, so that the general funds will not have to be encroached upon.

Prints of the tables prepared by the Association in support of their case, and giving much information upon the present powers of the various companies running into London, can be obtained at the office of the Association.

Early in the year the Committee had to consider the action of the London County Council (Main Drainage Committee) in proposing to fine a member of this Association 500*l.* for sub-letting brickwork. The firm attended to be fined by the London County Council, when the Committee's report was read, and the Chairman of the firm, and the matter has since been allowed to drop by the London County Council.

During the autumn demands were made by the navies employed by three firms of contractors for an advance of wages of 5*d.* per hour, but on being told their demands could not be acceded to, and that any dissatisfied men could go to the office and receive their money, the men, after a short interval, returned to work.

Notices have been received from different branches of operatives in the Provinces, viz., Birmingham, Bradford, Liverpool, Leeds, Edinburgh, Bristol, &c., for a rise in the rate of wages, and other matters.

The attention of the Committee having been directed to the recent Act of Parliament for the rating of hoardings, which empowers each parish to make its own regulations, the Committee felt it was a matter that must be dealt with, in each case, by the individual alderman.

The Committee have to announce that the Home Secretary has given notice of his intention to introduce into the House of Commons a Bill to amend and consolidate the law relating to the Liability of Employers for Injury to their Workmen. The Committee presume that this Bill will be drafted on the lines of the Bill introduced previously, and, if passed into law, will add very much to the liability of employers. The Committee therefore, think it right to impress upon all members of the trade the desirability of effecting insurances against these risks with the Builders' Accident Insurance, Limited.

In accordance with the rules of the Association, the President, Mr. Jno. T. Chappell, becomes an Honorary Vice-President; and four members of the Committee—viz., Messrs. Wm. Downs, John Marsland, Geo. Wall,

and John Woodward, retire—Mr. Wm. Downs and Mr. Geo. Wall being eligible for re-election.”

The Chairman moved that the report and accounts he received and adopted, and the resolution having been seconded was carried unanimously.

Mr. J. Howard Colls was then elected President; Mr. Downs and Mr. Geo. Wall were re-elected, and Mr. G. J. Lyall and Mr. R. Thorn were elected, members of the Committee. Messrs. G. Williams and H. S. Foster were elected auditors.

A vote of thanks to Mr. Jno. T. Chappell for his services as President for the past year concluded the proceedings, after various matters with regard to the trade had been fully discussed.

PROVIDENT INSTITUTION OF BUILDERS' FOREMEN AND CLERKS OF WORKS: ANNUAL DINNER.

The annual dinner of this old-established Institution was held on Saturday last, at the Holborn Restaurant, under the chairmanship of Alderman Sir James Clarke Lawrence, Bart. There were more than 300 members and friends of the Institution present. The usual loyal and patriotic toasts having been given (Mr. George Barr, jun., replying on behalf of “The Reserve Forces”).

The Chairman, in proposing the toast of the evening, “Success to the Provident Institution of Builders' Foremen and Clerks of Works,” said it was hardly necessary to say a word to commend the claims of the Institution to the sympathy and support of those whom he saw around him. Was there any one present who did not know how precarious was the life of a builder's foreman or a clerk of works? Where, then, would be found a stronger desire or a deeper determination to support an institution which ministered to the needs of old and infirm members of those callings, or of their widows and families? He had been looking through the report, and one thing that struck him was the great amount of good they had been able to accomplish. He had known the Institution for a great many years, and he most cordially commended it to the support of all who were connected with the building trade. With the toast (which was warmly received) he coupled the name of Mr. J. W. H. Bedford, the honorary secretary.

Mr. Bedford, in responding, gave some particulars of the working of the Institution. He stated that a member's subscription was only 2*l.* per annum. With that limited subscription, however, they never could have done what they had during the last fifty years. They had to thank the master builders (and none more so than those who, father and sons, bore the honours of the name of Lawrence), the builders' merchants, and others. The Institution now dispensed about 300*l.* a year in pensions.

Mr. Grooms, in proposing “The Governor, Trustees, Donors, and Honorary Subscribers” spoke in warm terms of the great services which had been rendered to the Institution by those gentlemen, and especially by the Governor, Mr. George Plucknett, J.P., whose name was associated with the toast.

Mr. Geo. Plucknett, J.P., in responding, said that he could bear testimony to the admirable and economical way in which the affairs of the Institution were managed. There were hardly any expenses connected with its management, the officers being honorary, and doing their work well.

The Chairman next proposed “The Architects and Surveyors,” who were of all men the most capable of judging of the value of the services of the clerk of works and builder's foreman. He spoke of the interest which many architects and surveyors evinced in the status and prosperity of building trade employees, and urged his hearers to do all they could to take advantage of the means of improved technical education now open to them. Alluding to the lectures now in course of delivery at Carpenters' Hall, he spoke in highly complimentary terms of the lecture given there a few days ago by Professor Roger Smith on “Drawing.” He had never heard that subject, in relation to the needs of building artisans, so well treated of in a lecture, and he could only say that Professor Roger Smith was proving himself a worthy successor of the late Professor Donaldson in the Chair of Architecture at University College, London. As a personal matter, he (the Chairman) was proud to have been amongst the first of the late Professor Donaldson's pupils at University College, some forty years or more ago.

Mr. H. Percy Monckton, F.R.I.B.A., replied on behalf of “The Architects,” and Mr. W. H. Strudwick on behalf of “The Surveyors.”

Mr. Alexander Ritchie, in a humorous speech, proposed “The Builders,” coupled with the name of Mr. Hall, of the firm of Hall, Beddall, & Co., successors to Messrs. William Lawrence & Sons, of which firm the Chairman was a member.

Mr. Hall, in replying, said that he was specially pleased to be allowed to speak on that occasion, for if it had not been for the magnificent liberality of Sir James Clarke Lawrence and his brothers, he

(Mr. Hall) would most probably not have been there in the capacity of a master-builder that evening.

The other toasts were "The Chairman" (proposed by Mr. Bedford), "The Press" (proposed from the chair and coupled with the name of the representative of the *Builder*), and "The Visitors," proposed by Mr. Stapleton, and coupled with the name of Mr. James Adams.

During the evening the Financial Secretary, Mr. J. Merifield, announced donations and subscriptions to the amount of between 50*l.* and 60*l.*

A CLAIM ON A BILL OF EXTRAS:

SMITH R. KIRK AND RANDALL.

THIS case, heard in the Brompton County Court on Tuesday last, was of some interest. It had been remitted from the High Court, and was a claim for 49*l.* 5*s.* 6*d.*, for goods supplied. The point raised was as to a builder's liability to pay to specially-empowered tradesmen money ordered by the architect to be included in the bill of extras, and so included by the quantity surveyor.

The case arose out of the erection of the Kensington Public Baths, of which Mr. Thomas Verity was the architect, and Messrs. Kirk & Randall the builders. The plaintiffs were Messrs. C. Smith & Sons, lock manufacturers, &c.

It was shown by the evidence of Mr. Verity and of Mr. F. H. A. Hardesty that the amount in dispute was inserted in the bill of extras, and that the amount had been paid by the Baths Commissioners to Messrs. Kirk & Randall, having been included in a lump sum of 2,500*l.* paid in final settlement of the contractors' account. That amount was arrived at on the basis of a bill of extras and variations, the items of which had been jointly agreed to by Mr. F. H. A. Hardesty, the quantity surveyor acting on behalf of the Commissioners, and Mr. Sydney Batstone, a surveyor appointed by the builders to watch their interests in the measuring-up of the work and the final adjustment of the account.

For the defence it was contended that the architect had exceeded his authority under the contract.

His Honour, Judge Stonor, gave judgment in favour of the plaintiffs for the amount of their claim, with costs. He held that, in pursuance of the contract, Mr. Verity had power to order the goods, and did order them; that the amount being included in the accounts prepared by Mr. Hardesty on behalf of the Commissioners, and Mr. Batstone on behalf of the defendants, the latter must be held to have had knowledge constructively that it was so included; and that, not having repudiated it when they agreed to a settlement with the Commissioners and gave a receipt in discharge of all claims, they were liable.

INSANITARY CONDITION OF A RESIDENCE IN WEST HAMPTSTEAD.

SIR,—My attention has been directed to your "Note" in last week's *Builder*, with reference to the above, and as the "Independent Surveyor" who was called in permit me to say that the statement made in Mr. Tonge's letter to the *Times* of the 10th inst. was perfectly correct, and that the passage to the main drain (or sewer) was blocked at the time of my visit to the house, and, judging from the accumulation of deposit in the drain, I should say it had been blocked for a considerable time.

Chokages of this kind, under certain circumstances, can occur without being known to the tenant and without being visible at the surface, and, incredible as it may appear, on being called in to examine the drainage system of a large house in South Kensington a short time ago, in which there were two cases of typhoid fever, not only was the outlet to the sewer blocked, but the whole drain—a nine inch one—was full-up with decomposing sewage from end to end, and in addition, the soil surrounding the drain was blackened to the extent of about three feet on either side of it and from two feet to two feet six inches in depth. The pipes had been laid dry, i.e., without any form of jointing material, and after the occurrence of the chokage the liquid sewage passed away into the gravel soil, and the solids remained behind, as before stated.

There was absolutely no evidence of all this on the surface, and but for the outbreak of fever the sewage might have gone on accumulating under the house to this day without the tenant being aware of it.

I am pleased to note from recent reports that the Local Sanitary Inspectors, as a body, are making a move to weed out the incompetent men from their ranks, of whom, alas! there are at present by far too many. Within the past twelve months no less than three cases similar to that of Mr. Tonge's have come under my direct notice, where Sanitary Inspectors have shown gross ignorance and incompetence in dealing with drainage matters, and this in London too, "the least badly-drained metropolis in the world."

N. P. JASPER, Assoc. M.Inst.C.E.

LECTURES FOR SANITARY INSPECTORS AT THE SANITARY INSTITUTE.

SIR,—Referring to Mr. Booker's well-meant letter in your issue of the 15th Feb., I should like to point out that hitherto no lecturers have, as a rule, departed at the twelve or thirteen hours in all devoted to them is insufficient. It would, therefore, seem impossible to make the lectures of more extended application without seriously injuring their present special usefulness. On the other hand it seems to me that the Sanitary Institute would greatly extend its usefulness, and promote the objects which are dear to it, by granting certificates to candidates other than Sanitary Inspectors, and confining the examination of such candidates to those subjects (varying, of course, according to the offices held, or trades pursued) in which they desire to obtain certificates of sanitary knowledge and proficiency.

I put in a plan that the Sanitary Institute should grant certificates to builders who show a sufficiently perfect knowledge of the sanitary branches of their trade, without asking them to pass through the whole of the subjects special to inspectors of nuisances, many of which subjects are entirely outside the builders' sphere and trade, and which might easily be replaced by the knowledge of sanitary building construction and the methods by laws relating thereto. It seems strange, whilst the registration of plumbers, masters and men, is progressing slowly but surely, that the registered plumber is oftentimes under a misapprehension (not that the much-maligned builder) whose orders, whether sanitary or unsanitary, he must implicitly carry out, and yet that the master cannot obtain the Institute's sanitary certificate without coaching himself up in the multifarious duties of an inspector of nuisances.

Doubtless besides builders there are others who are desirous of obtaining the Institute's sanitary certificate, and surely the Sanitary Institute cannot better promote its objects than in creating, fostering, and satisfying the demand for such certificates which must eventually and certainly result in the diffusion of sanitary knowledge amongst all classes; until which time the Sanitary Inspector, with all his learning and perseverance, will find his hands greatly tied.

February 19, 1890.

VALVES TO FRESH-AIR INLETS.

SIR,—I noticed in the course of his interesting and valuable lecture on "Modern Sanitation," at Carpenters' Hall, on Wednesday last, Dr. Corfield touched on the question of "valve" or "no valve" to fresh-air inlets to drains. He appears most decided in his opinion that they are useless and radically wrong, and in the course of his remarks said:—"When you find a valve on a fresh-air inlet you may depend that the man who carries out the work had not sufficient confidence in the arrangements to be certain that what intended as an inlet would not at some time or other become an outlet."

With all due deference to Dr. Corfield's opinion, I think he is putting it rather strongly when he says this, and I would ask him whether he has sufficient confidence in any of the works he has superintended to enable him to say, "That inlet will never become an outlet?"

For my own part, I do not consider it of vital importance whether a valve is provided or not; but the fact remains that every time a good flush is sent down the drain it acts as a piston and forces the gases and air in the drain before it, and if there is no valve on the inlet that is where they will make their exit.

But, as I have just hinted, the quantity being so small, and in a properly-ventilated drain the gases having no opportunity of becoming dangerous, I do not consider a valve absolutely necessary, although I still hold that in some situations it may be desirable to prevent the exit of anything through the inlet. Therefore, I do not consider, because a man takes a precaution which in some cases may be necessary, that it shows a want of confidence in his work, for with the best design and workmanship, natural laws will at times cause the gases and air in a drain to seek to escape through the first air-inlet, and I challenge Dr. Corfield or any one else to refute this.

HARRY G. ASSITER.

Free Lectures to Artisans at Carpenters' Hall.—The third of the present series of free lectures to artisans and others in matters connected with building, under the auspices of the Carpenters' Company, was delivered on Wednesday, the 19th ult., by Professor W. H. Corfield, M.A., M.D., his subject being "Modern Sanitation." Mr. Joseph Preston presided, and there was a large attendance. The fourth lecture of the series was delivered to a large audience on Wednesday evening last by Professor Armstrong, Ph.D., F.R.S., his subject being "The Domestic Fireplace." Mr. Charles Barry, F.S.A., F.R.I.B.A., presided. We hold over our reports of these two lectures.

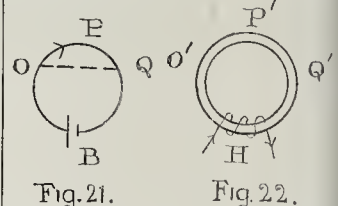
The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—IX. MAGNETIC CIRCUIT.

THE rapid development of dynamo-electric machinery soon rendered it necessary that the number of lines of force or flux traversing any part of a machine should be determined, if possible, by methods as easy to use as Ohm's law for the determination of the current flowing in any part of an electric circuit. Electrical engineers, finding the means employed by mathematicians unsuited to their wants, have returned to and extended Faraday's way of attacking the problem.

Faraday described everything he treated with such minuteness of detail that want of space prevents our giving his ideas in his own words, but the two following quotations from his "Experimental Researches in Electricity" will show his general methods sufficiently for the purpose.

Under *Magnetic Conduction* he wrote, in 1850, "I will now endeavour to consider what the influence is which paramagnetic and diamagnetic bodies, viewed as conductors, exert upon the lines of force in a magnetic field." And again, under *Analogy between the magnet and a voltaic battery*, "The magnet with its surrounding [field of force*], may be considered as analogous in its condition to a voltaic battery immersed in water or any other electrolyte; or to a gynomotus or torpedo, at the moment when these creatures, at their own will, fill the surrounding fluid with lines of electric force." Within the last few years the idea of conceiving a magnet or helix carrying a current as a magnetic battery, and anything through which lines of force pass as a magnetic conductor, has become all but universal among electrical engineers.



In the case of a simple electrical circuit, fig. 21, consisting of a battery B, where an E.M.F. E is driving a current through a circuit of total resistance R, if C is the current flowing, then $C = \frac{E}{R}$. Again, if between the points O and Q

in the external circuit a second conductor be placed, it is easy to calculate how it will modify the resistance of the whole circuit, and also what proportion of the whole current given by the battery flows from O to Q by way of either of the two branches O P Q and O Q. When the dimensions of an electrical conductor and the specific resistance of the substance of which it is made are known, it is easy to calculate its resistance, unless mathematical difficulties are introduced owing to its shape being complex. By the specific resistance of a substance is meant:—The resistance of a cube of the substance whose edge is one centimetre in length, the direction of the current being perpendicular to a face. Under ordinary circumstances conductors are of uniform cross section. For such a conductor let:—R=the resistance, ρ =the specific resistance of the substance of which it is made, l=length, s=the cross section, then:—

$$R = \frac{l}{\rho s} \quad (1)$$

By the length of the conductor is meant the length measured in the direction of the current, and similarly the cross section is taken at right-angles to this direction at each point. Clearly, the resistance of a particular conductor differs according to the direction in which the current is sent through it, the resistance offered to a current by the conductor in fig. 23 is much greater when the flow is from the face A to B

* Faraday uses the expression "spheroidal of power," the meaning of the word spheroidal having been previously explained in a note which it does not seem necessary to reproduce here.

than when it is from P to Q. Ohm's law and its consequences, however, are too well known to need recapitulation here, and the above



Fig. 23.

facts have merely been recalled for the sake of analogy in considering the magnetic circuit.

Figs. 21 and 22 may now be compared as two very simple cases of electric and magnetic circuits; B is a voltaic cell, having a certain electro-motive force which will, if a closed path of electrical conductors lead through it, produce a current in such path whose value can be calculated by Ohm's law, if the E.M.F. of the cell and the resistance of the circuit are known. H is a helix, carrying a certain current of A amperes, and produces lines of force whose number depends upon the media through which they pass. The number of lines passing by any path is, as already stated, called the flux through that path, and just as a voltaic cell can, by virtue of its electro-motive force (E.M.F.), send a current through an electrical conductor, so can a helix by virtue of its magneto-motive force (M.M.F.) send a flux through a magnetic conductor.

Flux is, therefore, the analogue of current, though it must at once become apparent that a flux is a more difficult thing to control than a current. A current may be entirely stopped by placing an insulator across its path; but lines of force can go through every known substance,—there is no such thing as a magnetic insulator,—and hence the regulation of a magnetic flux presents the difficulties that would be presented by an electric current if no substance could be found to insulate a charge of electricity properly. The meanings of such expressions as electro-motive force have already been given in former articles; how those explanations can be made to apply equally well to the corresponding ones applied to magnetism may be seen by the following definition of electric and magnetic potential, it being noted that as the definition applies to the "absolute" units. As the potential of the earth is unknown, and by the potential at a point is meant the difference between its potential and the earth's, difference of potential is alone defined.

The difference of { electric } potential between two points is the number of ergs of work that would be done in moving unit

{ quantity of positive electricity } from one point to the other. The various units used in the magnetic circuit have not been long enough in every-day use to have been given names corresponding to the ampere, volt, and ohm, and the expressions used are, therefore, verbose.

Various kinds of apparatus are employed for producing electro-motive force, but for the production of magneto-motive force a helix, as in fig. 22, is practically the only device used, and its M.M.F. can be readily calculated. Let A = current in amperes flowing through the helix, n = number of turns of wire and M = the M.M.F. produced:—

$$M = \frac{4\pi n A}{10} \quad (ii)$$

The quantity nA is called the number of ampere-turns in the coil, for as the other parts of the expression consist of constants, the M.M.F. of a helix depends upon the ampere-turns, and not upon either the current or number of turns alone.

Ohm's law, as applied to the electric circuit, may be regarded as a definition of electrical resistance. We will, therefore, take Ohm's law and apply it to the magnetic circuit, to define magnetic resistance. In fig. 22, suppose the anchor ring, O' P' Q', which forms the circuit under consideration, to be made of the best soft iron; as specimens of this metal may be taken whose specific magnetic resistance is only a few ten-thousandths that of air, we shall regard air as relatively speaking a magnetic insulator, and consider that the whole flux passes through the magnetically insulated anchor ring. Let l = mean length of ring, s = cross section. M = M.M.F. of helix.

If the ring contained air alone, the specific

magnetic resistance of air being taken as 1 then F_a, the flux through the air, would be by Ohm's law:—

$$F_a = \frac{M}{\left(\frac{l}{s}\right)} \quad (iii)$$

If, however, the air-ring is replaced by the iron-ring, whose permeability is μ, the flux F will be μ-times as great; M has not changed, hence the resistance of the circuit has fallen to $\frac{1}{\mu}$ -th its former value, and

$$F = \frac{M}{\left(\frac{l}{\mu s}\right)} \quad (iv)$$

If the expression $\left(\frac{l}{\mu s}\right)$ for the magnetic resistance be compared with $\left(\rho \frac{l}{s}\right)$ given in equation (i), it will be seen that $\frac{1}{\mu}$ is the specific magnetic resistance of the sample of iron used, so that permeability and magnetic conductivity mean the same thing.

In addition to the difficulty of applying Ohm's law to the magnetic circuit, arising from the fact that even air is a magnetic conductor, and hence that what may be called leakage of flux, corresponding to leakage of current in an imperfectly insulated electric circuit, takes place; there is the very serious difficulty that while ρ remains constant no matter what current is passing, so long as the temperature of the body remains constant, μ varies in a very complicated way with the flux, and this variation in the case of iron must next be considered.

Books.

Electric Light, its Production and Use. Embodying Plain Directions for the Treatment of Dynamo-Electric Machines, Batteries, Accumulators, and Electric Lamps. By JOHN W. URQHART. Third edition. London: Crossly Lockwood & Son. 1890.

THE first edition of this work appeared in 1880, and although a considerable amount of new matter has since been added, it is typical of the books which used to be written about the electric light in its early days. After giving a brief account of the first production of the voltaic arc, and defining the ordinary electrical units, the author expresses his opinion that, "As a source of electricity for permanent electric lighting the voltaic battery is, in our opinion, practically useless," and then proceeds to describe with much detail the "construction of batteries," and many of the well-known forms of cells. The accounts of the Lalande and Upward batteries, however, from which so much was at one time expected, will be read by many with interest. The descriptions of the development of accumulators give a good idea of what has been done in this direction; but the data, evidently furnished by manufacturers of secondary cells, are misleading in the extreme. Mr. Urqhart states that if a cell is discharged slowly its "efficiency" may be as high as 95 per cent. Probably the author means that 95 per cent. of the ampere-hours put into a cell can be got out again, but surely the fallacy of measuring the so-called "efficiency" of a cell by this means has been pointed out often enough.

A few words upon thermo-electric batteries bring the writer to the subject of dynamo-electric machinery. About two-thirds of the plant described is altogether antiquated, and never met with nowadays. "Antiquated" may seem a strong word to apply to apparatus that was used eight or ten years ago, but it must be remembered, so rapid has been the progress of the electric light, that dynamo-machines and lamps which were new inventions in 1880 are now wholly superseded. The hints given for the "Treatment of the Dynamo," are practical, and may be read with advantage by those likely to have charge of an electric light installation. Transformers and meters are dismissed with fifteen pages. Apparently Mr. Urqhart has never heard of the Ferranti transformer, used by the largest electricity supply company in the world, nor of the Lowrie-Hall transformer, used by all the House-to-House companies. Among arc lamps it is almost needless to

say, after the general idea which has been given of the contents of the book, that the Serrin, Duboscq, Wallace-Farmer, and other extinct varieties are all fully illustrated and described, as well as the candles of Jablochhoff, Wilde, Jamin, and others.

We sincerely trust that no young wireman will take Mr. Urqhart seriously when he states that "cotton-covered wire Nos. 12 or 14 B. W. G. is frequently used for conducting branches for groups of incandescent lamps," although it is only fair to the author to say that some of the fire insurance offices had reason to know that such acts were perpetrated before the days of the "Phoenix Rules."

Criticism on our final extract from this interesting work is unnecessary:—

"The Ferranti system employs high tension alternating currents, and as these mains are intended to be used for conveying electricity to Central London from the large generating station at Deptford, where the Ferranti system is exclusively employed, it is probable that at a pressure of over a million volts (sic), such a main will be utilised to convey currents to feed many thousands of lamps."

The Science of Metrology; or, Natural Weights and Measures. A Challenge to the Metric System. By the Hon. E. NOEL, London: Edward Stanford. 1889.

METROLOGY is the "science of measuring," and deals, as the author reminds us, with "measures of all sorts." The author, in challenging the advocates of the metric system, endeavors to show, in a clever and systematic manner, that, "by very little alteration and by a little amending, the existing English measures can be welded into a system scientifically as well as practically superior to the metric," and, at the end of the book, he provides tables and diagrams to completely illustrate his object. The number "ten" having only two divisors, 2 and 5, one of which gives a fraction of one-fifth, a proportion very seldom used, he argues that duodecimals are superior to decimals, and suggests how duodecimal sub-division may be applied to decimal notation. The metre, the basic standard of length, is supposed to be the ten-millionth part of a quadrant of the meridian passing through Paris. He recommends the adoption of the earth's semi-axis as a better base to start from than a line drawn from the North Pole to Paris and prolonged to the Equator, and suggests making the standard "foot" measure the twenty-millionth part of the earth's semi-axis, i.e., of the earth's polar radius, or half the polar axis on which it revolves. The most commonly-used rule in England being a 2-ft. rule, he would convert it into an "all" rule of about 25 in. in length, and he shows how all the measures he proposes bear a definite proportion one to another, and become applicable both to surface and to cubic measures. The acre not being an exact measure of a square, he shows how by his system the standard square unit would not possess this objection, and argues that the Government, in adopting the scale of 7920, "unwittingly forecast the coming of an improved and scientific system of measures." The real reason, we would remind him, is because this scale one square inch practically represents an acre. He applies his system to the readings of a thermometer, barometer, geometry, and coinage. We admire his efforts to defend the duodecimal system, but we think it is not likely to be amended in the ingenious manner proposed in this interesting manual.

Theoretical Mechanics. By J. EDWARD TAYLOR, M.A. Lond. London: Longmans, Green, & Co.

THIS is an elementary book, which is designed to be "specially helpful to those who are reading on the lines of the Science and Art Department Syllabus for the elementary stage;" and to be "sufficient for the requirements of the London University Matriculation examination in this subject." In these respects the author has undoubtedly been successful.

Mr. Taylor, — who, it should be stated, is head master of the Sheffield Central Higher Grade and Science School, — begins with a chapter on motion, and goes right back to the commencement of things, starting with the most elementary propositions. This plan he follows throughout the book, and no doubt it is necessary in a work designed for beginners and those not of mature age. There is really not much to criticise in a book of this description. The author does not attempt any literary embellishment.

We meet with the old familiar examples by which mechanical propositions are usually illustrated, a good feature being the examples for exercise at the end of the chapters.

The Ancient Laws of Wales. Viewed especially in regard to the light they throw upon the origin of some English institutions. By the late HUBERT LEWIS, B.A. Edited by J. E. Lloyd, M.A. London: Elliot Stock. 1889.

This is a work full of information, and marked by much erudition; but it is impossible for us to notice it in detail, as it is scarcely within the scope of this journal. It is a book which is, however, deserving of notice, because it is one of that class which, while it is of historic and permanent value, does not meet with that popular reception which much more ephemeral works receive. Here is an extract which will exemplify the character of the work: "There is good reason to believe that one sense in which the word 'maenor' was used was that of a castle or superior mansion, wholly or partially of stone or brick, or having a stone or brick wall enclosing its precincts" (p. 141). A few pages further it is shown that the maenor or "manerium" the manor, became synonymous with the district around the Castle. In this way we trace the English manor of the Middle Ages to a British origin. Hitherto legal writers have given the derivation of manor as the Latin word manendo, or the French mesner. This is merely fancy, and in the book before us we seem to have the true derivation. The fact is that the authoritative writers on English law, such as Coke and Blackstone, are of little weight in regard to many points, which can only be elucidated by writers who will treat the subject in a scientific manner.

How to Appeal against Your Rates in the Metropolis. By A. D. LAWRIE, Barrister. Second Edition. 1890.

This is a convenient little handbook. We should, however, scarcely notice the second edition of so small a work were it not that we are nearing the time for the quinquennial valuation of the metropolis. While, however, the procedure in regard to rating appeals in London and the general principles of rating are clearly and shortly stated, we should not recommend any one to go very far in an appeal without competent professional advice. On the other hand, a person reading this work will be in a better position to consider whether or not he shall rest satisfied with the manner in which his property is assessed.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

1,577, Sliding Windows. A. F. M. Yoniton. According to this invention, near the top of the inner face of the sash-stile of the bottom sash, as convenient, there are affixed plates containing slots, and to the frame of the window are attached block-plates, or vice versa, or sliding-pins or pivots are fixed, and when any of the improved methods of fixing or swinging the sashes are adopted, the sash (after temporarily removing the inside beads) and raising it to the height required, may be swung inwards from the bottom for outside cleaning from within the room. Into each face of the outside lining opposite the side of the frame at any convenient height is placed a projecting screw or pivot as an axis upon which the top sash may turn inwards by means of projecting hooks, affixed to the top-rail or outside face of sash-stiles, the parting-beads having been temporarily removed or hinged back flush with the pulley-stops.

2,795, Mixing Concrete. J. Stansfield. In a revolving circular pan or vessel similar to a pug-mill the material is mixed; but by this invention an addition is made to the ordinary mechanism in the shape of plates formed and curved like a ploughshare. The revolution of the pan forces the concrete against the plater, which turn it over and mix it.

2,862, Improvements in Water-closets. C. W. Durham (New York).

According to this invention, the lower portion of the water-closet bowl or pan is fitted with a screw-thread, which enables it to be fixed in the pipe itself with or without an intervening trap of O or half O form.

4,946, Bricks. R. R. Cluniss.

The improvement which is the subject of this patent consists in forming a series of studs or projecting pieces on one side, while upon the opposite side a corresponding number of indentations

are made. These studs and indentations are so arranged that the studs of one course will fit into the indentations of the next in order, according to any determined bond, so that a complete tie may be secured. Very little mortar is required, and the expense of manufacture is not greater than that of ordinary pressed brick.

4,947, Drain-pipe Joints. R. R. Cluniss.

By this invention an inward bevel is formed around the edge of the socket at one end of the pipe section, and a flange or collar is fixed at the other end of the pipe, the end of the pipe being roughly bevelled. The cementing material being roughly laid therein, the flanged end of the pipe next in order is forced therein until the bevelled end of the pipe comes in contact with the pipe end inside the socket, the shoulder comes in contact with the outer edge of the socket, and the expressed cement being cut off by the bevelling a complete and closed joint is made.

19,744, Decorating Tiles, Bricks, &c. G. A. Marsden.

According to this invention, lace or such like textile fabrics are put into the mould from which the brick or tile is made, or stencils or similar means are used, to produce a relief or indented surface; this gives a design in raised or intaglio to the face of the bricks or tiles.

NEW APPLICATIONS FOR PATENTS.

Feb. 11.—2,169, W. Barnes, Joiners' Cramp.—2,190, E. Johnson, Open Stoves or Fire-grates.—2,223 and 2,224, J. E. Rendle, Glass Roofing.—2,230, H. Lake, Excavators and Elevators.—2,233, H. Lake, Window Sashes and Frames.—2,240, H. Loftie, Wood Augers.

Feb. 12.—2,256, J. Robbins, Water-pipes, &c.—2,259, M. Chapman, Double-action Lock.—2,263, W. Heywood, Glazing and Roofing Buildings.

Feb. 13.—2,320, S. Denison and Others, Tile and Brick-pressing Machines.—2,321, S. Denison and Others, Brick-pressing Machines.—2,323, F. Bosshardt, Gabled Roofs.—2,346, T. Kemp, Testing Drains.—2,371, C. Edwards, Manufacture of certain kinds of Brick and Fire-clay Substitutes.—2,387, J. Pollock, Window-sash Regulator.

Feb. 14.—2,394, E. Field and F. Andrew, Door-knobs, &c.—2,397, W. Blackband and H. Lunn, Securing Door and other Knobs to Spindles.—2,400, T. Helliwell, Glazing Bar or Astragal for Supporting Sheets of Glass, Zinc, &c.—2,445, A. Osborne, Heads of Screws.

Feb. 15.—2,473, J. Bennison, Chimneys or Flues of Fireplaces.—2,508, B. Westerdahl, Plasterers' Lathing.—2,509, J. Guttman, Stocks for Boring-bits.

PROVISIONAL SPECIFICATIONS ACCEPTED.

16,016, D. Knowles and E. Raybone, Sash Fasteners.—19,825, G. Verity and J. Thomas, Raising and Lowering Sliding Doors.—20,175, B. Pybus, Door Closing Apparatus.—20,518, W. Eckerley, Water Waste Prevention Cisterns for W.C.'s.—20,814, J. Tudberry, Drying Bricks.—137, J. Lyon, Glazing Greenhouses, &c.—311, S. Rogers, Water Waste Preventer and Regulator.—723, W. Thompson, Window Fasteners.—746, F. Fawthorpe, Sash Bars and Glazing Holding Devices for Roofs, &c.—949, C. Szklia, Fastenings for Doors.—974, E. Ingham, Draught Preventers for Doors.—1,020, T. Reed, Water Taps.—1,115, N. Proctor and others, Brick-making Machines.—1,153, C. Danbelligh, Window Sashes.—1,176, W. Sinclair, Cementing Iron Rails to Stone Kerbing, &c.—1,178, W. Sinclair, Water-proofing and Preserving Composition for Stone.—1,190, H. Lake, Valves for Flushing Tanks and Cisterns.—1,346, W. Sugg, Ventilating, 1,978, R. Jewell, Fire Grates.—1,639, A. Deydon, Stove.—1,634, M. Farington, Lime.—1,671, W. Curtis, Window Sash Fasteners, &c.—1,678, C. Sansom, Fire-grates or Stoves.—1,755, A. Tomkins, Slow Combustion Stoves.—1,760, J. Taylor Ventilators, Cows, &c.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

2,688, W. Defries and N. Feeney, Hinges.—5,748, J. Willing, Fixing Letters and Devices to Facias, &c.—5,790, W. Emden, Drain-pipe Joints.—6,310, J. Sibson, Tombstones, &c.—15,364, W. Thompson, Grinding Machines for Frame and other Saws.—16,519, W. Minns, Cutting Window lead for Glaziers' use in the manner of Stained-glass Windows.—20,712, B. White and A. Boyd, Brick-making Machines.—256, A. Halliday, Saw-sharpening Machines.—671, A. Clark, Cutting Stone.—675, C. Stillwell and A. Thayer, Square and Level.

Value of Land at Cricklewood.—On Monday evening last Messrs. Baker & Sons, of Queen Victoria-street, held a sale of freehold building land, known as the "Oaklands Park Estate," opposite the "Crown" Hotel, Cricklewood. We understand that the whole of the plots offered were sold, at a total of 7,000*l.*, being at the rate of about 3,000*l.* per acre.

RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

FEB. 17.—By G. A. WILKINSON. Portland-place—No. 11, called "Langham House," f. £14,200. By ROGERS, CHAPMAN, & THOMAS. Belgravia—10, Lower Belgrave-street, u.t. 21 yrs., g.r. £20, r. £130 p.a. 1,000. Batterssea—7, 8, 9, 16, and 17, Little Europa-pl., u.t. 49 yrs., g.r. £20, r. £20 p.a. 316. Kennington—35, Durham-st., c. r. £22 p.a. 355. Pimlico—8, Denbigh-st., u.t. 40 yrs., g.r. £28, r. £35 266.

FEB. 18.—By R. BROWN. Peckham—F.g.r. of £21, with reversion in 20 yrs. 754. Batterssea—F.g.r. of £14, with reversion in 62 yrs. 305. Poplar—F.g.r. of £10, 14s. 6d., with reversion at 20 yrs. 856. Michaelmas to £90 p.a. 906. Rotherhithe—"The Princes Dry Dock," u.t. 65 yrs., g.r. £250. 225. Custom House, E.—3, Frenchnon-rd., F., r. £58 p.a. 1,445.

FEB. 19.—By HOBSON, RICHARDS, & CO. Broudesbury—8, The Avenue, u.t. 35 yrs., g.r. £12 225. Wandsworth—01, Haldon-rd., u.t. 37 yrs., g.r. £6, r. £32 225.

FEB. 20.—By RUSHWORTH & STEVENS. Pimlico—01, 52, and 55, Winchester-st., u.t. 38 yrs., g.r. £23, r. £180 p.a. 1,266. 25, Westminster-pl., u.t. 44 yrs., g.r. £3, c.r. £55 p.a. 440.

By C. W. MILLAR. Shepherd's Bush—25 and 30, Loftus-rd., u.t. 74 yrs., g.r. £13, r. £64 430. 4707, 13s. 6d., u.t. 74 yrs., g.r. £14, r. £107 400. Ashford—1, Gloucester Villas, u.t. 75 yrs., g.r. £4, r. £24 p.a. 222.

By NEWBON & HARDING. Tottenham—F.g.r. of £72 p.a., with reversion in 58 yrs. 1,485. Islington—F.g.r. of £14 p.a., with reversion in 62 yrs. 1,620. F.g.r. of £23 p.a., with reversion in 52 yrs. 700. F.g.r. of £20 p.a., with reversion in 36 yrs. 550.

By BLISS & SONS. Bethnal-green—44, 46, 48, and 50, u.t. 14 yrs., g.r. £10, r. £33 p.a. 235. Hackney—21, Navarino-rd., u.t. 65 yrs., g.r. £9, c.r. £38 p.a. 258. 5, Bayford-st., u.t. 81 yrs., g.r. £5, r. £33. 16s. p.a. 216.

By G. GOULDSMITH, SON, & CO. Hatton-garden—3, Greville-st., f. r. £65 p.a. 1,006. Clerkenwell—42, Rowstone-st., and 13 and 14, Buxton-st., u.t. 7 yrs., g.r. £7, r. £44. 4s. 110.

By F. CHRISTIAN. Forest-gate—86, Dames-rd., f. c.r. £31. 4s. p.a. 315. By JENKINS, SONS, & ELLIS. Lewisham—173, Lewisham High-road, u.t. 30 yrs., g.r. £9, 6s., c.r. £70. 555. Peckham—7, Lausanne-rd., f. 430.

FEB. 21.—By J. P. HOPE. Walham Green—96 to 102 (even), Harwood-rd., u.t. 98 yrs., g.r. £29. 12s. 1,280.

By SMITH & FORD. Hornsey-rd.—12, Harvest-mews, u.t. 63 yrs., g.r. £8. 10s. 80.

By GREEN & SON. Upper Thames-st.—5, Old Swan-lane, u.t. 26 yrs., g.r. £24, r. £100 956. Hackney—51 and 55, Ash Grove, and 89 and 91. Sheep-st., u.t. 36 yrs., g.r. £6. 16s., r. £111. 12s. 485.

By E. SMITH & CO. City of London—52 and 54, Cannon-st., u.t. 41 yrs., g.r. £24, r. £275 8,400. Regent's-pk.—28, Ulster-pk., u.t. 39 yrs., g.r. £3, r. £142 p.a. 1,700.

By HUMBERT, SON, & FLINT. Holloway—27, Cottenham-rd., u.t. 73 yrs., g.r. £6. 6s., r. £42 265.

[Contractions used in these lists.—F.g.r. for freehold ground rent; l.g.r. for leasehold ground rent; l.g.r. for improved ground rent; g.r. for ground rent; p. for rent; f. for freehold; c. for copyhold; l. for leasehold; c.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; s. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

MEETINGS.

SATURDAY, MARCH 1. Association of Public Sanitary Inspectors.—Mr. D. Richards on "The Removal and Disposal of House Refuse in London." 6 p.m. Royal Institution.—The Right Hon. Lord Rayleigh, M.P., F.R.S., on "Electricity and Magnetism." 11. 3 p.m. MONDAY, MARCH 3. Royal Institute of British Architects.—Special general meeting for members only; followed by a business general meeting for members only, to continue the discussion of Mr. John Slater's paper on "Building Legislation." 8 p.m. Royal Academy.—Professor J. H. Middleton on "Flourishing Architecture in the Fourteenth and Fifteenth Centuries." 11. 8 p.m. Society of Engineers.—Mr. R. H. Tweddell on "The Application of Water Pressure to Machine Tools and Appliances." 7.30 p.m.

Royal Institution.—General Monthly Meeting, 5 p.m.
Clerks of Works' Association (Carpenters' Hall).—Mr. T. Edmond on "Lighthouse Construction," 8 p.m.
Edinburgh Architectural Society.—Mr. J. M. Hay on "The Decorative Panels of St. George's Hall," 7 p.m.
Leeds and Yorkshire Architectural Society.—Mr. M. Macarney, B.A., on "The Revival of Applied Art," 7.30 p.m.

TUESDAY, MARCH 4.

Institution of Civil Engineers.—(1) Mr. C. O. Burgess on "The Hawkesbury Bridge, New South Wales," (2) Mr. F. T. G. Walton on "The Construction of the Buffin Bridge over the Ganges at Benares," (3) Mr. G. E. W. Cruttwell on "The New Blackfriars Bridge on the London, Chatham, and Dover Railway," 8 p.m.
Sanitary Institute (Lectures for Sanitary Inspectors).—Professor W. H. Corfield, M.A., on "Sanitary Appliances," 8 p.m.
Society of Biblical Archaeology.—(1) Dr. J. H. Gladstone, F.R.S., on "The Bronze and Copper of Ancient Egypt and Assyria," (2) Mr. E. B. Taylor, F.R.S., on "The Winged Figures of the Assyrian Monuments and the Artificial Fertilisation of the Date-Palm," 8 p.m.
Builders' Clerks' Benevolent Institution.—Annual General Meeting, 7.30 p.m.
Glasgow Architectural Association.—Annual General Business Meeting.

WEDNESDAY, MARCH 5.

British Archaeological Association.—Mr. J. Romilly Allen, F.S.A. (Scot.), on "The Early Sculptured Stones of the West Riding of Yorkshire," 8 p.m.
Architects' and Artisans' and others on Matters Connected with Building.—Professor A. B. W. Kennedy on "The Forth Bridge," Carpenters' Hall, London-wall, 8 p.m.
Civil and Mechanical Engineers' Society.—Mr. E. Lucas on "Fresco Cement," 7 p.m.
Surveyors and Auctioneers' Clerks' Provident Association.—Annual General Meeting.—Auction Mart, Tokenhouse-yard, 4.30 p.m.
Society of Arts.—Mr. J. Tripplin on "Recent Progress in British Watch and Clock Making," 8 p.m.

THURSDAY, MARCH 6.

Royal Archaeological Institute.—(1) Mr. J. P. Harrison on "Anglo-Norman Ornament Compared with Designs in Anglo-Saxon MSS.," (2) Mr. A. Oliver on "A Brass at Newbury," 4.30 p.m.
Liverpool Architectural Society.—A dinner will be given at the "Bear's Paw," Lord-street, 6.30 p.m.

FRIDAY, MARCH 7.

Royal Academy.—Professor J. H. Middleton on "Florentine Sculpture in the Fourteenth and Fifteenth Centuries," III, 8 p.m.
Sanitary Institute (Lectures for Sanitary Inspectors).—Mr. C. Jones on "Scavenging, Disposal of refuse and sewage," 8 p.m.

SATURDAY, MARCH 8.

Royal Institution.—The Right Hon. Lord Rayleigh, M.A., F.R.S., on "Electricity and Magnetism," IV, 3 p.m.
Edinburgh Architectural Association.—Visit to Free Library and Old University Buildings.

Miscellaneous.

Competitions: Germany.—Looking at the list of competitions decided during the last fortnight, we find that the one at Langensalza for a new school-house (with eighteen large class-rooms), which had enticed as many as one hundred architects to compete, has been won by Herr Reg. Baumeister F. Wendorf, who is at present attached to the staff of a well-known Imperial "Baubureau" at Leipzig. This is the third time,* and in quick succession that this artist, who may well be termed a "school specialist," has come out first in competitions for this class of buildings, and that in spite of the large number of rivals. Twenty-two designs were sent in for the new Trinity Church at Dresden; here, as at Strassburg,† the jury did not consider themselves entitled to award the first prize. The second one (£100) was won by Messrs. Abesser & Kröger of Berlin, and the third (£50) by Herr Schramm of Dresden.

Workman's Barracks.—On the works for the Baltic Canal, now being executed in North Germany, the unmarried workmen are required to live in barrack-huts especially erected for them. These are all built under Government control and supervision. They are constructed of timber, boarded inside and out. The minimum cubic contents per bed was fixed by the Government Sanitary Department at 12 cubic metres. The apartments are in all cases warmed and ventilated, and latrines are placed so as to be accessible to the living-rooms and dormitories, but not in contact with them; they must be supplied with water. The cost of each barrack-dormitory for 100 workpeople is approximately 700*l.*; living-rooms, dining-hall, and premises for staff, 1,000*l.*; latrine, 50*l.*; door-keeper's hut, 15*l.*; and dust-bole, 12*l.* 10*s.* There are also two hospitals, each with twenty beds.

Public Works in New York.—The report of Mr. T. F. Gilroy, Commissioner of Public Works of New York, states that 4,353,000 dols. were expended during 1889. In extending and improving the distribution of water, 18.93 miles of additional water mains were laid. The system for distributing the water supply of New York now includes 657.19 miles of mains, with 6,760 stopcocks and 8,420 fire hydrants. During the year, 1,659 additional water meters were placed, making a total of 19,870 now in use. The average daily consumption of water through meters is 37,483,300 gallons. Work is in progress for a canal and tunnel to divert the water of the Byram River into the Bronx River, by which the water supply from that source will be increased by 6,000,000 gallons a day. In the extension and improvement of the New York sewerage system, 28,273 lineal feet of sewers, 1,274 lineal feet of culverts, and forty-six receiving mains were constructed, and the sewerage system on Manhattan Island now comprises 433.73 miles of sewers, with 5,209 receiving basins.

Public Works Officials, Berlin.—All officials attached to or under the control of the Architectural, Surveying, Civil and Railway Engineering, and the Administrative Departments of the Prussian Ministry of Public Works have received notice that they will henceforth be required to wear uniform on all official occasions; and the new designs for the uniforms have been published. The "order" distinguishes "gala uniform" and "ordinary service uniform," the former requiring the old Brandenburg frock-coat, white casemere trousers and waistcoat, cocked hat, and a light sword in white leather sheath. The "service uniform" will resemble the attire worn by the German officers of line regiments, herring that dark grey trousers will take the place of blue ones, and that a sword of the old pattern will be worn in a black leather sheath. Members of the architectural department can be recognised by a cocarde containing a triangle, compass, and plumb-line, surmounted by a crown.

Berlin Town-hall.—The large assembly-room of the Berlin Town-hall has, owing to the great number of evenings it has been used since its erection, and also partly in consequence of the fire that occurred at the Red Cross Bazaar last December, been so blackened with dust and soot that the Committee in charge have proposed an entire cleansing and redecoration of the interior. Owing to want of funds, the ball has in reality never been properly completed, and it is now proposed that the original ideas of the architect (Barath Waesemann) should be carried out, and, besides the redecoration proper, that the walls should be adorned with frescoes referring to Berlin life (after the sketches of Prof. August v. Heyden). Barath Blankenstein, the City Architect, who is professional adviser to the Committee, strongly recommends the electric lighting of the assembly-room, and also some alterations in the hot-water coils. He estimates the total cost of the proposed improvements at 2,400*l.*

Oundle Sewerage.—The Commissioners of Oundle held a special meeting on the 17th ult. to consider plans submitted by Mr. W. H. Radford, C.E., of Nottingham, for the sewage disposal of the town. The engineer explained that he proposed to purify the sewage in duplicate precipitation and filtration tanks, the chemicals and filtering medium being supplied by the International Sewage Purification Company. The sewage mud would be pumped on to air-drying pits by means of a small circular windmill. The whole of the town sewage would be delivered to this site by various new pipe-sewers, the sewage of one low-lying locality being pumped into a high-level sewer by a small compressed-air pump placed under the street and supplied with compressed air through a pipe from the new waterworks engine. The Commissioners decided to carry out the scheme in its entirety.

Trade Smoking Concert.—The Mutual Cycling Club (in connection with Messrs. Colls & Sons' office staff) gave a very successful smoking concert at the Surrey Masonic Hall on February 20. Mr. J. Howard Colls occupied the chair, supported by Mr. William Colls, Mr. Ellis Marsland, and a large number of visitors connected with the building trade.

The Norwegian Pottery Industry.—The Norwegian pottery industry—a new one—is progressing, there being exported last year 45,000 kilos against 26,000 kilos in 1888. Most of the manufacture is sold in this country.

Edinburgh Architectural Association.—A meeting of the Edinburgh Architectural Association was held on the 20th ult., in the hall, 42, George-street, Professor Baldwin Brown in the chair. Mr. Henry F. Kerr read a paper on "Ingress and Egress for Public Buildings," a subject which, he said, had only in recent years met with any serious and sustained consideration. To render panic among an audience impossible or innocuous, he emphasised the necessity of passages, staircases, and doors being of such ample width as to allow the building to be emptied speedily. All exits should be always used, and individually they should be of such capacity as to visibly recommend themselves to the audience. The Glasgow scheme of enlarging the exits for the upper floors was, Mr. Kerr thought, to be recommended. A plurality of exits for each block should in all cases be insisted on, and the exit capacity of the seat rows should also be attended to. Stairs for ascent and descent ought not to be of less width than the corridors between them and the auditorium, or wider than the corridors between them and the exterior. They should be provided with a hand-rail on both sides, and where six or more feet in width should also have a hand-rail in the centre. The straight stair was open to objection if of any length, the square and the newel square,—when doubled on itself,—being the safest forms. It was desirable always, in the interests of safety, to reduce the number of steps required for access to the various parts of a building, as the danger was generally speaking in proportion to the number of steps to be traversed. Hence the object in sinking the pit in theatres below the street-level, to reduce the height from the street to the gallery, and hence also the merit of Mr. Barrow's plan, which placed the gallery outlets at the level of the lowest seats in place of at the level of the highest. He recommended that all exit doors should be conspicuously marked as such, so that the audience might not use a door which did not lead to the outside of the building. Doors should open outward or swing either way, and should not be secured except by some fastening which yielded automatically to pressure from within. Corridors and stairs should be kept clear of all obstructions, barriers being rarely if ever admissible. Mr. Kerr was cordially thanked for his paper, which was illustrated by plans, diagrams, and models.

The Plumbers' Company and the Education and Registration of Plumbers.—We understand that the freedom of the Plumbers' Company has been conferred upon Mr. Edward James Jarvis, operative plumber, of Plymouth, on account of his having passed the Company's Examination in Honours.—On the 19th ult. a deputation of the Governors of the University College for North Wales waited upon the Court of the Plumbers' Company at the Guildhall for the purpose of explaining their system of technical education, and urging the claims of their institution. The deputation, which consisted of Mr. Ratbone, M.P., Mr. Roberts, M.P., Mr. Lewis, M.P., Mr. Darlishire, B.A., J.P. (London University), and Prof. Gray, was introduced by the Right Hon. G. Osborne Morgan, M.P., Vice-President. Mr. Morgan, in addressing the Court, said it was hoped that some of the aid the Company had so generously extended to struggling institutions would be bestowed upon their College at Bangor, which devoted all its energies to promoting thoroughly scientific and technical instruction, and, during its five years' existence, had established branches in all the principal towns of North Wales. Prof. Gray gave details of the work done by the College, and the public support accorded thereto. Mr. Rathbone and Mr. Darlishire also addressed the Court. The Master of the Plumbers' Company (Mr. W. H. Bishop), in reply, said he could only say that the Company's resources were taxed to the utmost, and the Court were therefore unable to offer any immediate financial assistance; but they would consider what steps might best be taken to include the University College for North Wales in their scheme now in course of preparation, by which the necessary funds might be provided for carrying out a complete educational system in all parts of the kingdom.

Black Granite.—Black granite is now being quarried on the lake Vetterin, in Sweden, which is then cut and polished into various architectural ornaments at Varberg, whence they are exported to England, Germany, Denmark, &c. The stone is very handsome when polished. Some 100 men are employed here.

* Emden and Mannheim, both times first prize.
 † See *Builder*, Feb. 15 last.

British Archaeological Association.—The last meeting was held on Wednesday, Feb. 19, Mr. J. W. Grover, F.S.A., in the chair. A curious example of bookbinding, formed of an ancient illuminated MS. on a sixteenth-century book, was exhibited by Mr. Loftus Brock, F.S.A. Mr. A. Oliver produced a rubbing of the remarkable brass in the possession of the Surrey Archaeological Society, supposed to have been brought from Netley Abbey. Two figures are represented on it,—the field being occupied by a diaper of cresets in flame. Mr. C. H. Compton pointed out reasons for discrediting the belief that the cresets were intended for the badge of the Compton family, as had been supposed. Mr. G. R. Wright, F.S.A., read a description of the creset stone in the recently-destroyed church at Lewanick, Cornwall. It consists of a circular granite cap in which are holes for seven candles. References were given to many other similar objects, while their use was attested by quotation from the Record of Durham. A paper was then read by Mr. G. Patrick on the antiquities of Wandswoth.

Royal Victoria Hall, Waterloo Bridge-road, S.E.—The following science lectures will be given at the above Hall during March:—March 4, "Geology in the Streets of London," by Mr. F. W. Rudler. March 11, "The Infinitely Great and the Infinitely Little," by Dr. Dallinger. March 18, "Australia," by Prof. Beare. March 25, "Rome," by Mr. W. North.

New Post-Office, Geneva.—A new chief post-office is to be erected on the site in the Rue de Monthlanc acquired some time ago for this purpose by the Postal authorities. The cost of the building, which is to be carried out in accordance with the designs of the Brothers Camoletti, is estimated at 1,500,000 francs, or nearly 60,000*l.*

The Stockholm Building Trade.—Last year 188 new houses were erected in Stockholm, containing 7,196 rooms, of which 104 were passed by the City Building Board. In 1888 the number of new houses was 128, with 4,736 rooms, of which 123 were passed. This shows a great falling-off in building operations in late years.

Royal Society of Painter-Etchers.—The following gentlemen have been elected Associates of this Society,—viz., Messrs. A. W. Hayes, W. Boucher, C. F. Robinson, and F. S. Walker.

PRICES CURRENT OF MATERIALS.

TIMBER.		£. s. d.	£. s. d.
Greenheart, B.G.	ton	7 0 0	7 15 0
Teak, E.I.	do	12 0 0	14 0 0
Sequoia, U.S.	foot cube	0 2 3	0 3 0
Ash, Canada	do	3 0 0	4 5 0
Birch	do	3 0 0	4 15 0
Elm	do	3 0 0	4 15 0
Fir, Dantisc, &c.	do	2 0 0	3 10 0
Oak	do	2 10 0	4 10 0
Canada	do	5 10 0	7 0 0
Fine, Canada red	do	2 10 0	3 10 0
" yellow	do	3 0 0	5 5 0
Lath, Dantisc, &c.	fathom	4 10 0	5 10 0
St. Petersburg	do	5 0 0	6 10 0
Walpscot, Riga, &c.	log	0 0 0	0 0 0
Deals, Finland, 2nd and 1st. std. 100	do	8 10 0	11 0 0
" 4th and 3rd	do	7 0 0	8 0 0
Deals—Riga	do	7 0 0	8 0 0
St. Petersburg, 1st yellow	do	11 0 0	14 0 0
" 2nd	do	9 0 0	10 10 0
" white	do	9 0 0	10 10 0
Swedish	do	7 10 0	10 0 0
White Sea	do	9 0 0	17 0 0
Canada, Pine, 1st	do	15 0 0	25 0 0
" 2nd	do	11 0 0	17 10 0
" 3rd, &c.	do	8 0 0	10 10 0
" Spruce, 1st	do	9 0 0	11 0 0
" 2nd	do	7 0 0	8 10 0
New Brunswick, &c.	do	6 0 0	9 0 0
Battens, all kinds	do	6 0 0	17 0 0
Flooring Boards, 8q., 1 1/2, prepared, First	do	0 11 0	0 14 0
Second	do	0 8 0	0 10 0
Other qualities	do	0 6 0	0 7 9
Cedar, Cuba	foot	0 4 0	0 5 0
Honduras, &c.	do	0 4 0	0 5 0
Mahogany, Cuba	do	0 5 0	0 6 0
St. Domingo, cargo average	do	0 5 0	0 6 0
Mexican, cargo average	do	0 5 0	0 6 0
Tobacco	do	0 0 4 0	0 0 6 0
Honduras	do	0 0 5 0	0 0 6 0
Box, Turkey	ton	4 0 0	13 0 0
Rose, Rio	do	15 0 0	20 0 0
Bahia	do	14 0 0	18 0 0
Satin, St. Domingo	foot	0 0 9 0	1 3 0
Porto Rico	do	0 0 9 0	1 3 0
Walnut, Italian	do	0 0 10 0	1 6 0
IRON.—METALS.			
Bar, Welsh, in London	ton	0 0 0	0 0 0
" at works in Wales	do	0 0 0	0 0 0
Staffordshire, in London	do	8 10 0	9 10 0
COMPEN.—British, cake and ingot	do	8 10 0	9 0 0
Best selected	do	55 0 0	0 0 0
Sheets, strong	do	62 0 0	65 0 0
Chili, bars	do	47 5 0	0 0 0
YELLOW METAL.	lb.	0 0 5 1/2	0 0 6

METALS (continued).

	£. s. d.	£. s. d.
LEAD—Pig, Spanish	ton	12 17 6
English, com. brands	do	12 17 0
Sheet, English	do	14 15 0
Pipe	do	15 5 0
TIN—Straits	do	90 5 0
Australian	do	90 5 0
English Ingots	do	95 0 0
OILS.		
Linseed	ton	52 5 0
Cocoonut, Cochiu	do	26 0 0

OIL (continued).

	£. s. d.	£. s. d.
Cocoonut, Ceylon	do	25 10 0
Palm, Lagos	do	23 10 0
Rapessed, English pale	do	31 10 0
" brown	do	32 15 0
Cottonseed, refined	do	22 5 0
Tallow and Oleine	do	21 0 0
Lubricating, U.S.	do	5 10 0
" refined	do	7 0 0
TAR—Stockholm	barrel	1 6 0
Archangel	do	0 17 6

COMPETITION, CONTRACTS & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITION.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page
Public Baths, &c.	Camberwell Bath Com.	Not stated	Not stated.	ii.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Works and Materials	Tottenham Local Board	Official	Mar. 4th	ii.
Kerbing, Tarpaving, Metalling, &c.	Lewisham Bd. of Works	do.	do.	ii.
Works and Materials	do.	do.	do.	ii.
Slopping and Watering, Dusting, &c.	St. Margaret (Westminster) Vestry	G. R. W. Wheeler	do.	ii.
Reflex Valves, Stop Valves, &c.	Manchester Corp.	G. H. Hill	Mar. 5th	ii.
Works and Materials	Rugby Highway Bd.	A. J. Henderson	do.	ii.
Making of Roadways	St. Mary (Isington) Vestry	Official	do.	ii.
Supply of Timber	G. W. R. Co.	do.	Mar. 6th	ii.
Bakehouse, &c.	Barnet Union	do.	do.	ii.
Sewerage Works, &c., Loughton	Epping R.S.A.	E. Egan	do.	ii.
Timber (Grain Shed (Peterboro), and Shodding, &c. (Dart))	M. R. Co.	Official	Mar. 7th	ii.
Cleaning and Painting Slaters	do.	A. A. Langley	do.	ii.
New Works at Parish Church, Ruardean	The Committee.	Waller & Son	Mar. 10th	ii.
Croydon Gravel for Roads	St. Giles (Camberwell) Vestry	Official	do.	ii.
Works and Materials	St. Giles Bd. of Works	do.	do.	ii.
Purchase and Pulling-down Building Mat.	School Bd. for London	do.	do.	ii.
Quebec Yellow Pine	G. W. R. Co.	do.	Mar. 11th	ii.
Underground Ufinal	Wandswoth Bd. of Wks	do.	do.	ii.
Silicated Concrete Pipes	Norwich Town Council	P. P. Marshall	do.	ii.
Portland Cement	do.	do.	do.	ii.
Works and Materials	do.	do.	do.	ii.
Road Materials, Royal Parks	Rotherhithe Vestry	Official	do.	ii.
Works and Materials	Com. of H.M. Works	do.	Mar. 12th	ii.
Roadmaking and Paving Works	Sheffield Highway Com.	C. F. Wike	do.	ii.
Wrought-iron Fencing, &c.	Hammersmith Vestry	H. Blair	do.	ii.
Formation of Roads, Surface Drainage, &c.	Philip H. Pree	do.	Mar. 13th	ii.
Repairs of Roads and Footpaths	Metro. Ass'n's Board	Official	do.	ii.
Enlargement of Post-Office, Birkenhead	Com. of H.M. Works	do.	do.	ii.
Works and Materials	C. R. Fortune	do.	Mar. 15th	ii.
Wores, Materials, &c.	do.	do.	do.	ii.
Buildings on Pier, Douglas, Isle of Man	Ile of Man Harb. Com.	H. A. Cheers	do.	ii.
Making-up Roads	Com. of S.wares	W. & E. Carlton	Mar. 17th	ii.
Filling-up Graps in Precipitation Channels, &c.	London County Council	Official	do.	ii.
Bam Stand, Clapham Common	do.	do.	do.	ii.
Works and Materials	Bormondsey Vestry	do.	do.	ii.
Stone Paving	Com. of S.wares	do.	Mar. 15th	ii.
Maintenance and Repairs of Main Roads	County of Kent	F. W. Ruck	do.	ii.
Road Materials, Sewer Pipes, &c.	St. Helen's Highway, &c. Committee	do.	do.	ii.
Hospital Buildings, near Bath	The Trustees	G. J. C. Broom	Mar. 19th	ii.
Store Buildings, Wrought-iron Railings, &c.	do.	H. Spackman	do.	ii.
Enlargement of Schools, Burton-on-Trent	London County Council	Official	Mar. 22nd	ii.
The Governors	do.	R. Churchill	Not stated.	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Assistant Surveyors (5) of Main Roads	Stafs. County Council	175 <i>l.</i> each	Mar. 8th	xviii.
Book-keeper and Clerk (Surveyors' Dept.)	St. George (Hanover-square) Vestry	120 <i>l.</i>	Mar. 10th	xviii.
Surveyor's Assistant	Wandswoth Bd. of Wks	2 <i>l.</i> weekly	Mar. 11th	xviii.
Assistant Surveyor	Croydon Corporation	100 <i>l.</i>	Mar. 17th	xviii.

TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

BANBURY.—For the erection and completion of Salvation Army Fort in Banbury, for General Booth, Mr. J. Williams Dunford, 101, Queen Victoria-street, architect and surveyor:— Orchard & Son, Banbury £375 0 0 Haywood & Son, Bedford 950 0 0 Ellwood & Son, Sandy 790 0 0 S. Hipwell, Wisbech 742 0 0 E. Jarvis, Banbury (accepted) 718 0 0	CARDIFF.—For erecting new hotel in Albany-road, Cardiff. Messrs. T. Waring & Co., architects:— John Hopkins, Roath, Cardiff* £3,800 0 0 * Accepted.	CHISWICK.—For erecting a house and stables at Sutton Court Park, Chiswick, for Mr. J. Woodgate Messrs. Wyllson & Long, architects:— T. L. Green £4,370 0 0 H. & E. Lee 3,815 0 0 Falmes & Potheringham 3,793 0 0 Newcomer 3,748 0 0 C. F. Kearley 3,686 0 0 J. T. Chappell 3,678 0 0 Saunders 3,661 0 0 S. Hunt 3,539 0 0 Leslie & Co. 3,537 0 0 Ollivier & Co. 3,489 0 0 Atkinson & Son 3,477 0 0
CAMBERNE.—For the erection and completion of Salvation Army Fort in Camberne, for General Booth, J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, E.C.4.— H. Skewer, Camberne £280 0 0 J. Julian, Truro 375 0 0 Walmesley & Bunick 929 0 0 Willoughby, Redruth 850 0 0	CHISWICK.—For repairs, alterations, and addition to the church of St. Mary Magdalene, Chiswick. Messrs. Newman & Newman, architects, 21, Tooley-street, London Bridge. Quantities by Mr. G. Fleetwood— Church, Schools, & Balnau Bros. 44,403 254 <i>l.</i> Goddard & Sons 3,806 47 <i>l.</i> J. Hunt 3,807 50 <i>l.</i> Chamberlain Bros. 3,746 50 <i>l.</i> Adamson & Sons 3,579 46 <i>l.</i> J. Dorey 3,180 37 <i>l.</i> (These Tenders include an allowance for old materials.)	

COVENTRY.—For the erection of school and class rooms and additions, &c., to the Wesley Chapel, Warwick-street, Mr. Herbert W. Chittaway, architect, Trinity-churchyard, Coventry.—

C. Haywood, Gosford-street, Coventry.....	£2,850 0 0
C. Gray Hill, Much Park-street, Coventry.....	2,828 0 0
T. & S. Herbert, Welford-road, Leicester.....	2,740 10 0
C. Garlick, Far Gosford-street, Coventry.....	2,704 0 0
Hetherly Bros., Gosford-street, Coventry.....	2,628 0 0

DARLINGTON.—For erecting and finishing boys' school to accommodate 300 pupils, for the Darlington School Board. Mr. Thos. W. Robson, architect, 10, Paradise-terrace, Darlington. Quantities by Mr. H. T. Neilson, Darlington:—

Brick, Stone, and Plasterers' Work, including Cement Flooring.

George Marshall.....	£1,917 7 10
J. & G. Wharton.....	166 1 3
Emmerson Smith.....	333 0 0
W. H. & W. Hoskins.....	37 19 0

[All of Darlington.]

EAST WICKHAM (Kent).—For alterations and additions to the "Forester" public-house, Wickham, for Messrs. Mitchell & Bealey, of the North Kent Brewery. Mr. J. O. Cook, architect, Eleanor-road, Woolwich.

Battley, Old Kent-road.....	£591 0 0
Foreman, Plumstead.....	515 0 0
J. O. Richardson, Peckham (accepted).....	449 0 0

ELTHAM (Kent).—For completion of boundary walls and fences at Green Hill-end, for Colonel J. T. North. Messrs. J. O. Cook and T. W. Chittley, joint architects:—

Smith & Sons, Norwood.....	£815 0 0
J. T. Chappell, London (accepted).....	739 0 0

ESTON MINES.—For the erection and completion of Salvation Army Fort, for General Booth. Mr. J. W. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, E.C.:—

Oliver & Gandon.....	£605 10 0
T. Bulmer, South Bank.....	509 7 0
G. Radge, Northumbury.....	459 5 0
J. Welch, Stockton-on-Tees.....	395 0 0
J. Lord, Middlesbrough.....	354 10 0

* Accepted.

GOVEY (Channel Islands).—For the erection of a Salvation Army Fort, for General Booth. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, E.C.:—

P. Le Rossignol & Son, Rouge Bouillon.....	£158 17 0
Sprignale & Baker, Govey.....	334 0 0
Laurens & Le Cornu & Son, St. Heliers.....	385 0 0
A. Viel, Jersey.....	369 0 0
E. J. Laurens, St. Heliers.....	362 10 0

GULDFORD.—For the erection of St. John's Ecclesiastical Society, Lodford, near Guildford, Surrey, or the R.C. Bishop of Southwark. Mr. F. A. Walters, architect, 4 Great Queen-street, Westminster. Quantities by Mr. John B. Lofting, 6, Great Queen-street, Westminster:—

Patman & Fotheringham, London.....	£27,830 .. £380
Colles & Son, London.....	27,200 .. 653
Stimpson & Co., London.....	27,139 .. 829
Marriage, Croydon.....	26,590 .. 510
H. B. Oldrey, London.....	25,910 .. 509
Sanders, Southampton.....	25,900 .. 513
Gregory & Co., London.....	25,777 .. 553
Harris & Wardrop.....	25,622 .. 556
Farnell & Son, Rugby.....	25,487 .. 485
Higgs & Hill.....	24,900 .. 650
Smith & Son, Croydon.....	24,767 .. 625
Bottrill & Son, Reading.....	24,135 .. 765
Lonsley, Crawley.....	22,965 .. 375

HERNE BAY (Kent).—For the erection of new premises, William-street, for Mr. Moore, grocer. Mr. F. Farley, architect, Richmond-street, Herne Bay:—

C. Welby.....	£1,520 0 0
E. Radge.....	1,263 0 0
G. Adams.....	1,358 0 0
G. Farley.....	1,350 0 0
A. J. Ingleton (accepted).....	1,347 0 0

[All of Herne Bay.]

IDLE (Yorks).—For the erection and completion of Salvation Army Fort, for General Booth. Mr. J. Williams Dunford, architect, 101, Queen Victoria-street, London, E.C.:—

T. & A. Thornton, Bromley.....	£792 0 0
Hobson & Son, Idle.....	783 0 0
Radgett, Idle.....	750 0 0
T. Obank & Sons, Thackley.....	721 0 0

* Accepted.

JOHANNESBURG (South Africa).—For supplying cabinet chippies, &c., for the Stock Exchange, Johannesburg, London, E.C.:—

C. Binlley & Sons (accepted).....	£196 10 0
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LA RIVETTE (Channel Islands).—For the erection and completion of Salvation Army Fort, for General Booth. Mr. J. Williams Dunford, architect, 101, Queen Victoria-street, London, E.C.:—

Manger & Prieux (accepted).....	£470 0 0
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LONDON.—For the erection of a Cookery Centre, laboratory, and drawing-class room, on the Medburn-street site, St. Pancras, for the School Board for London. Mr. T. J. Bailey, architect:—

J. M. Macey & Sons.....	£2,330 .. £2,330
Kilby & Gayford.....	2,323 .. 2,368
W. Cubitt & Co.....	2,305 .. 2,360
Dove Bros.....	2,280 .. 2,345
Patman & Fotheringham.....	2,173 .. 2,223
E. Lawrence & Sons.....	2,091 .. 2,123
W. Goddard.....	2,078 .. 2,123

* Recommended by the Works Committee for acceptance.

LONDON.—For the erection of eight studios, West Kensington, W. Mr. Frederick Wheeler, architect, 22, Chancery-lane. Quantities by Messrs. Evans & Deacon, 1, Adelaide-street, Charing-cross, S.W.:—

Hills Bros.....	£10,460 .. £250
Laing.....	10,200 .. 165
Candler & Son.....	10,150 .. 290
Shillito, Bury St. Edmunds.....	10,100 .. 175
Bywater.....	9,785 .. 196
Peters, Horsham.....	9,380 .. 158
Foster & Dicksee, Rugby.....	9,333 .. 200
G. Jervis Smith.....	8,637 .. 164

LONDON.—For erecting new printing warehouse in Southwark-street, S.E. for the Committee of Lloyd's Registry. Mr. W. Hilton Nash, architect, 5, Adelaide-place, E.C. Quantities by R. Fabian Russell, 6, Moor-gate-street, E.C.:—

Leeks & Hooker.....	£7,050 0 0
Gill & Sons.....	6,777 0 0
T. Rider & Son.....	6,738 0 0
Patman & Co.....	6,693 0 0
Higgs & Hill.....	6,590 0 0
D. Charteris (accepted).....	6,520 0 0

LONDON.—For building five shops, Goldhawk-road, Shepherd's Bush, for Mr. Edward Roberts, W. G. G. Battley, architect, 2, New Broad-street, E.C.:—

Craig.....	£5,080 0 0
Kirk and Easdale.....	3,274 0 0
Patman & Fotheringham.....	3,234 0 0
Lealie & Co.....	3,229 0 0
Oldrey & Co.....	3,207 0 0
Lundy.....	2,915 0 0

LONDON.—For additions and alterations to "Paron's Court Hotel," West Kensington, for Mr. H. Miller. Messrs. Wyson & Long, architects, 15, King William-street, Strand:—

T. L. Green.....	£1,637 0 0
Faulkner, Junr.....	1,590 0 0
Patman & Fotheringham.....	1,503 0 0
Mark Patrick & Son.....	1,483 0 0
G. F. Kenley.....	1,430 0 0
J. T. Chappell.....	1,413 0 0
Oldrey & Co.....	1,325 0 0

LONDON.—For certain alterations and additions to No. 225, Upper-street, Islington, N., for Mr. T. R. Roberts. Mr. J. Kingwell Cole, architect. Quantities by Mr. E. S. Mansergh, 28, Mount-street, Grosvenor-square, W.:—

Patman & Fotheringham.....	£2,150 0 0
B. E. Nightingale.....	1,830 0 0
Drew & Cadman.....	1,822 0 0
G. S. S. Williams & Son.....	1,816 0 0
Dove Bros.....	1,645 0 0
J. Mowlem & Co.....	1,594 0 0
G. Neal.....	1,546 0 0
Puzev & Lumley.....	1,525 0 0
Wall Bros. (accepted).....	1,494 0 0

LONDON.—For the erection of the first portion of St. George's Church, Westcombe, Blackheath, for the Rev. W. H. K. Seames. Messrs. Newman & Newman, architects, 31, Tooley-street, London Bridge:—

Balaam Bros. (accepted).....	£5,172 0 0
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[No competition.]

LONDON.—For pulling down and rebuilding 30, 31, and 32, Sandy-row, Whitechapel, E., for Mr. J. Gabriel. Mr. J. O. Cook, architect, Eleanor-road:—

Harris, North Woolwich.....	£887 0 0
Battley, Old Kent-road.....	870 0 0
Sharpe, Bow.....	715 0 0
J. O. Richardson, Peckham (accepted).....	714 0 0

LONDON.—For the erection of a steward's house at the Infirmary, Backham-street, Northfleet, for the Guardians of the Poor of the Parish of St. Marylebone. Messrs. H. Saxon Snell & Son, architects, London:—

H. B. Oldrey.....	£1,370 0 0
G. Gaisford.....	1,293 0 0
Patman & Fotheringham.....	1,220 0 0
Wall Bros.....	1,223 0 0
Thos. E. Mitchell.....	1,184 0 0
G. Godson & Son.....	1,174 0 0
Thomus Ney, Ealing (accepted).....	1,138 0 0

LONDON.—For decorations, repairs, and alterations at 2, Orme-square, Bayswater, W. Mr. F. W. Kinkead Tart, architect and surveyor:—

F. Giles & Co., Kensington.....	£760 0 0
Johnson & Manners, Great Putney-street, W.....	684 0 0
Vernal & Griffiths, Albany-st., W.....	670 0 0
Wells & Son, Red Lion-street, W.C.*.....	561 0 0

Drainage Work.

R. P. Beattie.....	164 0 0
W. Dodds.....	159 0 0
Wells & Son (accepted).....	134 0 0

J. Keith, Holborn Viaduct (accepted)..... 145 0 0

* Accepted.

LONDON.—For decorations, repairs, and alterations at the "Midland Hotel," Luton, for Messrs. Bingham-Cox & Co. Mr. F. W. Kinkead Tart, architect and surveyor:—

W. & A. Cox, Luton.....	£422 10 0
W. Sparrow, Havendon.....	409 10 0
W. G. Dunham, Luton (accepted).....	305 0 0

LONDON.—For pulling down the present water-closets and urinals, and erecting new ones with eastern enclosure, in Southwark Park, for the London County Council. Mr. T. Blashill, architect:—

T. Charming.....	£134 0 0
A. & W. Garner.....	132 0 0
Smith & Co.....	130 0 0

LONDON.—For alterations and additions to the "Field Tavern," Field-road, Fulham, S.W. Mr. G. Treacher, architect, 30, Coleman-street, E.C.:—

H. Smith & Son.....	£435 0 0
Walker Bros.....	430 0 0
J. Mills.....	410 0 0
Moore & Son.....	359 0 0
Alfex & Richardson.....	348 0 0
W. G. W. Gardner.....	345 0 0
Dorman.....	293 0 0
Washington (accepted).....	287 0 0

LONDON.—For the erection of refreshment-room and outbuildings in Ravenscourt Park, Hammersmith, for the London County Council. No quantities:—

F. Blandford & Co., 59, Queen's-road, Walworth.....	£1,960 0 0
J. Boarder, 2 and 4, Helyer-road, Uxbridge-road, W.....	1,075 0 0
H. G. Heywood, 44, Bridge-road, Hammersmith.....	885 0 0
A. Adams & Son, 246, King-street, West Hammersmith.....	798 0 0
Simmonds Bros., 13, College-street, Chelsea.....	797 0 0
Laphorne & Co., 1 and 2, High-street, Lambeth.....	788 0 0
J. Martin, 3 and 7A, Warwick-place, Maida-hill.....	648 0 0

LONDON.—For painters' work to the "Cook Tavern, Denmark Hill, for Messrs. Ayres & Co. Mr. H. I. Newton, architect, 49, Victoria-street, Westminster, S.W.:—

F. Mathews, Walworth-road*.....	£120 0 0
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* Accepted.

LONDON.—For proposed alterations to the International Headquarters of the Salvation Army, 101, Queen Victoria-street, E.C., for General Booth. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, E.C.:—

	Pitch	Yellow
	Pine.	Pine.
C. Robson, Lewisham.....	£470 ..	470 ..
Coxhead, Leytonstone.....	468 ..	£418
Martin & Barclay, Battersea.....	440 ..	380

LONDON.—For alterations to premises, Horacery-road, Westminster, for General Booth. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, E.C.:—

Robson, Lewisham.....	£1,150 0 0
Coxhead, Leytonstone.....	963 0 0
Martin & Barclay, Battersea*.....	880 0 0

* Accepted.

LONDON.—For fitting up the premises known as the "Oriental Restaurant," Blackfriars Bridge, as offices, for General Booth (branch offices of the International Headquarters). Mr. J. Williams Dunford, architect, 101, Queen Victoria-street, London, E.C.:—

F. J. Coxhead, Leytonstone.....	£1,711 0 0
A. Martin, Battersea.....	1,626 0 0
W. & D. Castle, Southwark.....	1,546 0 0

LYMINGTON.—For the erection and completion of Fortness, for General Booth. Mr. J. Williams Dunford, architect, 101, Queen Victoria-street, London, E.C.:—

G. Colles, Lymington.....	£899 0 0
J. Denham, Norton Green.....	835 0 0
A. Wheeler, Lymington.....	508 0 0
E. G. Perkins, Lymington.....	487 19 0
Martin & Barclay, Battersea.....	473 0 0
E. Jarvis, Banbury (accepted).....	439 0 0

MIDHURST (Sussex).—For erecting house at Pendean Farm, near Midhurst, Sussex, for Mr. G. H. Drew. Mr. John Odell Scott, architect, 31, Spring-gardens, S.W.:—

Quantities by Messrs. John S. Lee & Sons:—	
House.....	Verandah.
Dove Bros.....	£4,805 0 0 .. £175 0 0
Thomson, Peterborough.....	4,678 0 0 .. 126 0 0
Ancombe.....	4,594 0 0 .. 135 10 0
Dobson.....	4,489 0 0 .. 140 0 0
S. Norman.....	4,409 0 0 .. 135 0 0
C. Langley, Crawley.....	4,395 0 0 .. 145 0 0
Bottrill & Son, Reading.....	4,305 0 0 .. 130 0 0
Gregory & Co.....	4,287 0 0 .. 145 0 0
W. P. Rice.....	4,197 0 0 .. 131 0 0
R. Fink, Milford.....	4,153 0 0 .. 112 0 0
Patison.....	4,109 0 0 .. 121 0 0
P. Peters, Horsham.....	3,937 0 0 .. 124 18 0
G. Box.....	3,918 0 0 .. 114 0 0

MACCLESFIELD.—For alterations and additions to the Theatre Royal, Mill-street, Macclesfield, for General Booth, Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, E.C. :-
 G. Roylance, Macclesfield £1,150 0 0
 W. W. Gladwell, Macclesfield 1,000 0 0
 Weale & Co., Ludlow 900 0 0
 Martin & Barclay, Battersea* 517 0 0
 * Accepted.

NEWCASTLE-ON-TYNE.—For the erection and completion of Citadel, accommodating 3,600 persons, for General Booth, in Westgate-road, Newcastle-on-Tyne. Mr. J. Williams Dunford, 101, Queen Victoria-street, London, E.C. :-
 Lowry, Newcastle £3,657 0 0
 Coxhead, Leytonstone 3,497 0 0
 Middlemiss Bros., Newcastle* 3,125 0 0
 * Accepted.

POTTON.—For the erection and completion of Salvation Army Fort in Potton, for General Booth, Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, E.C. :-
 J. Smith, Bedford 547 0 0
 Haywood & Son, Bedford 375 0 0
 H. Walker, Bedford 319 0 0
 J. Ramsford, Potton 286 10 0
 S. Woodman, Potton 285 0 0
 Edwood & Son, Sandy 235 0 0
 L. Jarvis, Banbury (accepted) 228 0 0

PRESTON (Lancs.).—For pulling down and rebuilding Mission-room, Rugged School, &c., Leeming-street, Preston, for Rev. E. Over, Mr. Thomas W. Weaver, architect, Preston :-
 George Lucas (accepted) £408 0 0

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 White & Humphrey, Park-street 187 0 0
 [All of Tunbridge Wells.]
 * Accepted.

WOOD GREEN.—For the erection and completion of Salvation Army Citadel at Wood Green, for General Booth, Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, E.C. :-
 Brown & Sweetland, New Southgate £2,050 0 0
 Martin & Barclay, Battersea 1,469 0 0
 E. J. Coxhead, Leytonstone 1,373 0 0
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The Builder.

Vol. LVIII No. 247.

SATURDAY, MARCH 8, 1890.

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Burford Church, Tenbury: Interior of Chancel, as Restored.—Mr. Aston Webb, Architect	Double-Page Ink-Photo.
Rothwell Market House, Northants.—Measured and Drawn by Mr. J. A. Gotch, F.R.E.B.A.	Three Single-Page Photo-Lithos.
New Town Hall, Cromer.—Mr. G. J. Skipper, Architect	Single-Page Photo-Litho.

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The Discovery of Coal in Kent.



THE Ruskinian "cult" must have been greatly shocked by the discovery of coal between Dover and Folkestone, in a boring at the works of the Channel Tunnel Company during the past few weeks.

It would not be at all surprising if "the master" himself were to present us with an indignation paragraph on the subject, for has he not already said in "King's Treasures," "If . . . you could double your income or quadruple it by digging a coal-shaft in the middle of the lawn, and turning the flower-beds into heaps of coke—would you do it? I hope not. I can tell you you would be wrong if you did, though it gave you income sixty-fold instead of fourfold. Yet this is what you are doing with all England!" Already, on nearly all sides, we hear unfavourable comments as to the prospects of the "fair county of Kent" being turned into a "black country," and it may not be uninteresting, on these and on other grounds, to inquire into the nature of the evidence which has been mainly instrumental in producing the scare.

At a point on the South-Eastern Railway adjoining the experimental heading for the proposed Channel Tunnel, a deep boring has, for some time past, been in progress, with the object of investigating the deep-seated geological structure, and especially to learn if coal exists within reasonable limits of depth; and Mr. Francis Brady, C.E., Engineer of the Railway and Tunnel Companies alluded to, reported that on February 15th coal was reached at a depth of 1,180 ft. below the surface, and it was proved to be of good bituminous character. The seam was struck after passing through 20 ft. of clays, grits, and blackish shales belonging to the Coal-measure series, and it is known that the lines of bedding in the shale are distinctly horizontal. Specimens of coal were also taken at 1,182 ft. and 1,183½ ft. from the surface—so ran the official announcement. We are able to add, on good authority, that fossil plants were also discovered which, when duly investigated, will no doubt go far to fix the exact horizon in the Carboniferous formation to which the coal-seam belongs, and so

enable us to more safely predict the probable depth of additional seams.

This is unquestionably an important discovery; but before indulging in visionary illusions of the prospect of obtaining coal at the proverbial "eighteen-pence per ton," let us critically examine the value of the evidence bearing on the point. We know that, so far, the coal has been proved to be of good quality, but we require further information to enable us to solve the problems as to whether the seam discovered is associated with others, and, if so, what are their nature, thickness, and depth from the surface, as well as their extent and development underground.

These questions can only be answered by analogy, and the only one that admits of an easy off-hand solution is the consideration of the depth of the seams (assuming more than one to exist) from the surface. Since the discovery, doubts have been expressed as to the commercial results of working a coal-field at such a depth,—such remarks, as usual, emanating from irresponsible persons. A very elementary acquaintance with coal-mining shows how groundless are such fears, for the depth is well within the mining limit. At the Rose Bridge coal-pit, near Wigan, the shaft is nearly 2,500 ft. deep; in Hainault, coal is being worked at the depth of 2,800 ft., and one pit even goes down to 3,411 ft. The chief element in determining the limit within which coal may be won is the increase of temperature which accompanies increase of depth. The thermometer rises 1 deg. in about every 60 ft. of descent for the first 1,800 feet, and the ratio then increases, and it is calculated that at 3,420 ft. the temperature of the air in the mine equals that of the blood. From experience in deep mines, Sir W. W. Smyth is of opinion that the difficulty of temperature may, by due appliances, be overcome for even a greater depth than 4,000 ft. There need, therefore, be no fear but that, if other coal-seams exist anywhere near the one already discovered near Dover, they could be won in the ordinary way.

In regard to the other questions, it may be at once admitted that they can only be answered theoretically, but the theory in this case is accompanied by very strong probability. The mere fact that coal would be found in south-eastern England, and near the spot where it has actually been proved to exist, was predicted by geologists a long time ago. Mr. Godwin-Austen nearly forty years since gave several reasons for his belief in, which

belief was also shared by Professor Prestwich and other well-known geologists. The geological world, therefore, is not surprised at the discovery, though eagerly waiting further results. Certain eminent geologists, however, and amongst them the late Sir Roderick Murchison, were of opinion that, although Carboniferous and other Palaeozoic rocks might be met with at great depth in the south-east of England, no coal-field would be found to exist; and from an intimate knowledge of the facts (strengthened by recent research on the Continent) on which this opinion is based, we are bound to say that great deference must be paid to it. To find coal is one thing, but to find it in payable quantities is quite another.

It may be premised that the argument for the extent of the coal measures under our south-eastern counties rests, in short, on the fact that a line of coal-fields runs from Westphalia through the south of Belgium and French Flanders into the Boulonnais, and that these fields present a most striking analogy with the Somersetshire and South-Wales coal-fields, which trend in the same direction. In order that the non-geological reader may appreciate the whole question, we may say something respecting the occurrence of the strata concerned in the matter.

The rocks in the region in question, when all are present and in order, are superimposed as follows:—

Palaeozoic	}	Carboniferous.
		Devonian.
		Silurian.
		Cambrian.

Thus, normally, the Carboniferous beds (including the coal-measures and carboniferous limestone, &c.) lie on the Devonian, and this in turn on the Silurian, and so on. It will be readily seen that under these conditions, if the boring tool reaches the Devonian or other beds under the coal-measures, without passing through these latter, we ought not to expect to find coal at the spot. The general order of succession of the beds is absolutely proved, and does not admit of the slightest discussion—we know, not only from the stratigraphical relations they bear to each other, but from their included fossils, that of these beds the Cambrian is the oldest, and the Carboniferous the youngest. Now, certain of these beds have frequently been met with in borings of great depth in and around the London basin, but hitherto no coal seam has been discovered. At Messrs. Meux & Co.'s Brewery, Tottenham

Court-road, the Devonian was reached at 1,066 ft. from the surface, and bored into 80 ft.; at the New River Co.'s boring at Cheshunt (Tarrford) the same horizon was found at 950 ft., and was pierced 30 ft. The geological age of the lowest beds found down to 1,445 ft. in the Richmond boring, which mainly consisted of red marl and sandstone, is not definitely known, in the absence of fossils, but, from the circumstance that small pieces of anthracite were found, it is inferred that the coal measures are not far from the site. It should be remembered, however, that this anthracitic matter was found above the red sandstone beds alluded to, so that this evidence does not preclude the possibility of the latter being of Devonian age. From an inspection of some of the cores brought up in boring, we incline to the opinion of Professor Judd (though not quite from the same reason) that they are younger than the Carboniferous beds. The sandstone does not seem to be sufficiently altered to present the normal appearance of those Devonian beds with which it ought to be compared, whilst in lithological character it very closely resembles the New Red Sandstone, which is younger than the Carboniferous. It is much to be regretted that this and the borings at Crossness, near Erith, which finished at 1,060 ft.; at Kentish-town, which went down to 1,302 ft.; and at Streatham, 1,120 ft., all of which left off in rock of a similar character, were not driven deeper; for, if the coal-measures exist under those spots, they would almost certainly have been reached. In any case, the experiment was well worth trying. At Ware (New River Company's works), in Hertfordshire, at about 796 ft. from the surface, Silurian beds were found and pierced for 35 ft.; whilst at Harwich, Carboniferous beds were met with at 1,030 ft., but the presence of the fossils known as *Posidonomyæ* showed the horizon to be lower than the coal-measures.

Many other deep borings have been made, but the evidence afforded by them does not immediately concern the subject in hand. We may, however, allude to the deep Sub-Wealden boring, near Battle, which is of a negative character, as it attained a depth of nearly 2,000 feet, ending in rocks of middle oolite, which are very much younger in age than the Carboniferous. This experiment shows that it is not advisable to search for coal in that part of Sussex. The oft-repeated question as to whether coal exists under London is, therefore, not yet definitely settled. Indeed, we are of opinion that none of the evidence obtained from the above-mentioned borings in the London district,—not even in those instances where pre-Carboniferous rocks are proved,—is *per se* absolutely conclusive as to the presence or absence of the coal-measures; for although the super-position of the divisions of the strata, alluded to in the earlier part of the article, holds good as a very general rule (indeed, wherever they have been comparatively undisturbed), the contingency of an exception must unfortunately be made in reference to their relative position under south-eastern England. The coal-measures and Palæozoic rocks, stretching in a line through the south of Belgium to the Boulonnais, were involved in the making and elevation of the Ardennes mountains, of which the Somersetshire and South Wales coal-fields and associated rocks are merely the western prolongation. This does not seem to admit of the slightest doubt. Therefore, the old rocks proved in the deep borings, in the south-east of England, are simply the depressed broad axis of the old Ardennes mountains which run underground from the Boulonnais to Somersetshire, being covered by deposits of younger geological age. This being so, there is no reason why the same stratigraphical phenomena should not be exhibited in the depressed portion of the Ardennes axis, as we find in its elevated and exposed portions on the Continent, on the one hand, and in Somersetshire on the other. It is clear, therefore, that in order to get at the true value of the discovery near Dover, we must study the ex-

posed parts, to which we have just referred, and this we will now briefly proceed to do.

The first thing that strikes us is that the great earth movements which resulted in the elevation of the Ardennes, have considerably fractured and dislocated most of the geological formations concerned, by reason of which the natural order of the beds has been very much upset. In places, hundreds of feet of strata have been completely inverted, whilst "thrust faults" have much disturbed their original positions, the maximum effect of which is that older beds have been forced to occupy a superior position to the coal measures. For example, in the bore-hole of Saint Homme, near Mons, the section is as follows:—

	Mètres.
Tertiary and Cretaceous beds.....	34
{ Silurian shales	78
{ Devonian beds	84½
{ Carboniferous (coal-measures, &c.) reached.	109½

It will be seen that the normal positions of these beds have been completely inverted. This is by no means an isolated example. It is the Mons coalfield that so closely resembles the Somersetshire basin. In both areas, the strata are partly inverted, and the coal-seams much cut up, but especially at Mons. In the latter place, a single seam may be passed through six times in one pit 1,050 ft. deep, and the strata which if flat would be 9 miles broad, are squeezed into a space 7 miles across. At Charleroi, the compression is still greater, a breadth of 8½ miles of flat strata being narrowed to less than half that distance by contortion through lateral compression. To the north of the Mendip Hills (Somersetshire coalfield) the seams of the lower coal-measures are bent quite over, in the Nettlebridge Valley, they are \cap -shaped, slide faults are of common occurrence, and, in fact, the analogy is very complete, not only in regard to the physical disposition of the strata, but to the included fossil plants, in the two areas under discussion. At Ougrée, near Liège, the coal shales are covered by the Devonian, and the same class of structure predominates in the Boulonnais. The question may be asked, in the light of the foregoing facts, whether any one could positively say that, because Silurian or Devonian beds have been found in deep borings in south-east England, the coal-measures do not exist under that region. What is there to show that the older beds are not thrust on to, or inverted over, the coal-measures in that district? We shall see.

Certain evidence tends to show that to the north of the Ardennes, the Palæozoic beds are not so much disturbed, and this throws an important light on the whole question of a Canto-Metropolitan coal-field. The Palæozoic beds, on becoming covered over by newer deposits north of the Ardennes, do not at once plunge very deeply into the earth. At Brussels, Silurian beds are found at depths varying from 63 to 123 metres; at Denderleu they exist at 151 metres; at Ninove and Grammont, Palæozoic strata were met with at 56 and 4675 metres respectively; at Alost, Silurian at 1869 metres; at Menin (near Courtrai), Devonian at 1565 metres; Flobecq, Silurian at 67 metres; Tournai, carboniferous limestone at 151 metres; and at Ostend we get the Silurian at 310 metres. On plotting and sectioning these to scale, it will be found, as we have before explained, that the old Palæozoic surface, now underground, is less disturbed and goes deeper (though not immediately) as it recedes from the outcrop on the northern flank of the Ardennes, and goes northward and westward, and, moreover, that no coal exists at any of these points to the northward of the known productive fields; the borings are so close together (we could quote several others) that this important point is definitely settled. We could show that the same phenomena are presented in Eastern Belgium with reference to the Liège field.

Now to approach the Valenciennes coal-field, for this is a further connecting-link with our

own beds, being nearer to them than the Mons area. The field of Valenciennes thins out, and the coal deteriorates so much that at Bethune it is a mere narrow wedge. In coming nearer the Channel, this poor narrow zone is flanked to the north and south by Devonian rocks, which occur just under the chalk. A "Carte Industrielle du Bassin houiller du Nord de la France" was prepared for the Compagnie des Végnes, showing numerous fruitless trial-bores by speculators. In face of these facts, Sir Roderick Murchison stated his belief that success would not crown any efforts in search of coal on this side of the Straits of Dover; and this argument is so potent that hardly anything short of the actual discovery of a coal-field in Kent or adjacent counties can materially affect it. There seems no doubt whatever, from the continental evidence, that the middle and lower Palæozoic rocks serve to connect the Ardennes axis with the Somerset axis and basin, but the probability of the coal-measures lying on them, or being caught up in folds or inversions underground in the south-east of England, is rather small. The evidence of the London basin borings alluded to, is painfully similar to that obtainable from those cities executed to the north of the productive fields in South Belgium. There is just a bare possibility of a small independent coal-field existing under parts of our south-eastern counties, but that is all; the evidence at present in support of this theory, as we have seen, is not very encouraging.

Meanwhile, Sir Edward Watkin must, of course, follow up the discovery by going on with the work, and we hope that the diameter of the bore-hole is sufficient to enable him to thoroughly probe the matter. Other trial bores are, no doubt, contemplated, and we would suggest that a more favourable result might be obtained by sinking them about ten miles west-south-west of the Channel Tunnel site. The lower Secondary beds will probably be a little thicker there; but the main reason for the suggestion is that the site is more on the line of strike of the Carboniferous beds in the Boulonnais at Ferques, Leulinghen, Locquinghen, and Hardinghen, than is the Channel Tunnel site. This latter seems rather too much to the eastward, and, assuming extension of the coal-measures from the Boulonnais, that seam at present discovered would merely be a representative of the thin northern flank of the field, instead of the thicker and best part of it, which we believe (under the assumptions) would be found at the spot at which we suggest a further experiment being made.

In the meantime, it is to be hoped that both public spirit and private enterprise will raise sufficient funds to definitely prove or disprove the existence of the coal-field. The necessities of a practical and progressive nation will then decide whether or not it is wrong to turn Kent into "heaps of cokes," and increase our incomes "sixtyfold instead of fourfold," in face of the maledictions of Ruskinian sentimentalists.

A HISTORY OF CROMER.*

THE interest recently felt in Cromer through its rehabilitation as a fashionable watering-place, coupled with a desire to do something for the fund for the restoration of the church, seem conjointly to have inspired Mr. Rye with the idea of putting some information as to the history of the place into a handsome quarto volume, printed on special and thick paper and with margins of monumental spaciousness. There is much to be said and learned about the town and district, we surmise, other than what is here included; but the volume contains enough information, apparently trustworthy and carefully prepared, to satisfy those who are not professed archaeologists, and ought to prove of some interest to the many persons who now throng to the decayed little Norfolk

* Cromer, Past and Present (or, an attempt to describe the Parishes of Cromer and Spidpen, and to narrate their history. By Walter Rye. Printed for the benefit of the fund for the restoration of Cromer Church. Jarrold & Sons, Norwich and London; 1889.

coast town for their autumn change and holiday.

"Decayed" may be thought a mistaken word to apply to a town which has not many years since had a new railway run to it, besides the more recent local line ending at "Cromer Beach" terminus, and which has built various new terraces and is entering for the first time on the dignity of a town hall, the new building for which is illustrated in this number. But Mr. Rye,—who, though he dates his preface from Putney, appears from various patronymics in the book to be either in person or in family an old Cromerite—observes that at the present moment the town has absolutely no sort of trade except that one of looking after the comfort and pockets of visitors, which goes on so briskly for about two months out of the twelve. Shipden or Schipeden, which was once the main portion of the town, lies under the sea, and a steamer was wrecked on what was said to be the remains of its church walls the year before last, and which are occasionally visible above water, though not as the author says, "at neap tides," but at low water at spring tides, which is when the tide is lowest.*

"To understand what Cromer was like three or four hundred years ago, one must picture to oneself a great cliff standing much more out to sea than at present, and under it a real harbour with a heavy-timbered pier-head like that now at Gorleston, with rough stone walls clumsily contrived and repaired now and again in an obstinate English fashion, as the incoming sea cut them away from time to time. Quite a fleet of trading-ships and fishing-boats lazily tossing about within the harbour, and a large fishing and outfitting population busy on the shore,—in fact as different a spot from the quiet watering-place of the present day as can well be conceived."

And what was the great spacious church of Cromer built for, with its massive and richly decorated tower, save for a place where many went out and in—for something much more of a town, we may be sure, than now clusters about the two or three little winding lanes which form all that is left of the streets of the old town. In 1358, the author tells us, the "merchants of Cromer" are mentioned (he does not say in what document). He also notes the theory that Cromer is really the buried part of the town and Shipden the present Cromer, for which there seems to be some evidence of a doubtful and uncertain character. In 1425 the place is referred to as "Shipden by Cromer": the form "Shipden alias Cromer" begins about 1452, and the name of Shipden by itself falls out about 1483, but "Cromer alias Shipden" is found for many years afterwards.

The chapter on "The Old Trades and Townsmen" contains much that is interesting, especially in the glimpse we get through old letters and other documents of the constant struggle to keep up the port and make things good against the inroads of the sea. 1551 was a bad year. "Not only had 'the rages and surges of the sea' swallowed up and drowned a number of the great sort of houses, but a great part of the town had by negligence of certain persons been consumed by sudden fire, so that by the length of a whole street it was still not rebuilt;" and a petition for relief was sent up to the Government, with what result does not appear. In the seventeenth century Cromer and the neighbouring coast received a good deal of disagreeable attention from pirates of various kinds, and there was such a chronic state of alarm on the subject that in 1623 Taylor, "the water poet," and his companions, making an innocent boating excursion round the coast and landing at Cromer, were taken in charge on suspicion, their boat considerably damaged, and themselves kept in durance vile till some leading gentlemen of the neighbourhood could be summoned to examine them; who quickly understood the truth, and Sir Austin Palgrave offered them the hospitality of his house a few miles off, where no doubt they ended with a merry

* It is curious how widespread is this popular error that neap tides are the lowest of all. The high tide is lower at neap than at spring, but the low tide is not so low: in other words, the rise and fall in reference to normal level is less.

evening. The whimsical poem in which Taylor relates the adventure, and satirises the absurd alarm and cowardice of the town-folk, is quoted in full, and is in its way very amusing reading. Taylor at the close of the poem heaps coals of fire on the heads of his persecutors by making an appeal to public sympathy in regard to the perilous condition of the town, not from pirates, but from the sea:—

"It is an ancient market-town that stands
Upon a lofty cliff of mouldering sands;
The sea against the cliff doth daily beat,
And every tide into the land doth eat.
The town is poor, unable by expense,
Against the raging sea to make defence;
And every day it eateth further in,
Still waiting, washing down the land doth win,
That if some course be not ta'en speedily,
The town's in danger in the sea to be.
A goodly church stands on these brittle grounds,
Not many fairs in Great Britain's bounds;
And if the sea shall swallow it as some fear,
'Tis not ten thousand pounds the like could rear.
No Christian can behold it but with grief,
And with my heart I wish them quick relief.
So farewell Cromer, I have spoke for thee,
Though you didst much unkindly deal with me."

The present Cromer lighthouse, with its powerful revolving light, well known to visitors as a conspicuous object on the highest point of the fine down between Cromer and Overstrand, was built well inland in consequence of the fate which befell the old one, which it appears was still standing, an old brick circular tower, on the then verge of the cliff, in 1806, "when it slipped into the sea silently one night"; a fate which will probably also before many years befall the old abandoned circular church tower of Stedstrand, three miles eastward, of which a sketch was given in the *Builder* of Sept. 24, 1887.

The book having been produced mainly with the intention of aiding the church restoration fund by its sale, Cromer church naturally occupies a considerable space in it, and is well described historically and architecturally, and illustrated by many engravings of various curious and interesting bits of detail. From this chapter we learn that the recent state of utter ruin of the chancel was consummated by deliberate destruction, in order to save the expense of repairing it; an order for the demolition, for that stated reason, having been given by "Antony, by divine permission Bishop of Norwich," in 1681, and for building up the ends of the nave and aisles with walls. The author adds: "The work of demolition is said to have been completed by gunpowder (I sincerely wish the reverend gentleman had been seated on the mine at the time of its explosion), and the roof screen and loft, if not already down, must have been sacrificed when the chancel arch was blocked up. . . . It was reserved for the authorities in 1840 to put the finishing touch to a century and a half of vandalism; for, to obtain 540 extra sittings, they pulled down the west gallery, and not only built it up again, which was bad enough, but erected two others along the aisles, which was worse." All these were removed in the first restoration some years since, and there is now a grand open lofty nave, a little marred by the rather too slender proportions and poor mouldings of the piers, but the general effect is fine, especially when seen filled with the crowded congregation which musters in the autumn season. The next thing wanted, when the chancel is paid for, is an organ in proportion to the scale of the building, instead of the wheezy little instrument (opened by Beckwith of Norwich, in 1792) which stands in a corner of the nave, and is fairly drowned by the psalm-singing of the congregation.

The restoration of the nave was carried out under the direction of Mr. Brown of Norwich, and by a local builder, Mr. Newman, and seems to have been very well and carefully done internally, and in a very conservative spirit as regards the exterior. The author observes, "the present restoration is supervised by Mr. Blomfield, and the builders are strangers to these parts, which is a pity." Mr. Rye is evidently a Home Ruler in these

matters, and makes one or two other hits at the impropriety, as it appears to him, of having engaged an architect from a distance, instead of one native to the country and acquainted with the local type of flint building: but as he does not appear to be able to lay his finger on any tangible error on Sir Arthur Blomfield's part, we may regard this as only the general grumble of a writer with strong local sympathies. He has however, in spite of these feelings, produced the book before us as a contribution towards the cost of the chancel restoration, and whether or not it has been successful in that respect, it is at all events a record which many of those who know and love the place may be glad to possess.

NOTES.

WE have said so much concerning the Forth Bridge at various stages of its progress that it is hardly necessary now to recapitulate its history, or to do more than offer our congratulations to those most nearly concerned on the successful completion of one of the greatest and boldest engineering projects in the history of the world. Whether the construction of the bridge will repay in a financial sense the outlay upon it may be doubtful, but we are disposed to agree with the opinion we have already seen expressed, that it was worth doing for the sake of glory, and the exhibition of the power of modern engineering to cope with great natural obstacles. Sir John Fowler, we are glad to see, is to be created a Baronet, and Mr. Baker a Knight Commander of the Order of St. Michael and St. George, and Mr. Arrol, the contractor, will be knighted. No one will dispute that all the honours are well earned, far better than some of the similar honours that are bestowed as mere political rewards. Sir John Fowler in his speech at the luncheon did not forget to say a word for the workmen, who as a body deserve all recognition for the courage as well as skill which they have exhibited in carrying out this difficult and risky work. To say that "not one of them had ever knowingly scamped a rivet" may be hardly in accordance with things we have both heard and seen in the progress of the work; but this we suppose is an occasion on which "omnes omnia bona dicere" is a kind of accepted understanding.

WE feel little doubt that the cause of the dreadful railway accident at Carlisle is that which has nearly caused other accidents before now, and which we have always expected would bring about a fatal accident sooner or later: viz., the habit of trusting to the power of the continuous brake over a whole train to pull up in a much shorter space than was formerly necessary, and thereby endeavouring to save time by running fast up to a station and pulling up quickly. This system, to begin with, greatly interferes with the comfort of railway travelling by shaking and jerking the train much more in stoppage than used to be the case; but it is also a constant source of possible danger, which this time seems to have had its effect. The old hand-brakes on tender and guard's van required a considerable distance to pull up a fast train, but they were simple levers which, if examined immediately before starting (as was always the rule on all well-managed railways), might be safely depended on to do their work. The continuous brakes of various kinds, now in use, are much more complicated machines, giving no doubt an immensely-increased chance of safety in an emergency, but also liable to fail occasionally when absolutely wanted. The inquest may elicit some other or additional reason for the accident; but on the face of the facts as so far stated we have little doubt that the real moral of the accident is that engine-drivers should be peremptorily required to allow longer distance for pulling up, regarding the continuous brake not as a means of regularly

pulling up sharp, but as a provision for emergency. Unless this is enforced we shall have other accidents of the same kind.

MR. STANHOPE'S statement in the House of Commons last week, in moving a resolution preparatory to the introduction of his Bill in regard to barracks and the accommodation of troops, must be regarded with mingled mortification and satisfaction, for it is evident from the speech of the Secretary of War that the sanitary state of our barracks has been thoroughly unsatisfactory, and that the progress in sanitary matters, which has generally been noticeable all over the Kingdom, has not taken place in those buildings which are set apart for the accommodation of our troops. The blame for this must be placed on several shoulders: on those who have been at the head of the War Office, on persons in charge of troops at insanitary barracks, and on the country at large, who have preferred to save their money rather than improve the health of their troops: but, of course, the chief blame rests on the Secretary of War, who is morally and officially responsible to the country for the health of its troops. A more naive and unstatesmanlike confession than that of Mr. Campbell-Bannerman, who had been Secretary of War to the late Government, could not have been made; for he stated that he was well aware that the housing of the troops of this country was in a most unsatisfactory state, and had been so "for a series of years." It was, in fact, a confession of official incompetence. Again, Mr. Stanhope stated that so long ago as 1859 the Commission on Barracks and Hospitals reported as to the Galway Barracks "that they are amongst the very worst specimens of public establishments we have ever seen." Yet thirty years have elapsed, and we are only now going to carry out the recommendation of that Commission. But of past mistakes and oversights it profits little to speak; we are now more concerned with the effective improvements of the future. At the same time it is necessary to point out that it will not be sufficient to remedy defects in some places only; the whole barrack accommodation of the United Kingdom and abroad must be overhauled. We say this because in Mr. Stanhope's statement no mention was made of Scotland, and of only four foreign stations; and we can have little doubt that there are lots to be found in other places.

WITH the military details of the scheme above referred to we are not concerned, but, as regards the other parts of it, Mr. Stanhope's statements seem to be fairly satisfactory. As he is going to ask the country to spend over 4,000,000 of money, he has not been satisfied with the opinion of his official advisers. He has consulted "a contractor high in his profession," and Mr. Pilkington, who has had "enormous experience in planning industrial dwellings," who are satisfied with the proposed manner in which the work is to be done. It would have been more satisfactory to the public, however, if the name of this contractor had been stated, and a consultative committee of two or three architects would have had more weight than the opinion of one. It is satisfactory, however, to find that a Sanitary Committee is to be established to supervise the sanitary part of the scheme, and also, in the future, to examine the reports of the sanitary state of the barracks received both at home and abroad; and to make recommendations thereon to the Secretary of State for War; but our satisfaction is somewhat damped on this point when we hear in mind how many reports are made which responsible officials do not act upon, and we have a glaring instance of this in regard to the Galway Barracks, which we have just mentioned. It is unnecessary to particularise the new barracks which are to be built,—which, indeed, Mr. Stanhope did not do fully. There are to be new barracks at Duhlin and somewhere outside of Manchester, also at Portsmouth, Enniskillen, and at Malta. The ques-

tion is yet in a preliminary stage, and as further details are made public it will, no doubt, be necessary to refer to it from time to time. For the present it is sufficient to congratulate the country on the probability that within the next two or three years its troops will be housed as for a long time it has accommodated its paupers, lunatics, and criminals.

THE new edition of the Post Office Guide is far more true to its name than has been the case with previous issues. Not that these have been deficient in information, varied and valuable, but the meaning of some of it was so obscured by "signs and wonders" that only an expert could show the interpretation thereof. These remarks apply more especially to the particulars of the despatch and delivery of mails to and from London, which are now set out most distinctly. Hitherto they have been expressed in a mysterious manner by means of letters and figures (in and out of brackets), the seeker for information on these points being confronted by something closely resembling an algebraic problem. Now, the time of despatch of each mail to and from all the principal offices in the three kingdoms is shown in one column, and the approximate time of delivery in another. This information occupies nearly a hundred pages, in lieu of the half-score pages into which it was before compressed, and is followed by the regulations relating especially to the London district. The latter still presents a somewhat complicated appearance, but is very full and complete, and is set out in a more uniform manner than before. It will be remembered that the January edition of the Guide was burnt at the printers' just as it was ready for delivery; and if Mr. Raikes had all this new matter ready for the New Year's issue, it must have been particularly annoying to him to have had the whole edition destroyed. We notice that the Telegraph Money Order system is now to be extended to all offices transacting Telegraph and Money Order business, so that the experiment,—which has hitherto only been in force between about a dozen places,—has, presumably, been successful.

THE eighth exhibition of the Society of Painter-Etchers at the rooms of the Society of Water-colours is an excellent one as a whole, and contains some works of special character and power. In an architectural journal mention should perhaps be made first of the highly worked and magnificent etchings of buildings by Mr. H. A. Haig, especially the interior of Burgos Cathedral (16), as remarkable for the accuracy and care with which the architectural detail is shown as for the brilliant effect of light and shadow that is realised. There are few architectural etchers who combine breadth of effect with correctness and clearness of detail as we see it here; though it may perhaps be said that the work still remains essentially an architectural drawing, with a certain degree of the artistic limitation suggested by the phrase, "The Patio of the Cloisters, Burgos" (45), is another fine work of the same class. Mr. Slocombe contributes also some large architectural subjects in a somewhat freer and less finished manner (more suitable perhaps for etching), such as "A Canal at Bruges" (91). We should not forget Mr. Haig's fine view of "The Two Bridges, Cuenca" (123), the subject being a remarkably effective one, the contrast of the little half-ruined bridge below and the towering arches of the aqueduct rising above it. In regard to etching, however, our sympathies are much more with the slighter and more freely executed works, which show a great deal by a few lines, which is the special power of etching. Among the best of this class are some of Mr. Frank Short's small works, "A Wintry Blast on the Stourbridge Canal" (20), a dry-point, is quite a little poem in copper-scratching, so bleak and wind-driven is the effect of the whole. Mr. Hugh Paton's "Gourock" (11), Mr. Wilfrid Ball's "After Sundown, Venice" (12), Mr. Percy Robert-

son's "Wet Day, Whithy" (107), Mr. F. Short's "Low Tide, The Evening Star, and Rye's Long Pier Deserted" (97) are other examples of the same kind of work, where "more is meant than meets the eye." Among works aiming at special effects the "Music Party on the Grand Canal, Venice" (114), by Mr. T. C. Farrer, is a remarkable attempt to realise moonlight effect in an etching on a large scale, and very striking and powerful in effect and manner of execution. Among the special things of the exhibition are the strange figure studies by Mr. William Strang; some of them, as "The End" (249) and "A Soup Kitchen" (52) are perhaps as repulsive as they are original; but the one called "Taking the Oath" (34) is a most remarkable study of character in the various heads. Of the original genius of this artist there can be no doubt; it is to be hoped he will not allow it to degenerate into eccentricity, which seems to be rather his danger. A considerable loan collection of Rembrandt's etchings adds another special interest to this year's exhibition.

PARIS GARDEN, known as the King's Manor, as appertaining to its lord and copyholders, formerly lay in St. Saviour's parish, and was famed for its mill, water-courses, pastures, and wild plants. In 1670 nearly all of it was taken for the new parish of Christchurch, as constituted under the will of John Marshall, who had died forty years before. Comprising the ancient hide of Widelife, and covering nearly 100 acres, it had been given in 1113 by one Robert Marmion to the Cluniac monastery at Bermondsey, whence, about fifty years later, it passed to the Knights Templar, who set up a chapel there, and from them to the Knights Hospitaller of St. John. In the early years of the fifteenth century it became a sanctuary for offenders. Ultimately passing to Henry VIII, it was granted as dowry for Jane Seymour. Lord Hunsdon and others, who got the manor from Queen Elizabeth, conveyed the land and manor-house to Thomas Cure, a benefactor to the parish. The manor-house has been identified with the Holland's Leaguer, or Nob's Island, one of the many houses of ill-fame that formerly flourished on Bankside. The moated and castellated "Leaguer," which was kept by one Susan Holland, in 1630, and is illustrated in Wilkinson's "Londina," stood south-westwards of the present Falcon drawing dock. Latterly known as Beggars' Hall, it was pulled down in making the southern approach to Blackfriars Bridge; yet some authorities question the survival of the original building to that time. The Widelife was converted into a sewer, having its outlet by the Barge House-stairs. In a fine bird's-eye view of Bankside, *temp.* Elizabeth, are shown "Gravel-lane [now an arm of Holland-street] leading to St. George's-fields" (of which the site has lately been taken for widening the railway bridge); the "Olde Parris Garden-lane," running from the Cross to the river-side; the way leading to the Manner-house; "Olde Parris Garden"; together with Widelife Mill and the mill-pond, southwards of the once famous "Folken Ine in the Clincke Libertie." Gravel-lane is marked in Horwood's large-scale map as the parish eastern boundary. The mill-pond lay at the elbow of Holland-street.

TWO tenements in Gravel-lane, Southwark, a cottage in White Hart-court, and a plot of land in Broadwall, Stamford-street, Lambeth, were yesterday put up for sale at the Mart. This small property, which is free from quit-rents or fines, is noteworthy as being copyhold of the old Paris Garden Manor, whereof a small slip,—latterly Cuper's Gardens,—yet remains, in position at least, in the public recreation-ground at the southern foot of Blackfriars Bridge. In his "Glossographia" (1681), Blount derives the name of this Manor from one Robert de Paris, *temp.* Richard II. A Close Roll, 15 Rich. II., relates to an order by that Sovereign that London butchers should carry their garbage

and off to a place "juxta domum Roberti de Parys," whence, it appears, the residuum was to be cast into the river. Mr. W. Rendle, the eminent Southwark antiquarian, has stated that he is "inclined to think the Manor may have been first known as Parish or Parysh Garden, becoming at length, about the time of Henry VIII. and Edward VI., Paris Garden, or, indifferently as it was spelt, Paris or Parish." He cites a record of 1420 wherein it appears as Parish Garden; and from another, of fourteen years later,—“*Molendina de Widefete cum Gardino, &c.: vocato Parish-gardin.*”

SOME stained glass which is shortly to be fixed in the great west window of St. John's, Chester, given as a Jubilee Memorial by the Duke of Westminster, has been on view at Mr. E. Frampton's studio. There are three lights filled with figure subjects (numbering twelve in all) dealing with the history of the city and church, and divided from each other by bands of grisaille. Heraldic work has been introduced at the base of each light and on the grisaille work, the shields in the former position bearing the Royal Arms and those of the donor and his wife; while the latter have the arms of the Mayors. The church itself figures in several of the subjects, the warm red sandstone forming a suitable background. Altogether, the contrast between the white of the grisaille and the rich colouring of the figure-subjects seems likely to give a fine effect when fixed, although it is impossible to judge fairly of its effect as seen in the studio in London. The success, however, of the Blake Memorial at St. Margaret's, Westminster, augurs well for this latest addition to St. John's at Chester. The window is to be fixed shortly, and dedicated on Easter Eve.

THE newly-worked marble quarries at Saalburg promise, at a period not far hence, to be the largest of their kind in Germany. The stone-bed, which is of enormous extent, and will take centuries to exhaust, gives a stone of excellent durability as well as of very fine colouring. The works are in good hands, and extensions and improvements are continually being made on a large scale.

ON February 17 a paper on "London Docks and their Construction" was read by Herr Garbe before a company of about eighty members of the "Architekten-verein" of Berlin. Special note was taken of the construction of the sides, lock-walls, &c., of the more modern docks in "beton"; and the lecturer strongly advised the use of this material for similar works in Germany.

THE President of the Union at Oxford has appealed to the life-members, says the *Academy*, for subscriptions to a fund of 2,000*l.* for putting the buildings into thorough repair. The Society's rooms lie between the Corn Market and New Inn Hall, lately incorporated with Balliol College. To this site, since enlarged at various times, the original "Debating Society" removed in 1852. A room for debates was built about four years later; and this in turn was replaced with a larger room, constructed of brick with stone dressings, after the designs of Mr. Waterhouse. The former debating-room was converted into a library. Its frescoes, by Burne Jones, Rossetti, and other artists, are, we are informed, in a sadly decayed condition. The block of buildings comprises, also, the keeper's apartments, a smaller library, a writing-room, newspaper and magazine rooms, lavatories, &c. Our contemporary hints that these attractions are somewhat weakened by the recent luxurious provision on the part of the several college authorities of libraries and undergraduates' common-rooms, together with the increase of various clubs and kindred associations amongst the students themselves.

THE exhibition of pictures of Japan by Mr. Alfred East, at the Fine Art Society's Gallery, is interesting both in an artistic and topographical sense. Mr. East is an artist with a great power of rendering effects of light and colour in landscape, and has produced a number of drawings of great beauty and interest from this point of view, while conveying also a strong impression of reality of representation; and those who have not visited Japan gather from the collection an impression of knowing a good deal more of the character of the landscape and village scenes of the country than before. The village street half covered with umbrellas put down open to dry after a rainstorm (96) is a very characteristic bit of local effect. Among the larger landscapes is a very fine view of Fuji-San (as we are now told to call the mountain) in early morning (22); two scenes showing peculiar effects of light on Lake Biwa (14, 18); "A moist day in a paddy-field" (21); with the white egrets like flying flocks of sunlight over it; "Lotus flowers" (34) and "Lotus pond" (42), the latter a fine study of the crowd of flowers with great leaves expanded in the bright sunlight. "An angry night" (60) is a small but interesting study of a peculiar effect of dull red sky under a roof of dark clouds. The largest painting, "Dawn on the Sacred Mountain" (69) is perhaps not so entirely successful as some of the smaller landscapes, but it is an ambitious and in many respects a fine work.

AN Architectural Students' Association has just been formed in Sunderland, the stated object being, according to the wording of its second Rule, "to provide union among its members, the elevation of the profession of architecture, the general advancement of the study of the art and science of architecture, and the guiding the studies of the members to qualify themselves to pass the progressive examination of the R.I.B.A." This is a step in the right direction, which we hope will be followed by other towns which have not as yet any such Association. The formation of provincial Associations with the special object of working up to the programme of the Institute of Architects is one of the best practical methods of promoting both unity and an adequate educational standard in the profession of architecture.

ROMAN ARCHITECTURE.*

BY PROFESSOR AITCHISON, A.R.A.

THE subjects I have touched on in the preceding lectures are so vast in extent that many courses of lectures might be given on each one, but I thought it would be more useful to devote this last lecture to some general remarks on Architecture, and to a reasoned abstract of the preceding subjects, than to add fresh matter.

Classical archaeology is a fascinating study, as it brings more visibly before us the ways of those from whom we have received the bulk of our civilisation, it opens our eyes to the knowledge we have gained since those times, and also to what we have lost, for, to speak of nothing else, the perfection of form and dignity attained by the ancients has never since been equalled.

We cannot doubt that Vitruvius was acquainted with the canons of Greek art, nor that he has given them in that modified form in which they were used by the Roman architects of his day. We have at least learned from Vitruvius the method of proportioning the parts and disposition of an order by means of the module, and we know that the proportions adopted by the ancient Romans in their orders have been universally approved by mankind ever since, or at least at the most cultivated epochs.

Through Vitruvius architects have not only been impressed with the importance of obtaining harmonic proportions in their buildings, but they have admitted, by constantly seeking such proportions, that to such proportions the æsthetic part of architecture is mainly due. We cannot doubt that these views were adopted by

* Being the sixth and concluding Royal Academy lecture on Architecture this session. Delivered on Thursday, February 13. (For the five previous lectures, see the *Builder* for February 1, 8, 15, 22, and March 1 respectively.)

the Gothic architects, when we have Casarino's scheme for properly proportioning the plan as well as the elevation of a Gothic cathedral. When an accomplished architect says of a building that it is disproportioned, or ill-proportioned, he cannot express a more severe condemnation.

Besides knowing the rules, we want so to educate our eyes to good proportion, that we cannot endure anything ill-proportioned coming from our hands. We should emulate Michael Angelo, and have our compasses in our eye. If my contention be admitted, can any study be more important than that of the antique for training our eye to good proportion?

Unfortunately, most of the ancient Roman buildings are in ruins, so that we can get but little else than the proportions of their plans; but when complete parts still remain, as in the Baths, though stripped of all ornament, we cannot fail to be struck with their majestic proportion.

All must admit that the effect of the Pantheon is unsurpassed, and in this case we have the original building almost complete.

Little more than half a century ago classical archaeology was nearly all that was taught, because it was nearly all that was wanted, and even now, according to V. le Duc, architecture is but archaeology. Still, I think we are now in a somewhat different position; there has been a Gothic eruption since in the way of art, and an engineering irruption in the way of science, and both have modified our views on art. As regards science, the ancients are mere children by the side of our contemporaries; the 1,300 ft. span of the Forth Bridge makes the Pantheon, with its 132 ft. diameter, and the Basilica of Maxentius with its 80 ft. span, look like toys. The Pantheon has, however, stood for 1,900 years, and affects the cultivated visitor of to-day very much as it may have affected a cultivated Roman in the days of Agrippa; while the bridge is but to meet a temporary want.

Though we are so near to Gothic days in point of time, and so far from those of Greece and Rome, yet as regards the main features of our civilisation, and as regards our feelings, thoughts, and habits, the position is reversed. With the fortunate exceptions of our having no slaves and not living on plunder, the Roman manners, customs, and ways of thought are very like our own; we fancy in our reading we are talking or listening to English gentlemen, until we come across some horrible trait of cruelty or inhumanity that almost makes our hair stand on end, but of which the Roman writers thought nothing. Martial mentions, in the lightest way, that at the ensuing games the episode of Mutius Scaevola before Porsenna is to be acted, and the slave who acts Scaevola will burn his right hand off. He remarks that this appears to be a very courageous act, but it is not so, for if he does not do it, he will be put in a pitched dress, and burnt alive.

We sympathise more with what is dignified, graceful, and refined than with what is wonderful and full of savage energy, but wholly wanting in grace and subtle proportion.

Geologists, I believe, draw a line between the condition of the earth before and after the Flood; our line of demarcation as regards a part of our thoughts and habits is drawn at the perfecting of the steam-engine by James Watt. In certain respects the world has been revolutionised by it and our habits, and partly our thoughts, have been revolutionised too. Shortly after the perfection of the steam-engine came the French Revolution, and that has produced a different state of feeling between man and man. There is, in consequence, a certain chaos of feeling on the disparity of the position this age holds in respect to the world behind it among all educated Englishmen, and probably in all Christendom. In certain material directions the old world has almost a ridiculous and contemptible air; time as regards space had not then been annihilated, and work had to be done slowly and laboriously. Ulysses smoothing his door-posts with a bronze adze is almost ludicrous, when we could get them better done in a few minutes by a planing machine; but who amongst us can compare with him in simplicity and dignity? The hulk of a Doric column of the Greeks is ludicrously excessive from a material point of view, but a 4-in. cast-iron column does not raise in any mind a feeling of sublimity and delight. We are, as it were, dragged in two directions; we are elated by the magnificent material achievements of our contemporaries and im-

* Vide "The Antiquarian Magazine and Bibliographer," June, 1888.

diate predecessors, and we are humiliated and depressed by the superiority of the ancient thinkers, writers, and artists.

Homer probably appears to us even grander and more unapproachable than he did to his contemporaries. The late James Fergusson was always in a state of indignation because the contemporaries of the inventors of the railway, the steamboat, the telegraph, and steam printing, were not better poets, painters, sculptors, and architects than the Greeks; he was convinced that it was merely due to indolence and wrongheadedness, and from the numerous utterances of the day you may see that this opinion is common.

If there is no poetic feeling at any particular epoch in a nation, there is no poet. If a figure-painter finds no paintable subject of the present time, he falls back on Greek, Roman, or Biblical times. A sculptor can have angels, gods, goddesses, or heroes; he is not confined to swallow-tail coats, chimney-pot hats, and glazed leather boots; but there must generally be new buildings actually fitted to the requirements and exigencies of the present day, and though most people do not care a straw about architecture, they execrate architects, because they do not happen to live in a fine-art epoch. Every despot would like his age to be an eloquent one, forgetting that persuasion or demonstration is useless when he can do what he likes, and that he may even punish plain out-spokenness with imprisonment or death. You cannot have what you want when that want, is merely produced by vanity. You must have the requisite preliminaries, cultivation, surroundings, and admiration before you can get what you say you want. People, as a rule, say they want a new style of architecture. What do they do to get it? Let us take music as a thing people do want: what do they do to get first-rate music? At least one-half of the population above the lowest class, the fairer half, learn it from their childhood. A great part of the male half profess to like it, and often hear some, and a few, outside professional musicians, study it. The encouragement of successful musicians, in a pecuniary sense, is splendid, and the enthusiasm not only exhibited but felt, is unbounded; whether the higher gifts of the composers are equally well remunerated and admired, I do not know.

Most educated people know the difference between a Classic and a Gothic building when they see them, and that is usually the beginning and end of their knowledge. They praise St. Paul's and Westminster Abbey, just as they praise Milton and Shakespeare, because it is the fashion, though they have probably never read the former and have only seen some of the plays of the latter acted. On how few modern buildings do they cast an eye or bestow a thought, for the purpose of appraising their merits or enjoying their beauties; how many passers in Pall Mall stop to admire the Reform Club, and thank God that England produced such a genius as Barry?

Before you can make the first step towards a new style there must be something with which the public is taken; the public must have some strong desire towards one form rather than towards another, or there must be some new structural necessity for some new form, and it must insist on this new form being made beautiful in the way it desires; but as far as I can see there is no more inclination towards one particular form than towards another, and there is no unanimous desire for any particular form of beauty. Directly such a taste showed itself the architects would follow, and then there would be a development; but until such a concurrence of taste exists, it seems to me impossible for a new style to arise; and he it observed that most new styles, except Byzantine, have been created by nations just emerging from barbarism.

Each architect now paraphrases what he likes best,—Greek, Roman, Early or Late Italian Renaissance; French, German, Dutch, Flemish, or Scandinavian Renaissance; Elizabethan, or the various phases of Byzantine, Romanesque, Gothic, and Saracenic.

Great skill in planning, considerable invention, and great taste is often shown in our new buildings; in fact, London is fast becoming the most picturesque modern city in the world; but there can hardly be a concurrence of aim in the architects.

Before this unanimity of taste can take place, the people must love architecture, have some knowledge of its laws, and have a strong desire

to get their views carried out, and he as thankful to the architects who can thus raise their emotions as they are to poets.

It is the admiration of his contemporaries that is the greatest spur to the unwearied striving of the genius, be that genius in what line you please. Next below this, the most desirable things are praise, honour, and wealth. Did any one ever hear of an architect getting anything but abuse? I believe there is only one architectural knight in England, and there are not ten men in London who make a decent living out of architecture. I now speak of those who can make a living out of designing buildings combining beauty with utility, and I do not include the measurers, valuers, surveyors, land and house agents, nor those who build for utility only, without regard to shapeliness.

Architects are not exempt from the effects of the wonders that are being created around them; the faint breathings of the past revolution still stir their veins, and there are signs of a new one:—

"Slowly comes a hungry people, as a lion, creeping higher,
Glances at one that nods and winks behind a slowly dying fire."
Tennyson—"Locksley Hall."

They, too, want to surpass the past, to stamp their works with the expression of the age, and, if possible, to start such new modifications in architecture as may eventually become a new style; but the question is, how any one of these objects is to be compassed? The age is an inartistic one, where the highest intellects are wholly set on conquering physical difficulties, on superseding human labour, and on the investigation of the laws of Nature—an age which looks on all the arts, and particularly the architectural one, in the same light, that Sir Isaac Newton looked on poetry, as "ingenious nonsense." Much of the building that is done, and much that will be done, must in its main features greatly resemble the past; it will be in stone, in brick, in concrete, in wood, or in lath and plaster. There must be columns and piers, colonnades and arcades, and walls with openings. The openings must be square or oblong, round or oval, with flat, round, elliptical, or pointed tops, and there must be roofs or terraces. The architects should stamp their buildings with the tastes of the day—only, unfortunately, there are none. Directly there is an insistence on buildings being beautiful (and of a new kind of beauty), there is a hope in iron, for iron buildings do now occasionally occur, and must occur more frequently in the future, and there are no examples of iron buildings in the world.

The question is, How are we best to prepare ourselves for the inevitable changes that must take place? Of one thing I am sure, that there can be no improvement so long as men think that any man, any people, or any age has done that which cannot be surpassed, and that all that can be done is to imitate that work. Yet the sole method of surpassing the best that has been, is to imitate it and to paraphrase it, until we can do as well ourselves, and then to advance beyond it.

Since the Egyptians, there have been no such great builders as the Romans, and they, being the masters of a good part of the world known to the ancients, wanted grand public buildings in every large city of their dominions. Consequently, there was a school, or probably many schools, for such buildings; here there is only occasion for two or three in a century.

Even three great public buildings in a century might give much aid to young architects, and to the foremen and workmen employed, they would be schools of architecture if they were in one style, and that style was the chosen one of the people, and by this I mean if the people had developed taste and liking enough in one particular direction; but if one of these public buildings is Classic Roman, another Gothic, and another Early Italian Renaissance, you get no concurrence of opinion and effort, and no means of comparison. There is, too, another consideration—the buildings should be such that the best paintings and sculpture of the present day will harmonise with them. This cannot be the case with Gothic. The best painters and sculptors will put in their best work; but then their work is incongruous with the building; the modern Gothic architects feel this, and when they can, force inferior artists to imitate Gothic images and Gothic gabling.

Considering that our practice is now confined to mansions and private houses, I thought that some notion of the Roman mansions and houses must be both interesting and useful.

Rome itself was in a sunny climate, and all

its southern and eastern possessions were in still warmer climates. Shade was wanted, which was procured by porticoes, and porticoes require columns, and nothing is more beautiful than well-designed porticoes in a sunny climate, with the alternation of bright light and deep shadow. But here, in this misty climate, and in this sooty air, the columns and the shade between them are nearly alike for a great part of the year. Here, it is true, we want shelter, but we also want light, and porticoes are usually most disastrous adjuncts to public buildings, except as porticoes to churches, for they darken the interiors.

One would judge England to be a very poor country, for the riches and pedestals of our public buildings are still without their statues and groups. Remember the three thousand bronze statues Scarus had in his theatre, which was only a temporary one for a month or two's use; and gem engraving is almost extinct, as well as the making of artistic plate. Yet if we can keep up our courage, our vigour of mind and body, our industry and invention, our integrity and virtue, England will gradually become rich, and as wealth is what is saved by self-denial from the surplus industry of mankind, the gaining and preserving it are certainly virtues. Riches themselves, if properly used, seem to me to be an undoubted advantage. As Dr. Johnson so wisely remarked, there have been many treatises on the advantages of poverty, but none on the advantages of riches, as these are self-evident. If we will but use these riches, when we get them, wisely, there is no reason why England should fall; that is, if wisdom, courage, temperance, and justice still remain with us.

I think the creation of beautiful things is not demoralising, so I have had no hesitation in recommending the study of Roman houses, villas, and palaces. In hearing the account of Pliny's villas you see to some extent the requirements of those days,—the choice of views, of sun and shade, of retirement and quiet; and you have the attempts of distinguished architects and antiquarians to re-construct the Laurentine Villa from Pliny's description. You must not even think that the Atrium of the Roman house is not adapted to English wants for one of the great triumphs of Barry at the Reform Club and at Bridgewater House was the utilising of their Atriums by covering them with glass.

Whether it was from modesty or fashion that Pliny said nothing about his servants' housing I know not, but we can only deplore it. The series of cells (Cellatio) on the first-floor, that Trimalchio mentions, was probably the slaves' barracks. We find that Pliny had an apartment for his pages to sleep in, and that there were many of them in the room (Pliny 7, 27). As early as Plautus we find the women's slaves included wardrobe women (Vestisipia), a perfume keeper (Unctor), a cofferer (Auricustos), fan-bearers (Flabellifera), sandal bearers (Sandaligerulo), singing girls (Cantrices), casket keepers (Cistellatrices), messengers (Nuntii), news-carriers (Bennntii) (Plaut. Trinummus, act ii, sc. 1), and it is not likely that these were decreased as Rome became richer. There are inscriptions to the slaves of the Empress Livia,—the maid who combed her lap-dog is called "a Cura Catella"; another put in her earrings and was called "Auricular Ornatix"; another put on her shoes, and was the "Sera Sandalis"; there were the dress-folders and dress-perfumers, the hair-dressers, the hair-parter, the wig-keeper, the mistress of the rouge-pot, and of the powder-puff. But, as I told you before, there were names for upwards of 300 slaves. This affluence of slaves encouraged a passion for every possible convenience. We see how small an advantage was dearly purchased by Pliny in having a gallery built as large as a public one, merely for taking a walk in bad or hot weather. Nero's was a mile long.

The plan of a Roman house seemed so convenient to Palladio that he built the Convent of La Carità at Venice in imitation of one. These are his words:—"The following building is of the Convent of La Carità; where there are the regular Canons in Venice. I have sought to make this house resemble those of the ancients; and therefore I have made there the Corinthian Atrium: which is as long as the diagonal of the square of its width. The wings are two-sevenths of the length, the columns are of the composite order, $3\frac{1}{2}$ ft. thick, and 35 ft. long. The open part in the middle is a third part of the breadth of the Atrium." (What he means

by this I do not understand, unless he alludes to a rain-water tank in the open space.) "Above the columns there is an open terrace on a level with the third order of the cloister, where there are the cells of the friars. Adjoining the Atrium on one side is the Sacristy, girded with a Doric cornice, which carries the vault above; the columns that are seen there support that part of the wall of the cloister which in the part above divides the chambers, or rather the cells, from the gallery. This Sacristy serves for the Tablinum (so they called the place where they put the images of their ancestors). Again, to suit myself, I have placed it on one flank of the Atrium. On the other flank is the place for the Chapter, which answers to the Sacristy. In the part by the church is an oval staircase open in the middle, which is convenient and beautiful. From the Atrium one enters into the cloister, which has three orders or columns, one above the other. The first is Doric; the columns project from the pilasters more than half" (he means from the piers). "The second is the Ionic; the columns are a fifth part less than those of the first; the third is Corinthian, and has the columns a fifth part less than those of the second. In this order in the place of pilasters there is a continuous wall, and in a straight line over the arches of the lower orders are windows" (i.e., in a vertical line from the centres of the arches), "which give light to the entrance of the cells, the vaults of which are made of canes, so that they may not weight the walls. Opposite the Atrium and the cloisters beyond the walk the refectory is found, two squares long, and as high as the bottom of the third order of the cloister; it has a gallery on either hand" (how the refectory and the walk were lit the plans and sections do not show), "and under it is a cellar much after the manner that they make cisterns, in order that the water cannot get into it. On one side it has the kitchen, ovens, poultry-yard, wood-house, laundry, and a pretty garden, and on the other, other places. There are in this building, including rooms for strangers, and other places which serve for different purposes, forty-four rooms and forty-six cells."—(Pall. "I quattro libri dell' Architettura," Venice, 1570. Lib. 2, Cap. 6.)

The plans of the Palace of Augustus are worthy of your attention for many peculiarities. I mentioned before that the audience chambers, or Courts of Appeal, were of a peculiar shape, reminding one of Byzantine work (in Byzantine architecture these curious shapes were adopted to get abutments for domes and vaults); with the exception of the light they got from the outer doors, they seem only to get light from a grating at the top; how the rooms at the back were lit we do not at present know, as they abutted on a hill side, but probably by slanted shafts to the front of the Palace, as was done at Caracalla's baths. On the two flanks, the Peristyle might have been lit from it, as we know nothing of how much of the wall was found, and the back parts might have been lit by skylights; but in the front of the ground-floor circular rooms, if they really were without windows, could only have got a glimmer of light by reflexion from the passages; it is scarcely likely that they had gratings in the floors over them, and we are at a loss to know for what purpose they were used. If there were no upper story, the rooms on the first floor might have been lit by skylights. It has occurred to me that they might be bed-rooms, supposing that bedrooms were ever made circular, and the passages round them were Androns to prevent the inmates being disturbed by the noises of the streets. The street noises of a night seem to have been intolerable,—all the goods traffic being carried on between four p.m. and sunrise; and then, as now, in Italy, traders and copper-smiths began work at midnight.

Seneca's description of the noises of the smith, the sawyer, and the musical instrument maker who tries his flutes and trumpets close to him is amusing. (Senec. Epis. 57, 13.)

I think there must have been a large opening, or several openings, in the wall next the Peristyle at the back of the Tablinum on the first floor, so that when it was wanted there might be a view from the Tablinum across the court.

One must bear in mind that the Temple of Apollo with its porticoes, the Temple of Vesta, the House of the Vestals, and the Grove, were within the Palace grounds, and that the Temple of Apollo was probably used by Augustus and his family as a private chapel.

When Lepidus, who was Pontifex Maximus,

died, Augustus took the office himself, and as he was obliged to live close to the Temple, of which he was the guardian, and the Temple and the house of the Vestals was close to the Via Sacra, he moved the Temple and Virgins close to his palace.

The main hall of the Apollinean Library, if it was the original one, must have been magnificent, being 77 ft. by 56 ft., with its three large apses 37 ft. in diameter, but whether vaulted or not we do not know, and must have been well fitted for the meetings of the Senate, though one wonders how Augustus found them seats. The Senate-house or Curia, rebuilt by Diocletian, is now the Church of St. Adriano, and was drawn by Vitruvius. The state-rooms of Domitian's Palace are on a grand scale, the throne-room 136 ft. by 100 ft., and the dining-room 107 ft. by 95 ft., without including the flat apses. The throne-room may possibly have been vaulted, but the dining-room was certainly not. If there are any sufficient remains of the bases of the columns the whole could be roughly reconstructed, as definite proportions were given to the columns and entablature, and possibly there may be scraps enough left to see what the carved decorations were like.

It is worth noticing how charming the dining-room must have been with one end open to the Peristyle, and with windows or sash-doors down to the ground on either side, so that the guests could see the plants in the conservatories, and both see and hear the plashing fountains.

I read you before Plutarch's remarks on this palace being more superb than the Temple of Jupiter Capitolinus, enriched as this was with the columns plundered by Sulla from the Temple of Jupiter Olympius at Athens.

However great a monster Domitian may have been, he evidently had good taste in architecture, or he would not have employed so able an architect to build his palace. The curved terrace or portico, 244 ft. across, he built in front of Augustus's Palace to overlook the circus maximus, must have been one of the finest sights in Rome.

Martial has many epigrams on Domitian's buildings, one long epigram on the glories of his palace (Lib. VIII., Epig. 36) I gave you in my last lecture; but as all his epigrams to the Emperor are particularly fulsome until his death I have not given them. When Domitian was assassinated he wrote in his Book of Shows (Lib. Spec. 33):—

"How much thy third has wrong'd thee, Flavian race!
"Twere better ne'er to have bred the previous brace."

He has, however, another on the architect of the palace, Rabirius (Lib. VII., Epig. 56, p. 331), as follows:—

"Rabirius model took from heaven to build
Our wondrous Palace, sure; he is so skilled.
For Phidias Jove a worthy fame to rear,
Pisa* must beg him of our Thunderer."

According to Suetonius (Domitian 12), Domitian had exhausted the Exchequer by the expense of his buildings and public spectacles, but beyond this he says nothing of his Palace.

I have said in the lecture on palaces all I have to say about Diocletian's.

On reviewing the plans of these three epochs, the Augustan, the Flavian, and that of Diocletian, we see that there was much more thought and ingenuity bestowed by the architects on the plans in the first epoch than in the two latter.

From the houses at Pompeii there is much information to be picked up in the way of planning, particularly on angular and irregular-shaped pieces of ground, and in construction; much, too, may be learned in the way of monumental-water work, for Pompeii is full of fountains, and you heard from young Pliny what pleasure the Romans took in the tasteful display of water. The whole town was a plastered one, with the exception of some of the public buildings, and from it we see how colour can raise this mean material to the highest position. If there is not much to be learned directly in the way of architecture, there is that which is more valuable, hints and suggestions of treatment, that we may require at any time in our practice. I may instance the Roman Doric columns covered with mosaic, and the way in which the moldings of the bases were arranged to fit them for the application of mosaic.

I think I made it clear before that I was an ardent advocate for making every building a

* Pisa was another name for Olympia (sixteenth century MS.).

shrine of the three visual Fine Arts, and at Pompeii we see them combined; but I go further, and am equally desirous of seeing the household fittings and utensils made as beautiful as possible, so as to harmonise with the architecture, the painting, and the sculpture, as we see that the majority of them do at Pompeii. In one respect I think this heightening of furniture, tools, and utensils is quite as important as the heightening of buildings; for if the smaller things which are devoted to use are beautiful, the seeing them constantly must heighten a taste for beauty in those that use them. Their beauty has, too, additional advantages, for it must cause the makers to be instructed in the art of heightening the useful.

As far as architecture is concerned, it can hardly be expected that this great constructive art can become a necessity for all, nor can be so adequately fitted to its high position, if all the subsidiary constructive arts present nothing to the eye but utilitarian abortion; and when I speak of Architecture I do not mean mere building.

The capitals with figure episodes in them show the sculptor that they can be made more interesting and beautiful by the introduction of the highest form of beauty,—the human form,—and that their ornamentation is not necessarily confined to floral forms.

The painters, too, may see that however badly the subjects may have been painted, there was an evident desire to choose subjects that are fraught with lovely and dignified form, and connected by literary tradition with important and striking events. There seems an inclination in the present day to devote the genius that inspires the figure-painter and the extraordinary skill which has cost him so many long years to acquire, to immortalising events which not infrequently are the most commonplace, and forms that are without dignity or beauty, when they are not absolutely ugly. For example: workmen drinking, oysters gambling, or commonplace episodes in the dressing-rooms of theatres. Surely this entrancing art should preserve for us, and for posterity, the most perfect beauty, the noblest forms, the most delicate and most gorgeous colours, and those actions and expressions which charm the eye or ennoble the soul.

Personally, I am deeply interested in the bringing of constructive ironwork into the pale of architecture. It does have some place even now in modern building, and will, I am convinced, hold a conspicuous place hereafter in countries having a smoggy and misty atmosphere, like our own, and in the narrow streets and frontages of manufacturing towns, where land is dear and light is scarce. I say this without diffidence, although there is so vast a majority of an opposite opinion.

Few architectural students care about solving the scientific problems of ironwork, and are sometimes indignant at being expected to study them, and the aesthetic part they tacitly but resolutely refuse to attempt. The former neglect somewhat lowers, and certainly impoverishes, the profession. The public will have what it wants, and this important constructive branch of the profession falls into the hands of the engineers; but as to the latter, it cuts to the very roots of the art, for if architects show that they cannot deal architecturally with new materials, the art at once sinks to a sort of dilettanti antiquarianism, on a par with heraldry or shooting with the long bow.

The light architectural edifices portrayed on the walls of Pompeii, and in some of the now buried chambers elsewhere, suggest ironwork to us; and though we perhaps cannot adopt any of the forms directly, they give hints for the sort of treatment that might be adopted. There is, however, this observation to be made: at Pompeii the capitals and bases have mostly been treated like the orders,—i.e., proportioned to the diameter of the columns, while they should be proportioned to the height of the columns. The Italian architects, who dispensed with columns on the faces of their buildings, proportioned the crowning cornice to the whole height of the building.

Our architectural comrades in France, with that instinctive artistic perception which belongs to them, utilised these decorations as motives for the coloured ornamentation of cast-iron columns. The use of beautiful colour in buildings is fast becoming a necessity, and we may hope, ere long, to see enamel successfully applied to ironwork.

Before dismissing the subject of what we may learn from the antique, I may mention

their ornamental plastering, which is probably the most beautiful that still remains; there is a freedom, an extreme delicacy, and a look of being done off-hand, that makes it most charming to my eyes; and had not the Romans been of the same opinion they would hardly have classed the ornamental plasterers with the architects, sculptors, and painters.

To the sculptors must be left the decision of whether the Roman plastering or the imitations of it by the Italian artists of the Renaissance bear the palm.

Professor Roger Smith has lent me the photographs of the charming specimens you see before you, some from the tombs on the Via Latina and some from Pompeii.

From the ornamental plastering that I saw, many years ago, in one of the chambers at Hadrian's Villa, for it seems now to be withdrawn from the public gaze, I am convinced that it was hand-modelled on the spot. We have in the present day in England much plaster-work that is very beautiful, but it is almost invariably cast work, and that involves much repetition.

I fear architects are too prone to fall in with the ordinary sweating system, even to chime in with a statement of its principles, when they are but put forward as a feint. Englishmen, as a rule, are patriotic; and if it is pointed out to rich men that it is a patriotic thing to encourage first-rate work, and the revival of artistic work, once even common here, and that neither can be got on those principles, I feel sure that some architects would succeed, and that we should be re-creating a school.

Artistic, however, as the Roman school of plastering was, it did not possess the transcendent merits of Greek art. Greek art aimed at simplicity as the true mark of excellence. This simplicity was not the native simplicity of a rude race, charming as that often is, but the product of the highest cultivation, and we admire it as we do the off-hand work of a great artist, who, with one sweep of his brush, will give a curve not only of perfect beauty, but of exact fitness for its place, and by the addition of a few blobs will make a piece of ornament infinitely more pleasing to an educated eye than the most elaborate work of a second-rate ornamentalist, just as the simplicity of Demosthenes surpasses the ornateness of Cicero. The Greeks used as little ornament as they could, but made what they did use as perfect as possible, so as to have "infinite riches in a little space," putting the ornament too, exactly where it was wanted, and leaving the spectator to wish for more; throwing down, as it were, the gauntlet of challenge, as if the artist had said, "I have done my work, do it better if you can"; while as a rule the Roman work was overloaded with ornament, though it seems to me that it was less overloaded in their plastering than in their stonework. The Romans desired magnificence, the Greeks, art. I mention this lest you should think that the highest Roman standard cannot be surpassed.

Besides the important facts that the remains of Roman architecture are so numerous, and that Roman architecture was the mother of Byzantine, Romanesque, Saracenic, and Renaissance, the architecture of that great people is not without artistic merits of its own. It certainly attained dignity and magnificence, and occasionally the combination of size, proportion, and skilful lighting made some of its works sublime, as we see in the interior of the Pantheon, and in some of the ruins of the palaces and baths. Though it may appear rather paradoxical to say so, looking at the achievements of the present day; yet I cannot help thinking that the architects of Christendom have not as yet absolutely mastered architecture so as to be able to shape every new requirement and every new material that comes before them into a perfect architectural whole, different from the past, and yet equal or superior to it; for I cannot think that the want of a universal style is the fault of the architects. Capitalism as originality is, there is too much evidence in England of a desire for quaintness, oddness, and variety at any cost; after due harmonic proportion, without which the best architecture can only reach a secondary grade. The highest aim is to produce exquisiteness, majesty, or sublimity in buildings, and this can never be done until the art of proportion has been thoroughly mastered, and the architect makes architecture his expression of worship. This last phrase has been so much abused as to be equivalent not only to the,

religious devotion to an art, but to the abandonment of all the rules of morality as well; it is not, however, by brutalising ourselves by vice that we can attain the highest excellence, but by purifying ourselves by the practice of the virtues. We must first learn the elements of the supremely difficult and complex profession that we follow, more varied in its requirements than any other. We must not only study the great creations of the past, but endeavour to extort from them the secrets of their success; we must spare no pains in what we do, we must have an unselfish desire to see architecture soar to a perfection not hitherto attained, before we can even hope to equal the great masterpieces of antiquity, much less to surpass them. The very thought of surpassing all that has been done before raises a glow of generous emotion in the bosom of every architect, and no one can say when the time may come that people's eyes will be opened, and this master art again take the foremost place in the desires and admiration of the English-speaking race.

SCULPTURE ON GREEK TEMPLES.—II.

ROYAL ACADEMY LECTURES.

MR. A. S. MURRAY, of the British Museum, delivered his second lecture* on this subject on the 20th ult.

The lecturer commenced by remarking that in a Greek temple the most striking feature was the pediment by which it was crowned. Having shown how the triangular shape of the temple pediment grew naturally out of the exigencies of roofing, he proceeded to speak of the sculptures in such of them as had survived. Of existing pediments we had three conspicuous examples: the pediments of Ægina, of Olympia, and of the Parthenon at Athens. But firstly, he would draw attention to certain small pediments which were found on the Acropolis at Athens during the recent excavations, and which, being older than the others, would be of interest as illustrating almost a first effort to obtain a composition fitted for a triangular space. These pediments had belonged when the Persians sacked Athens. The sculptures were in relief on the back of the pediment, the material being a sort of limestone, known as *poros*. A very free use had been made of bright colours, blue and red, which would be attractive in a rude early age. In one pediment the scene illustrated was that of Herakles slaying the Lernaean Hydra, a huge serpent with innumerable heads. This was on the right; on the left was the faithful companion of Herakles, Iolaos, standing ready with the chariot to bear Herakles off victorious. Fragmentary as the sculpture was, it showed that the sculptor had made at least one good observation in regard to the horses. The Lernaean marshes, where the incident took place, were, to this day, thick with runnels of clear, glittering water. No horse could stand there without lowering his head to drink, and that was precisely what the sculptor needed, to get the heads of his horses down into the contracting part of the pediment. The huge crag that filled in the angle had also a part in the legend, for while Herakles was still engaged with the Hydra the crag moved forward and seized his heel. The opposite angle of the pediment had been destroyed, but doubtless it was filled in by the lessening coils of the Hydra. As regarded composition, it was interesting to compare the chariot of Herakles, facing the angle, with the chariots of the later pediments of Olympia and the Parthenon, which faced the centre. In the west pediment of the Parthenon the horses, rearing towards the centre, represented the perfection of grouping, where chariots were concerned; while the small archaic pediment in question, with its chariot turned away from the centre, belonged to a stage of art when sculpture was hardly equal to the difficult task of representing rearing horses; indeed, it was a century later before art was sufficiently master of its powers to render a group of fiery horses. Similarly, in the east pediment of Olympia, though the horses were not rearing, their heads were turned towards the centre,—a departure from the archaic manner and an improvement in composition. The archaic manner had, however, the advantage that the sense was perfectly clear; the chariot was waiting to

carry off Herakles when he had slain the Hydra. But as to the west pediment of the Parthenon, what troubles had we not had with the chariots facing the centre when the positions should have been reversed, according to our notions of the incident. We were told that in that incident the victory was won by Athene, and had her chariot been turned away from the centre, we could have understood the matter easily. But the great Greek sculptors apparently cared more for their art than for telling their story clearly enough for modern intelligence. The sculptor of the archaic pediment was more explicit: he wanted to tell his story. In the other archaic pediment, Herakles was represented, on the left, in the act of slaying a huge snake, possibly the Echidna, whose body seemed to be encircling itself out of the corner in which it had been lying. While, however, the serpent seemed to come out of a dark hole, Herakles equally appeared to advance from the broad light. By slaying the monster he illustrated one of those conflicts of the powers of light and darkness which played, or seemed to play, so large a part in Greek mythology. But in this pediment Herakles occupied a secondary position. His slaughter of the serpent paled beside the deed of his father Zeus, who slew the triple monster, Typhon, and buried him in the Serbonian marshes. On the right-hand side of the pediment we saw Zeus in the act of hurling his thunderbolt at the grotesque monster, whose tail coiled away into the angle. The sculpture of Typhon was very rude and very highly-coloured. Such work could not be much later than 700 B.C. In this pediment, equally with the other, the sculptor had followed an order of composition in which the action moved from the centre towards the angles; and it would be interesting to know whether the same was in general the archaic order as compared with the later compositions of Ægina, Olympia, and the Parthenon, where the movement was from the angles to the centre. At present we had not sufficient evidence on that point. In any case it was a splendid change from the archaic manner to the centralising of later times. The centre of the pediment then became the centre of action,—the place of highest dignity. From each side approached figures of ever-increasing importance in the scene. The great difficulty that remained was the filling-up of the angles with figures appropriate to the scene. In the pediments of the temple of Ægina the extreme angles were filled up by wounded men who had yet strength to raise themselves a little,—just enough to fill the increasing space of the pediment. Next to them came archers, who knelt on one knee to draw their bows; and so by a regularly increasing set of perfectly natural attitudes the centre of the incident was approached, and we looked for the incident which was to form the keystone, so to speak, of the angles to the centre. The centre was a wounded hero fallen to the ground; he had evidently been a leader in the fight, for while the opponents were eager to despoil him of his armour in the old Homeric manner, his friends made a desperate effort to save him. Meantime, in the very centre of the pediment, and directly behind the fallen hero, appeared the goddess Athene, visible to us, but probably invisible to the actual combatants, but in any case come to turn the scales of battle. So far as the indications of costume went, the battle was between Greeks and Trojans. Such was a brief outline of the composition of the Ægina pediments. These sculptures were worth careful study. They were, of course, archaic, and were certainly not exhibiting the perfect freedom of form which we saw in the pediment sculptures of the Parthenon, and in subsequent sculpture; but they evinced the faithfulness with which the sculptor had observed the details of his forms, and the precision with which he had rendered them. There was abundance of reason to give him credit for recognising those many modifications of form which were necessary for a composition in which the various groups, though sculptured in the round, had yet in a measure to appear as in relief. He had to find a medium between the flatness of relief and the full roundness of a statue. In point of date the Æginetan sculptures stood about midway between the very archaic pediments before described, and the pediments of Olympia. Looking at the sculpture of the east pediment at Olympia, the first observation which suggested itself was that the sculpture, though manifestly later than that of Ægina, had gone back in a great measure to the older principle of relief.

* For report of the first lecture see *Builder* for last week, p. 155.

But it was to be observed that the parts which were worked in relief had not, except in the case of the horses, been sculptured on the true principle of relief, which aimed at presenting to the front the greatest possible extent of the figure or figures. In the Olympian pediments the figures were, in a number of cases, sculptured on a background, and in that sense they were reliefs; but for the rest the projection was enough to make them look like actual statues in the round, and as such they were generally considered. Having discussed at some length the question of the subject and the arrangement of the figures in the east pediment at Olympia, the lecturer passed on to speak of the east pediment of the Parthenon, of the sculpture of which all that had survived was the group in each angle; the centre had disappeared, and with it the climax and key to the composition as a whole. The subject, we knew from a literary source, to have been the birth of Athena. After discussing the possible "interpretations" of this pediment, the lecturer, in conclusion, said that in archaic sculpture we had learned to admire the fine fastidious folds in which the drapery was systematically arranged, as if it had been put on a little wet and then pressed into shape. In the sculptures of the Parthenon, however, we had got rid of fashion and its fastidiousness. Beauty was found in the wider consideration of what was necessary,—no more and no less,—for a perfectly noble form. The dress, while it covered the forms, had no need to conceal them. It had, indeed, to be shown to be distinct from the forms beneath, and that was achieved by treating it as a perfectly distinct thing, movable and removable at pleasure. It thus aimed at a beauty of its own, and called upon the sculptor to reproduce the innumerable charms of light and shade which belonged to it under its aspect as an accessory with special features of its own. It was like the movement of a clear stream, which, though distinct from its rocky bed, yet owed its infinite charm to the configuration of that bed.

[We will give a report of Mr. Murray's third and concluding lecture of the series next week.]

LECTURES ON THE MYTHOLOGY AND ART OF ATHENS.

In connexion with the Chelsea centre for the extension of University teaching, Miss Harrison is giving a course of ten lectures on Athens, at the South Kensington Museum lecture-theatre. In this course the lecturer is following up and combining the subjects of her lectures on Attic mythology in the autumn of 1886, and on Attic cults in the autumn of 1888, reports of both of which appeared at the time in the *Builder*. The present lectures go with much greater detail into questions of topography, and show the result up to date of the recent excavations at Athens. One of these discoveries is especially important. The river Eridanos has been discovered by Dr. Dörpfeld, north of the Akropolis. Its course followed roughly the line of the great sewer shown on maps to pass under the northern part of Athens; the river flowed out of the city at the Dipylon. This localisation of the Eridanos dims the importance of the Kephalissos in Attic topography. In early times at least, it, and not the Kephalissos, formed the northern boundary of the city, as the Ilissos did the southern. The theory is fully confirmed by a passage in Plato (*Kritias*, 112), who says that the city in old times was bounded by the Ilissos and the Eridanos, by the hills of Pnyx and Lykabettos. The Pelasgikon (τὸ πρὸ τῆς Ἀκρόπολις. Thuc. II. 17), or old Pelasgic fortification which served as a defence to the Akropolis on its western side, is shown to have extended from the Klepsidra to the Asklepieion,—it was almost certainly used as a fortification down to the days of Herodes Atticus, when its course was slightly altered by the building of the Odeion. On the Akropolis the chief interest still attaches to the *temple of Athena*, discovered in 1835, and to the remains of Pelasgic masonry near the Erechtheion. These pre-historic foundations are doubtless those of the well-built house of Erechtheus (Homer, *Odysseus*, VII., 81). In connexion with the lecturer the lecturer gave an interesting piece of mythological analysis. Erechtheus, one of the earliest kings of Athens, is originally but a surname of Poseidon. When the worship of Athene established itself firmly at Athens, to the gradual subordination of the

Poseidon worship, it became necessary to connect the royal house intimately with the new goddess, but the ancient king, under his title of Erechtheus, was too strongly associated with Poseidon, therefore he must be, so to speak, re-born as Erichthonios. The Erichthonios of the Iliad (XX., 219), with his three thousand mares, who are loved of the north wind, is merely another form of the sea-god, but this aspect of him is less familiar to the Athenian mind, and since the end of the name *Ἐριχθωνίος* suggests a possible connexion with the earth, he is made into an earth-born King of Athens, entrusted at his birth to Athena herself. The story of his being enclosed in a chest and given in charge to the daughters of Kekrops, is one of those etiological myths which are frequently met with in Greek mythology, and which often arose to explain ritual, the original meaning of which had been either obscured or forgotten. This particular story was to account for the mysterious ceremony of the Arrhephoria (Pans. I., 27), otherwise Hersephoria, when young maidens carried on their heads chests, the contents of which were to be unknown to them. Miss Harrison contends that what they carried were effigies of young animals (*ἵππαι*). With these, the maidens were to propitiate already, at an early age, the goddesses of fertility,—but they must not understand the ceremony. Hence the injunction not to look into the chest, and threats to insure it. Hence also the story of what happened in the days of Kekrops to the maidens who opened the chest. The names of Herse and Pandrosos are themselves connected with young animals (*ἵπποι* Pandrosos). In passing from the ancient Poseidon and Erichthonios cults of the Akropolis to the Areopagos, the lecturer showed the story of the connexion of this hill with Ares to have arisen to account for the name of Areopagos, when its real meaning had been lost. The meaning may be arrived at from considering the importance of the worship of the Eumenides, who, together with the Chthonic deities (Demeter, Persephone, Triptolemos, Plouton) give the key-note to the mythology of this region. The shrine of the Eumenides was at the eastern angle of the Areopagos. From a study of (1) their early art form (note especially the series of Argos reliefs), and (2) their ritual (see Sophokl., *Ord. Col.*, 470, scholiast on the lines), we infer that Pansanias is right when he says that Aeschylus in his "Eumenides" first made them terrible. Originally they were austere and solemn, yet kindly nature-powers. It was as *Semnai*, or Venerable Ones, that they watched by the cliff on the east of the Areopagos. These Semnai themselves give a clue to the name of their hill. In Aeschylus they call themselves *Ἀοαί*, i.e. curses (Eum. 416). May not the hill mean the hill of the curses or imprecations, of the mysterious powers of the under-world? Here Pansanias also noted a tomb of Oedipus (Paus. I., 28, 7), yet in Sophokles we find the Oedipus legend and the grave of the Furies, where he disappears, localised at Kolonos. The explanation is to seek in the fact that to the early city, the Areopagos was the place *without* the gates. It was there that criminals were condemned, and outcast tyrants received. The place as such must not be within the city proper. But, as Athens spread, the hill of the *Ἀοαί* and the sacred shrine of the Semnai were no longer apart from the city,—and so a new hill of cursing was made, with its worship of the Semnai and its grave of Oedipus, safe this time beyond the walls of Themistokles. The sacred enclosure of the Eleusinion, with its two temples, one of Demeter and Persephone, and the other of Triptolemos, lay almost certainly south of the Areopagos, not far from the Pnyx. This position is confirmed by the passage of Aristophanes (*Thesmoph.*, 658), where the choros of Thesmophoriasuzai talks of searching the whole Pnyx (τὴν πύκνα πᾶσαν) for fear some man may be lurking there. During the performance of the mysteries of the Thesmophoria, which took place in the adjoining Eleusinion, the Pnyx was for three days given up to the women of Athens. For the cult and mythology of Eubouleus, another under-world deity, whom Miss Harrison shows to be originally another form of Hades and Plouton, a more general interest is now likely to be felt, owing to the beautiful head of this god recently discovered at Eleusis, and held by many to be from the hand of Praxiteles (Athens, Central Museum).

We will give a connected report of the remaining five lectures at the close of the course.

Illustrations.

SOME CHURCHES UPON THE LOWER RHINE.

ALTHOUGH the churches upon the Upper Rhine are well known to English archaeologists and architects, yet those upon the Lower Rhine, especially between the German frontier and Cologne, are far less known than they deserve to be, and some views and descriptions of some of the most important ecclesiastical buildings in this district may be of interest to our readers,—especially as the drawings are from sketches made on the spot, and the descriptions from notes taken down at the same time.

We commence our observations at Cleve, the capital of the old German Duchy of the same name. After passing through the vast plain which intervenes between Rotterdam and the German frontier, one suddenly comes upon a wooded range of hills, one of which is crowned by the old castle and Minster Church of Cleve. The pretty town winds gradually up the hill, by a steep, serpentine street. Although Cleve is a charming little place for the artist, there is not very much to detain the architect there. The castle, though an old building, has been too much modernised to be of any special value. It is true it contains two very singular-looking Romanesque kirchways; so singular, in fact, as to raise a doubt about their genuineness; and some early inscribed tablets, several of which are Roman in date. The Hauptkirche, or Catholic parish church, close at hand, is a large, fourteenth-century building,* consisting of a very long and lofty nave and aisles, terminating in apses at the east end, with two towers crowned by tall slate spires at the west, and a graceful fleche in the centre. The building is constructed of red and white bricks, used somewhat haphazard, in places arranged in stripes, and then again in other portions of the structure used indiscriminately; the window traceries, doorways, &c., are all of stone. The interior of the church, though rather bald-looking, is finely vaulted; it contains two extremely interesting fourteenth-century monuments, a well-carved tryptich altar-piece at the end of the south aisle, and an elaborate "Ambrüb." The "Kloster Kirche" (Dominican Church) in the lower town is a remarkably plain fourteenth-century building of brick, but contains a set of well-carved choir stalls. The "Evangelische Kirche" (Protestant parish church) is a most singular compromise between Gothic and Classic architecture, not unpicturesque, and dating from about the end of the seventeenth century. The neighborhood of Cleve contains a number of very interesting churches. Eight miles off, on the opposite bank of the Rhine, is Emmerich, with two fine churches,—the older of which, called the "Minster," is a most eccentric Ecclesiastical building, and we should describe it as consisting of a great north transept with a low, narrow choir and a short nave (only two bays long) attached to it. There is a picturesque brick tower and, beneath the choir, a very early Romanesque crypt. For furniture a bronze Renaissance font and very elaborately carved fourteenth-century choir stalls are worthy of notice. The principal parish church, in the centre of the town, is a vast brick structure dating from the fifteenth century, with a very lofty western tower crowned by an octagonal lantern. Unfortunately the whole of the furniture, altars, &c., are poor late Renaissance work, and are not sufficiently interesting to make up for the want of architectural detail which is lacking in this huge, plain interior.

About five miles from Cleve and three from Calcar is a village called Wisse!, which contains a very perfect twelfth-century church, consisting of a nave, aisles, transepts, and two towers, flanking the chancel, which retain their original gabled cappings. The vaulting is quadripartite, each bay enclosing two piers, but only a single triforium opening and clearstory window. There is a curious Romanesque font and part of a fifteenth-century organ-front. The whole building has been covered internally with modern decorative painting of a somewhat gaudy description.

Calcar, which is three miles further on, is an interesting little town, retaining its old walls and a plain but picturesque little fifteenth-century rath-haus; but the chief interest of the place attaches to the principal or Catholic

* Commenced in 1381.

parish church,—a most remarkable building. Externally, it is as plain as possible; it has high brick walls unadorned with either parapets, pinnacles, or string-courses,—nothing, in fact, but the window-tracery, and that very simple geometric work. The building consists of a nave and aisles of equal height, a long chancel with a chapel, the same height, on the south side, and one much lower on the north. There is a lofty brick tower, crowned with a slate spire, at the west end, and a deep porch to the south. The interior of the church is very fine, though rather plain; the piers are cylindrical, of brick plastered over, and scored in representation of alternate layers of wide and narrow courses of stone. The arrangement appears to be ancient. The capitals are foliated, and the vaulting is simple and exceedingly good. But what makes the building especially interesting is the quantity of magnificent furniture which it contains.

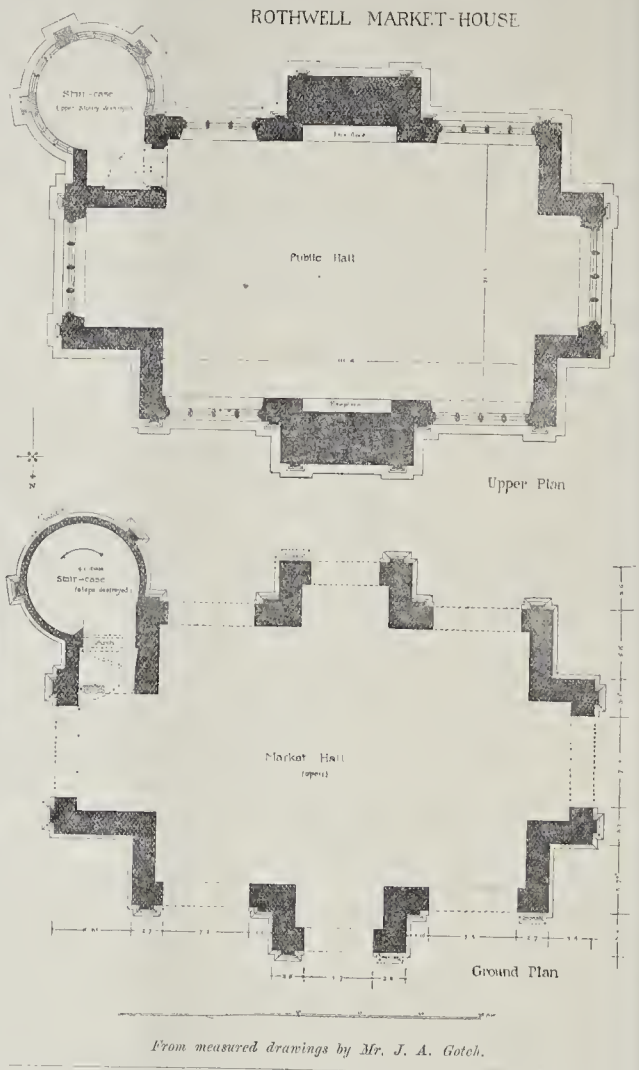
There are seven great triptych altars, all dating from the commencement of the sixteenth century. The high altar is a most wonderful composition. When opened, the triptych displays the whole history of the Passion of our Lord in one vast "alto-relievo" carved in oak, uncoloured. There are some 250 figures. The altar itself has an arcaded front.

Of the other six altars, that in the Lady-chapel, north of the choir, is the finest. The "Mater Dolorosa" in the centre niche, bearing the dead body of our Lord, is simply magnificent. The figures are about life-size; the finest work of the kind I know. The wings are painted. The two altars against the piers of the chancel arch are very rich, but a little confused in design. There are too many small figures introduced into them. The two other altars attached to the outer piers of the aisles are beautiful examples of very Early Renaissance carving. Each contains three large figures, standing in rich niches. Like the high altar, they are of oak, uncoloured. All these altars have painted wings or doors. That in the great chapel to the south of the choir is not so perfect as the others, but is still a beautiful work. Against the walls of this chapel are several old triptychs, pictures, monumental slabs, &c. In the chancel there is a very fine Sacraments-hauslein still in use; it is covered with the church, the stalls are excellent, and their ends remarkably richly and beautifully carved. From a boss in the centre of the nave hangs a splendid chandelier, the upper portion of which is composed of wood, and adorned by two life-sized representations of the Madonna standing in a great open bower composed of branches of a "tree of Jesse." One statue faces east and one west. Below the statue is a great pedestal adorned with carvings and statuettes, and from its six angles start the brackets which support a number of candles. The whole is a remarkably magnificent work. The old Rood and its attendant figures are now over the north doorway. There is an excellent brass chandelier near the west end of the nave, and a good, though rather plain font in the south chapel. In a kind of chapel at the west end of the south aisle is a "Pietà" composed of figures carved in wood nearly life-size, all painted. It is rather singular than a beautiful work, and dates from the commencement of the sixteenth century. Several inscribed tablets and other objects of interest are to be seen in this chapel.

The effect of this great plain church with its singularly rich furniture is very striking indeed. There is no old glass. Three modern windows, designed by Steinlie and executed by Capronier, above the high altar, though, no doubt, admired, are out of keeping, and too gaudy in effect. The grisaille in the side windows of the nave is unobjectionable.

The dimensions of the church are as follows:—Internally: Length, 180 ft.; width, 80 ft.; width of nave, centre to centre, 37 ft.; length of chancel, 60 ft.; height to vaulting of nave and aisles, about 70 ft.

The little town of Calcar has gained itself a great reputation for the school of painters who flourished there during the fifteenth and sixteenth centuries. Unfortunately, we are unacquainted with the names of most of these men, though the school had marked peculiarities which distinguish their works. John of Calcar was certainly one of the greatest German artists of the sixteenth century. The magnificent pictures upon the wings of the high altar of the church at Calcar would alone serve to establish his reputation. Other works of his



From measured drawings by Mr. J. A. Gotch.

are to be seen at Xanten, Cologne, Rees, Wesel, Dantzic. The ascertained dates of his works range from the year 1481 to 1516. The Protestant parish church of Calcar appears to be an old building, but it is very small, and so much modernised as to be of little interest.

H. W. B.

BURFORD CHURCH.

This building shows some traces of Norman work, but contains little of architectural interest beyond a fine and curious collection of tombs to the Cornwall family, especially a painted wooden altar tomb in the centre of the chancel shewn in the view, and a very curious painted oak triptych on the north side of the chancel, and the whole of this series of tombs has been carefully preserved. The greater part of the western tower was built in brick and cemented over in the last century; this has been rebuilt in Bromsgrove stone. The nave roof—an original trussed-rafter one—has been preserved and re-tiled. The chancel roof—a patchwork of recent years—has been replaced with a new one, and an oak-panelled panel ceiling with carved figures representing a complete choir of angels at the main ribs.

The church floor has been lowered to its original level and reslated in oak.

The reredos is a triptych, executed in mahogany, gilded and painted. The east window has been filled with new tracery and fine glass by Messrs. Powell & Sons.

Mr. Thomas Collins, builder, of Tewkesbury, carried out the work.

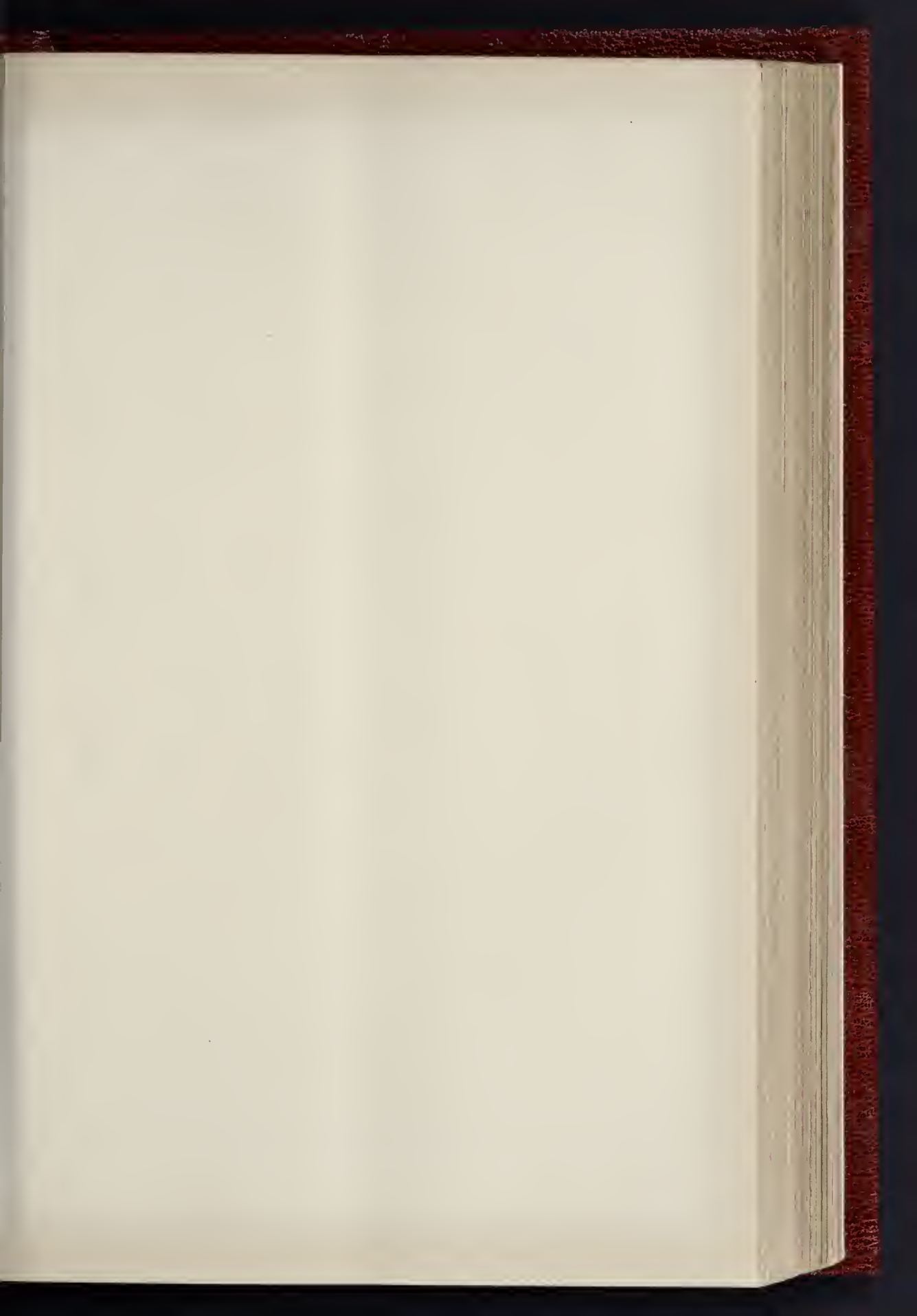
The whole expense has been borne by the Honourable Miss Rushout, of Burford House, as a memorial to her brother, the late Lord Northwich, to whom also a memorial lych-gate has been erected at the entrance to the churchyard by his friends and tenants.

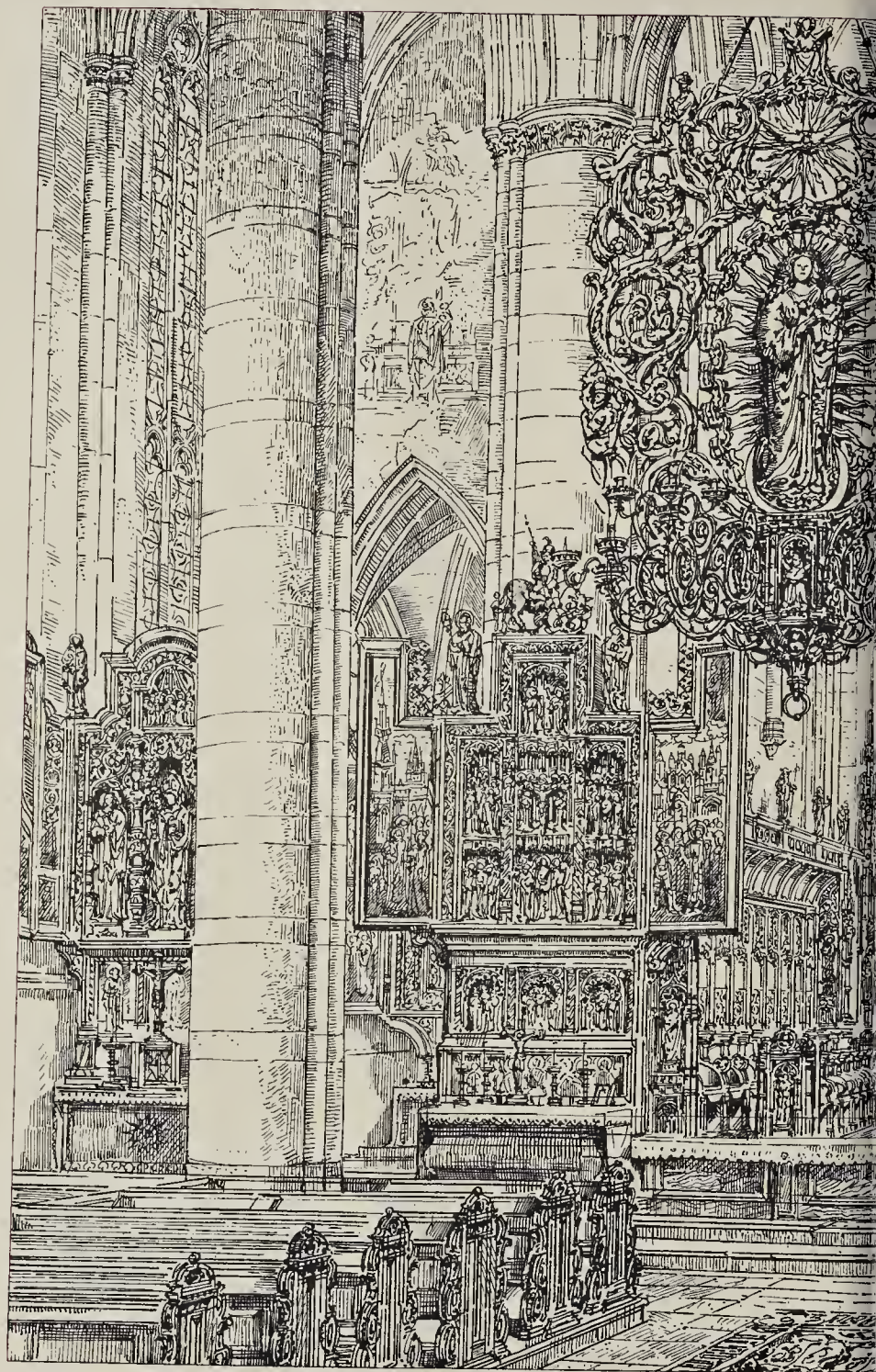
ROTHWELL MARKET HOUSE.

The illustrations of this interesting old building are reproduced from measured drawings by Mr. J. A. Gotch, which formed a portion of the illustrations to his paper on "The Renaissance in Northamptonshire," read before the Institute of Architects on February 3 of this year, and which appeared in the *Builder* of February 8th. The building was fully described in the course of the paper.

CROMER TOWN HALL.

The foundation-stone of this building was laid by Mrs. B. Bond Cabbell, of Cromer Hall, on January 8, to whom a gold trowel was pre-





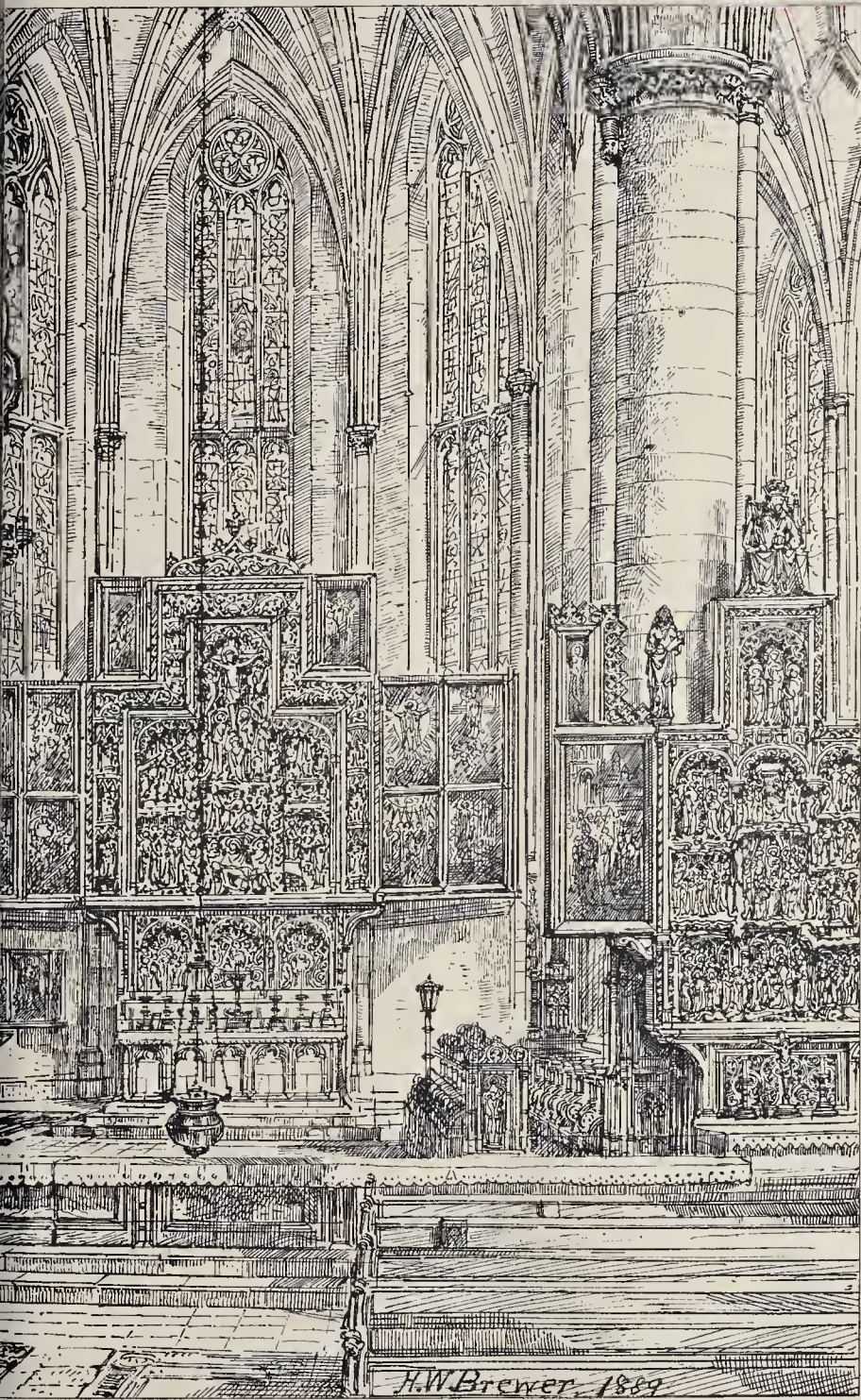
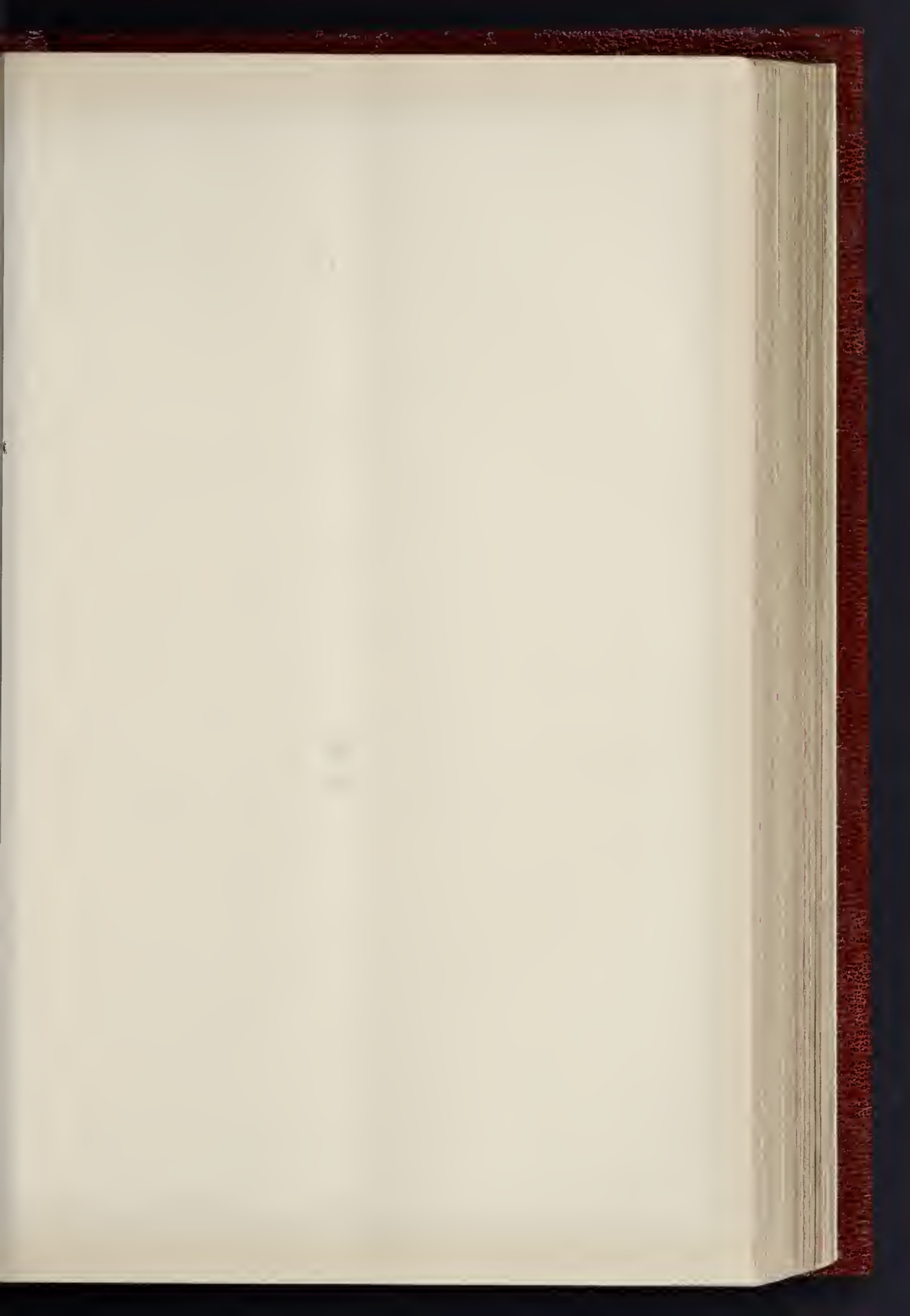
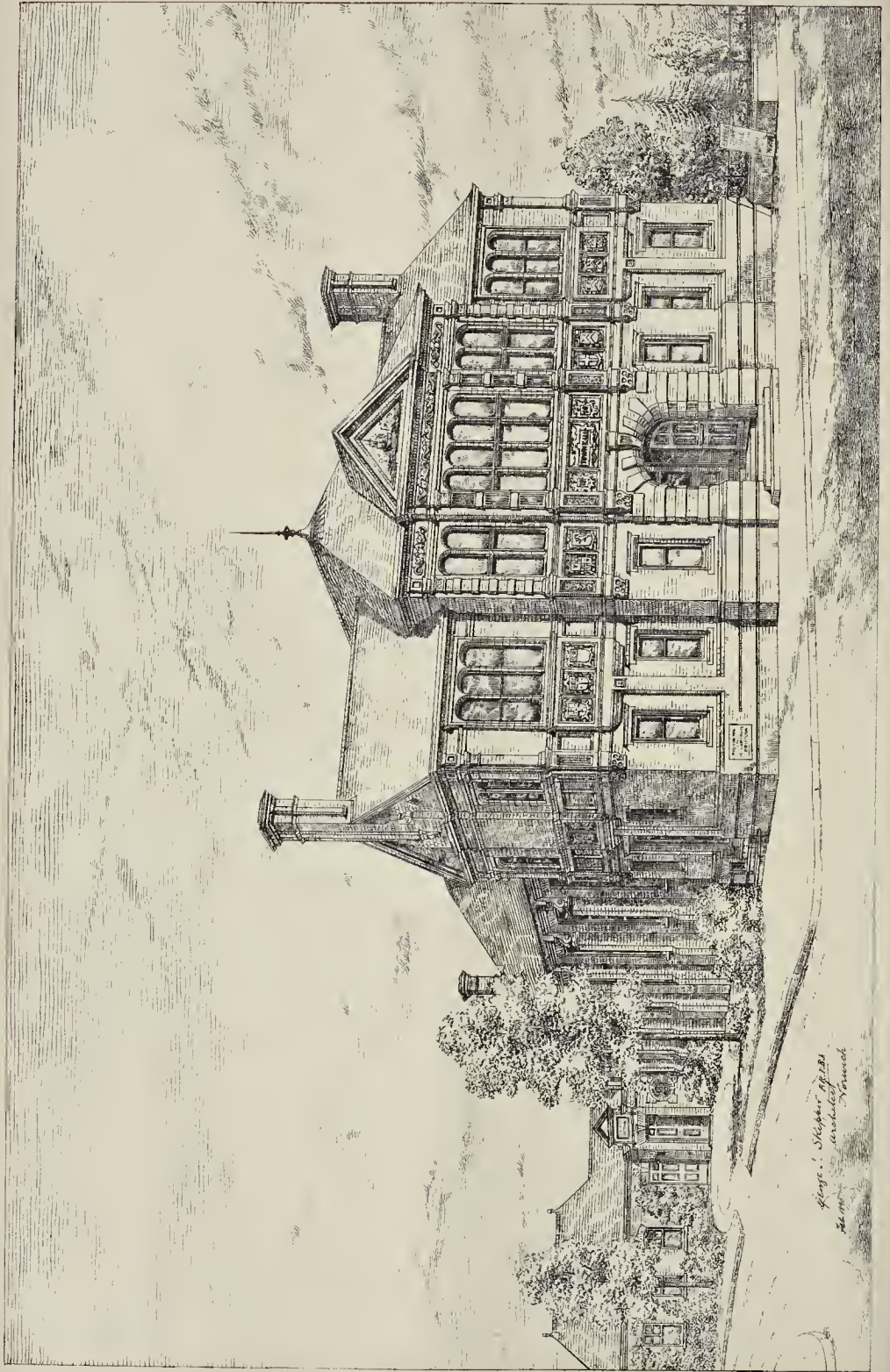


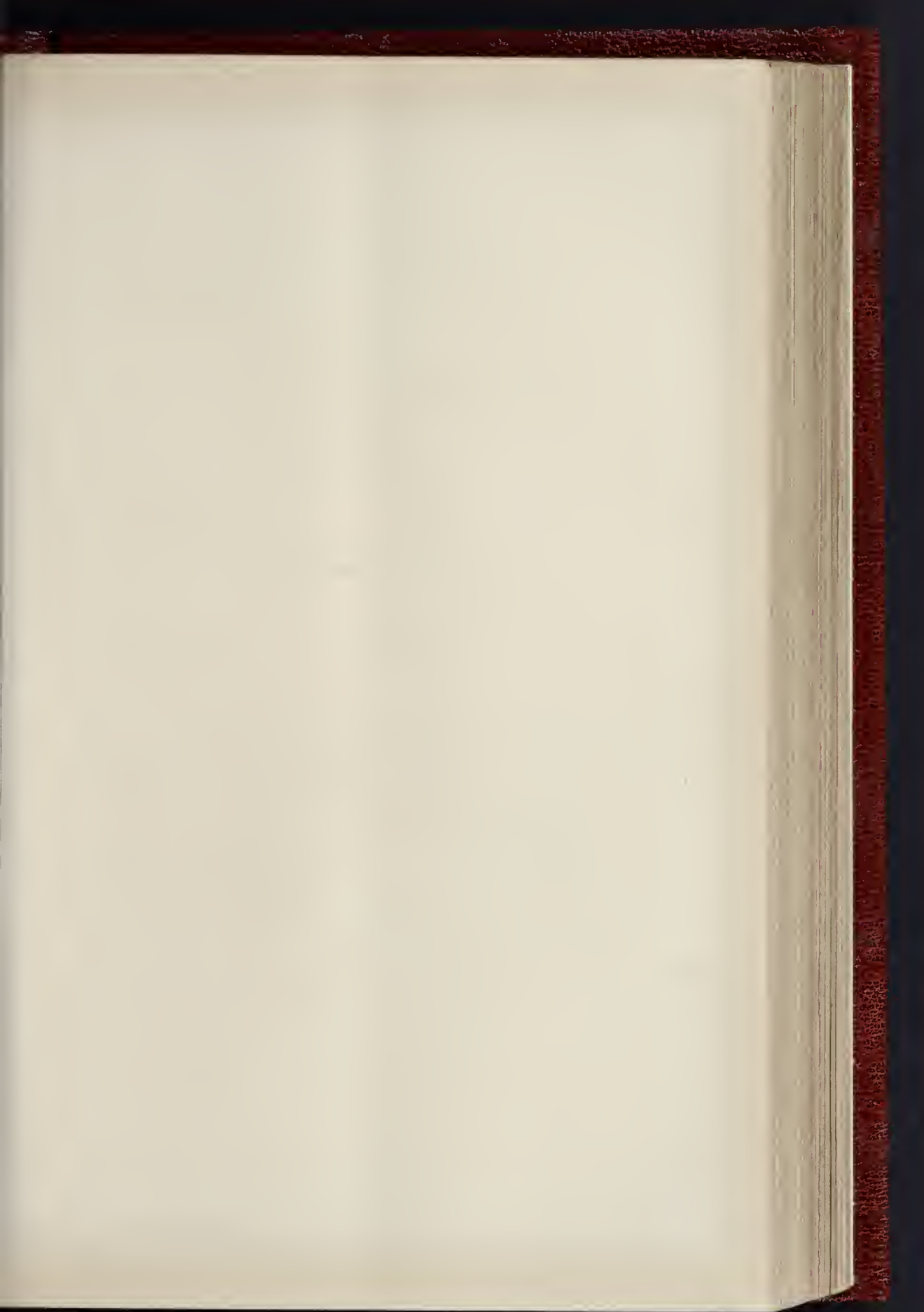
PHOTO-LITHO, SHAGUL & CO., 22, MARTIN LANE, CANNON ST., LONDON, E.C.



THE BUILDER, MARCH 8, 1890.



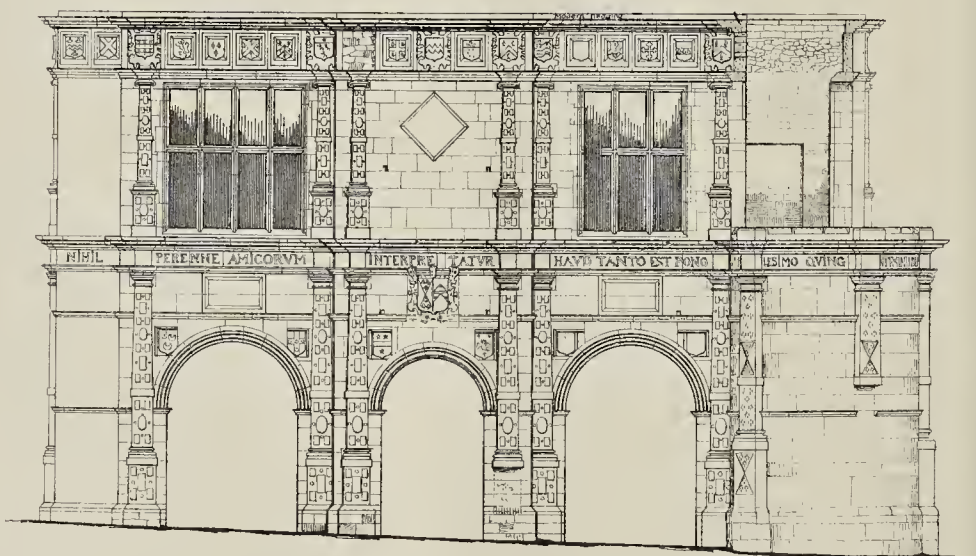
Design by Stephen Phipps
architect
Cromer



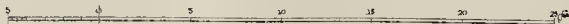
ROTHWELL MARKET-HOUSE.

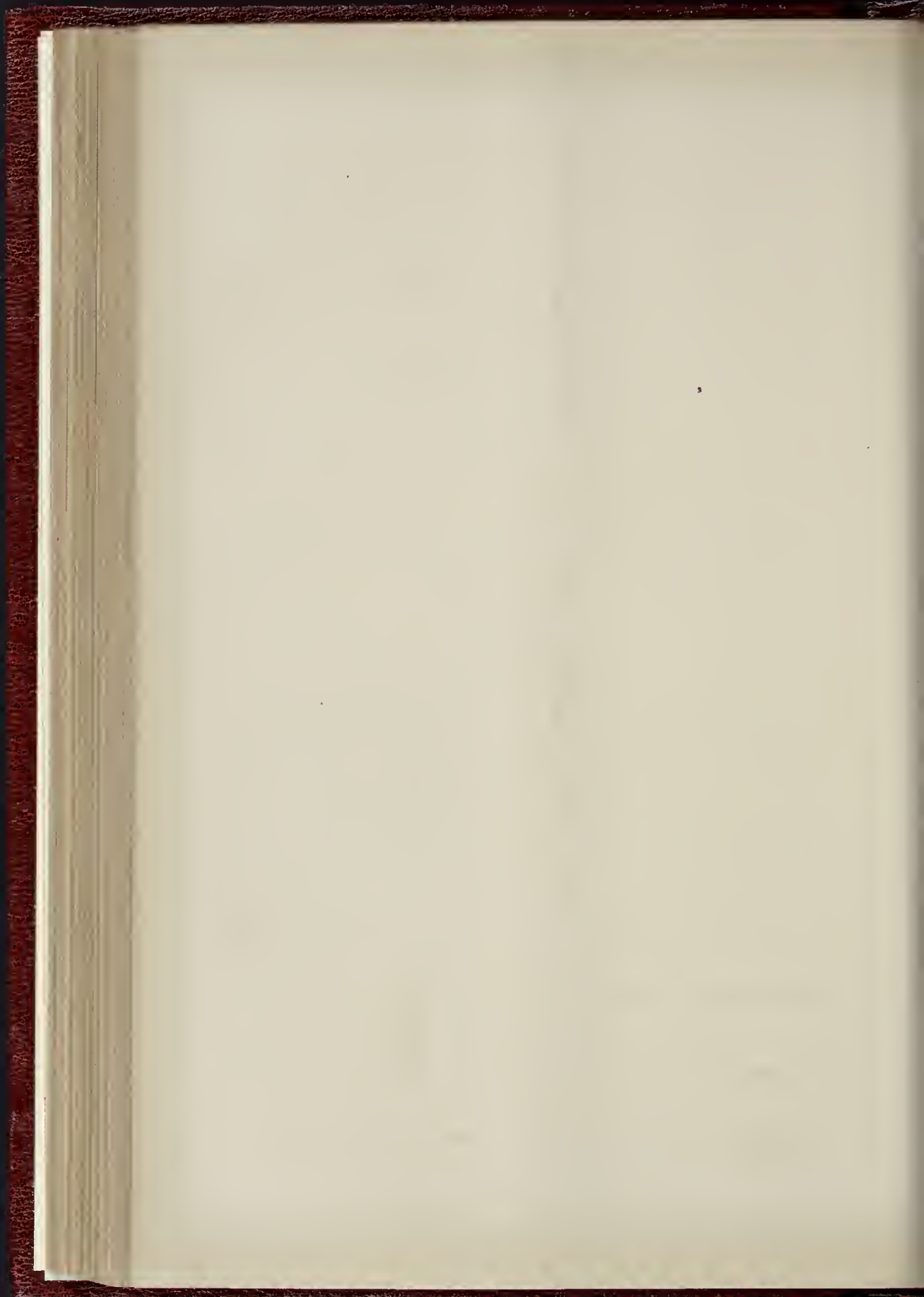


West Elevation.



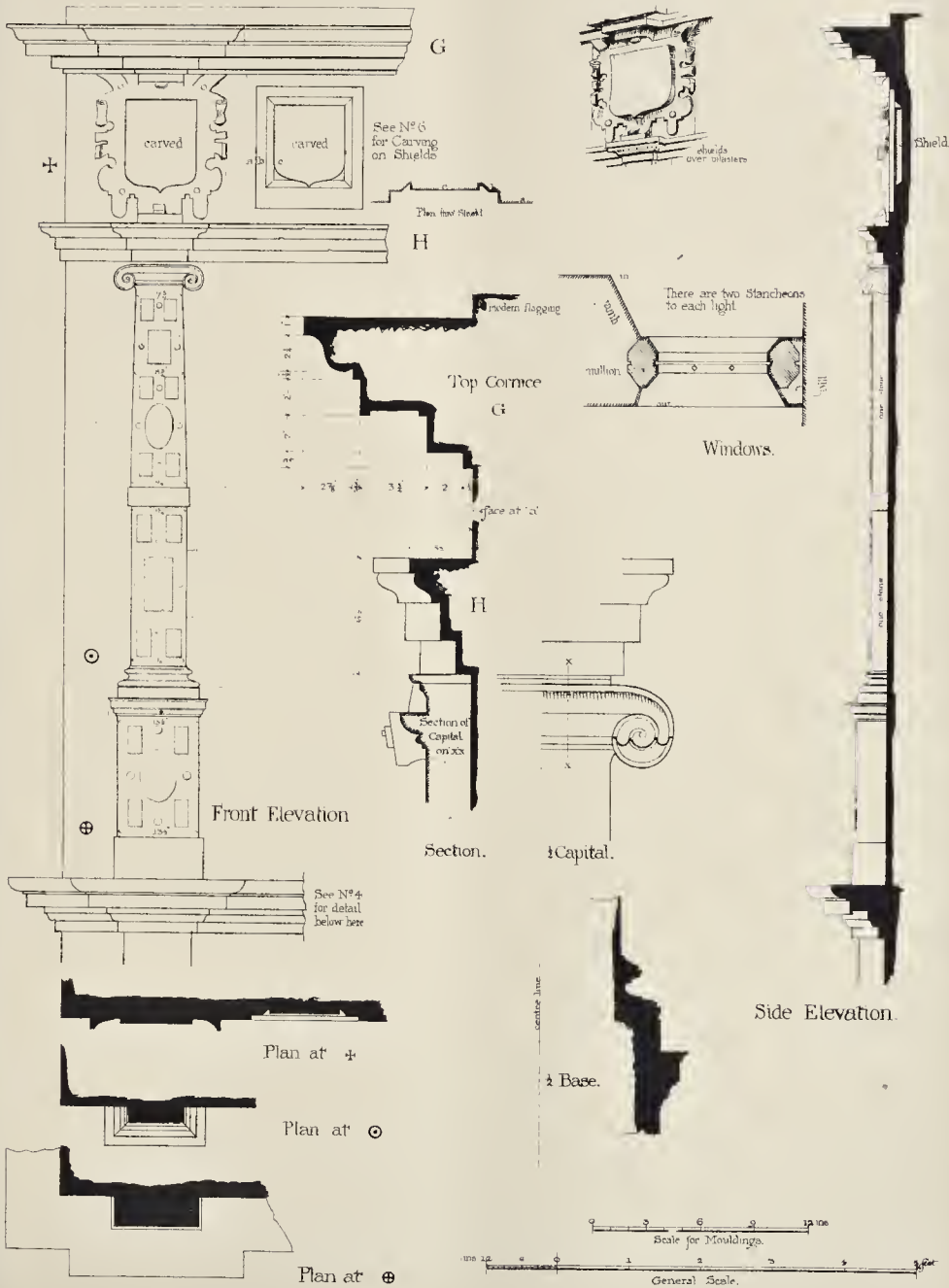
South Elevation.

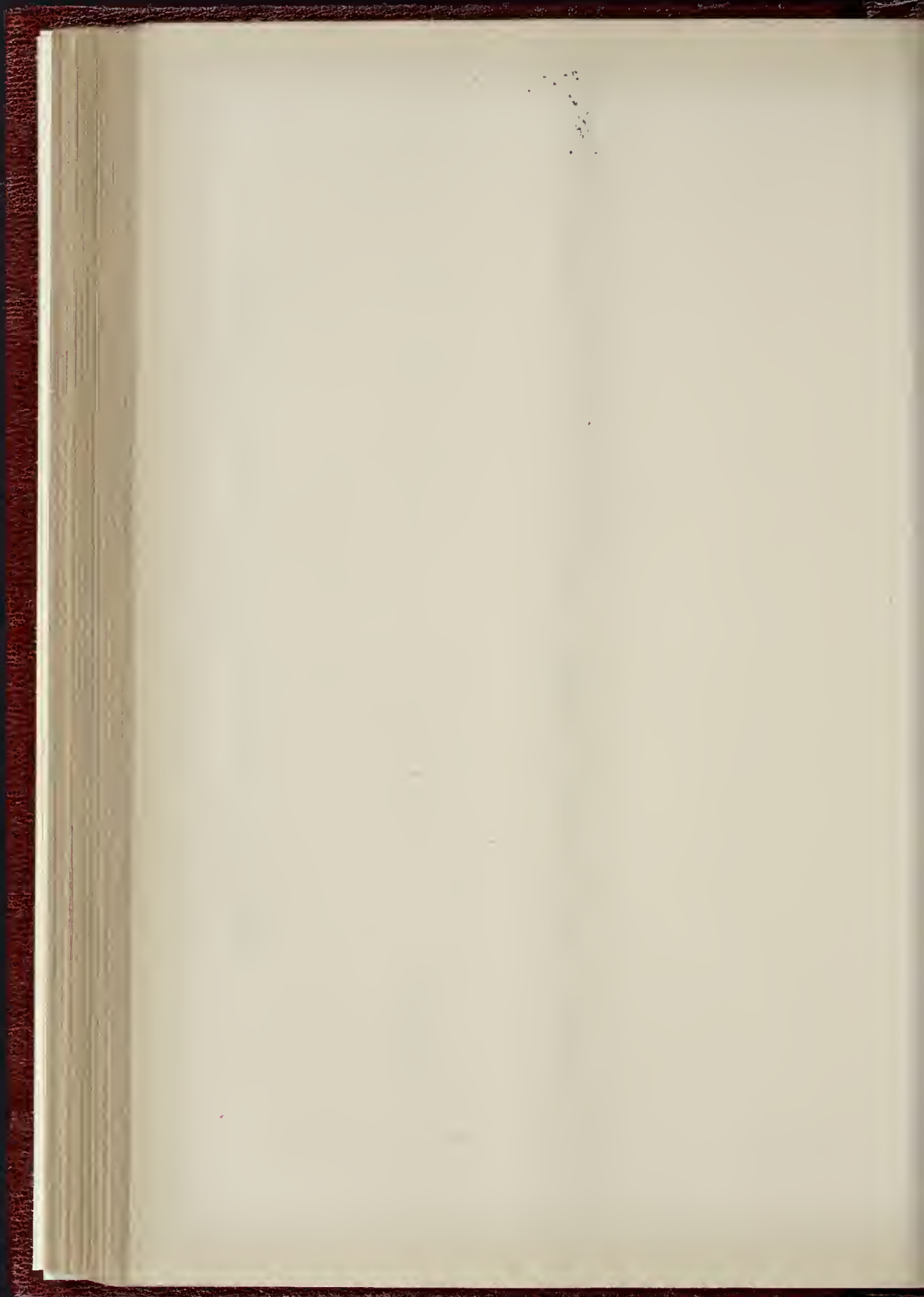


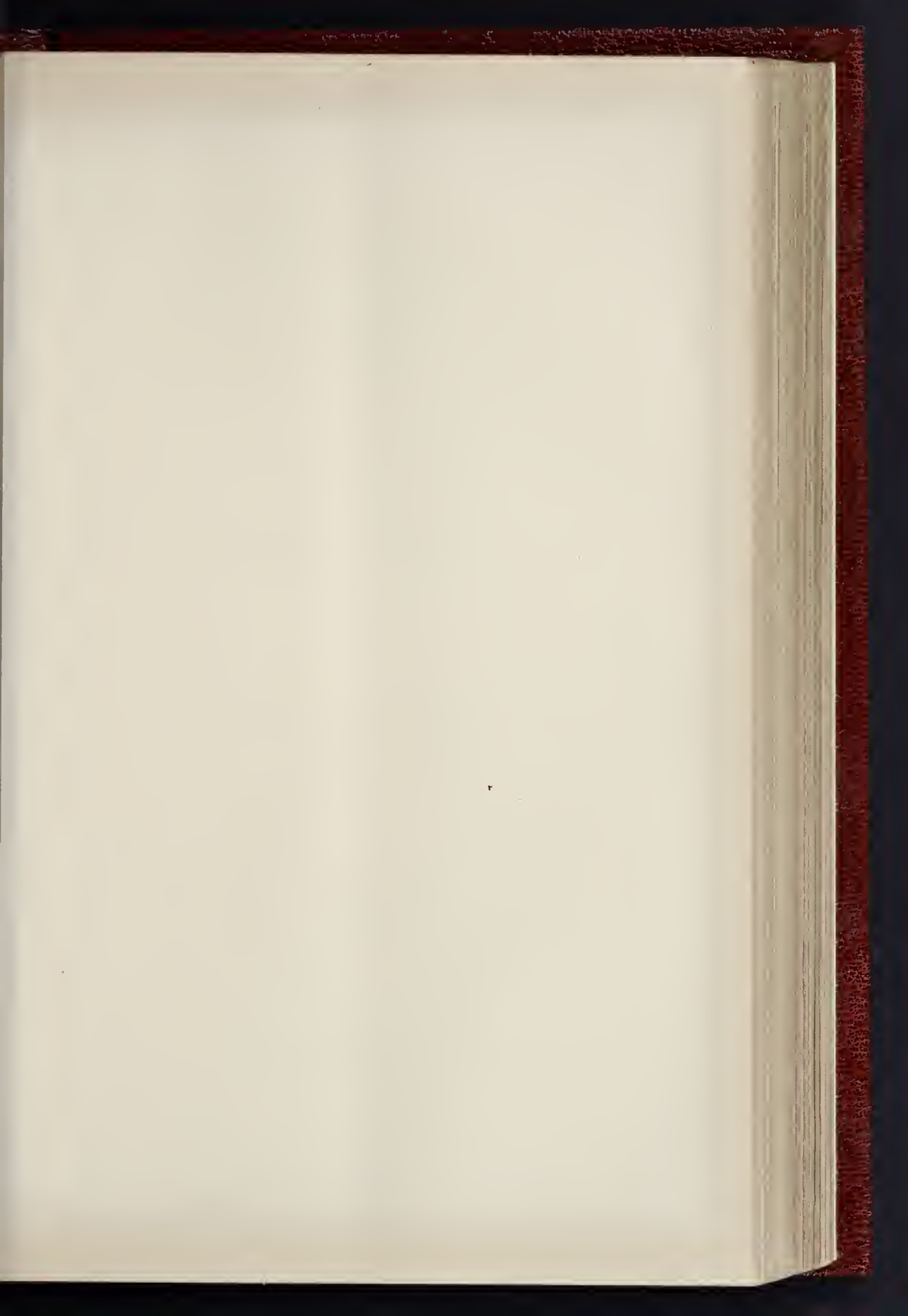


ROTHWELL MARKET-HOUSE.

Details of Upper Storey.





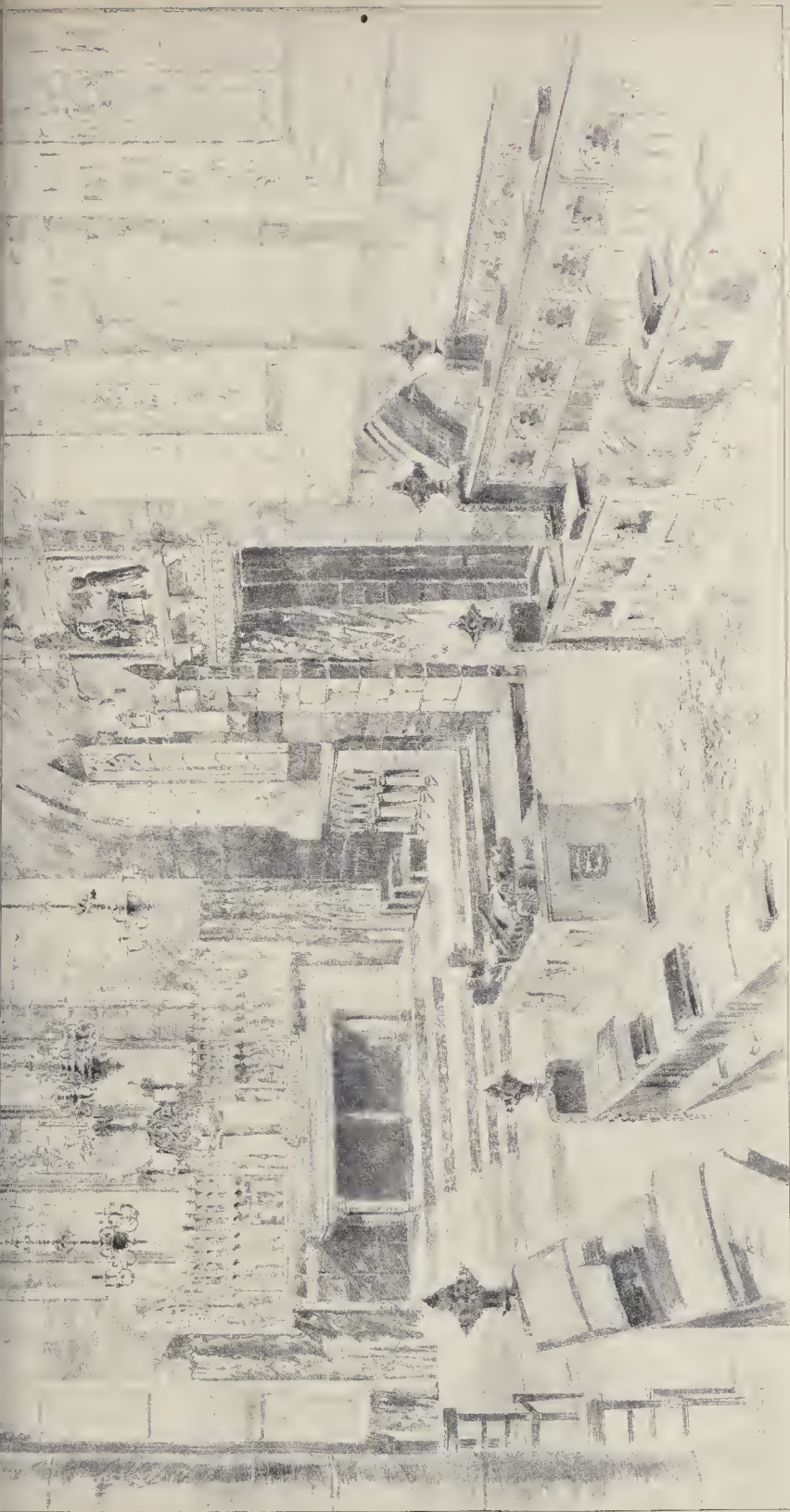


THE BUILDER, MARCH 8, 1890.

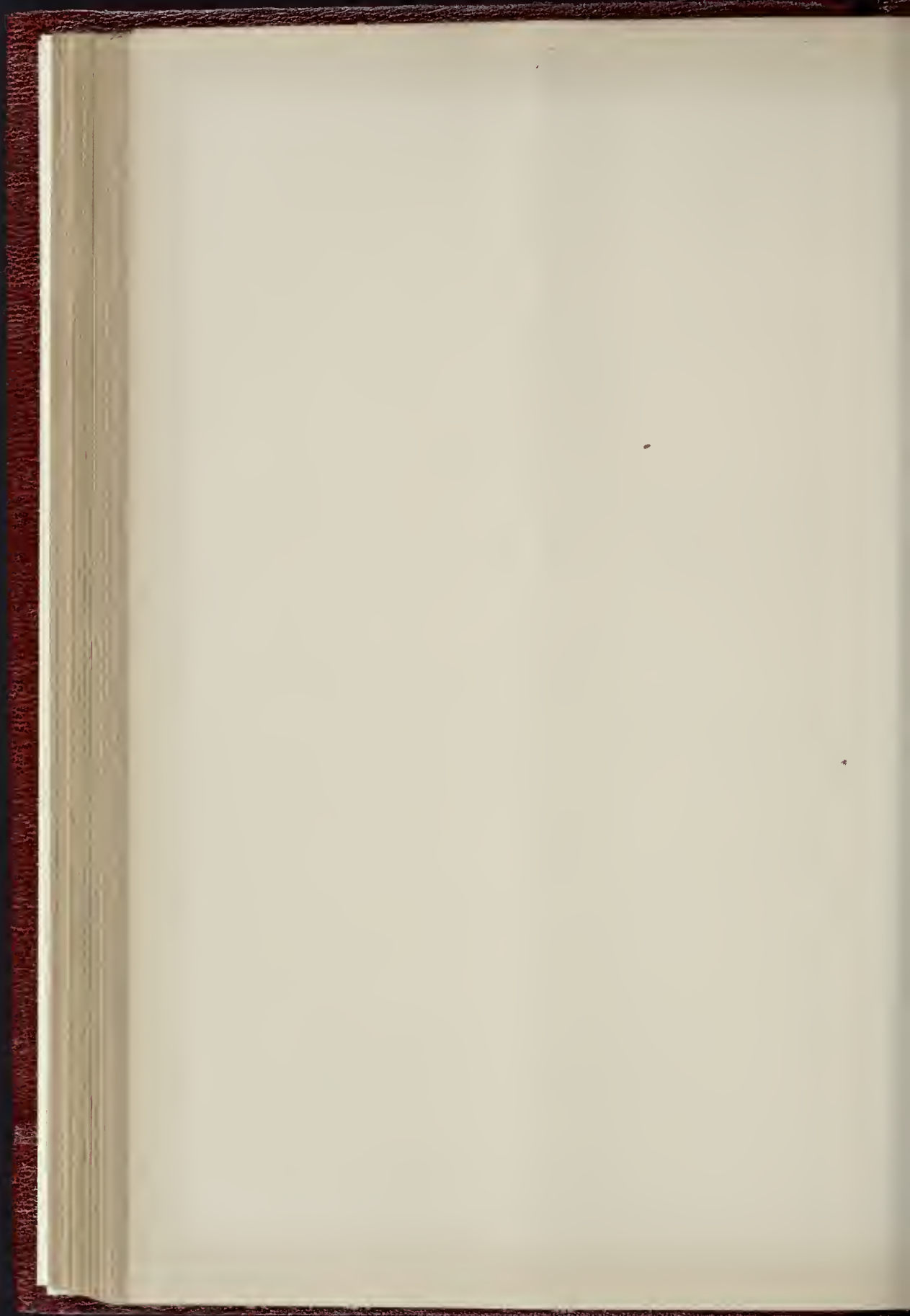
BURTON CHURCH
The Church
as restored



A. H. H. H.
Architect
20, Fleet Street, E.C.



THE HALL, BRADLEY'S, 11, WESTMINSTER, LONDON.



sent for the occasion by Mr. Samuel Hoare, M.P., on behalf of the townspeople. The architect is Mr. George J. Skipper, of Norwich, whose plans were selected in public competition in the autumn of last year. One of the special features in the external decoration of the building is the introduction of a series of panels containing the armourial bearings of persons connected with Cromer. The panels comprise the following arms:—Sir Nicholas de Wayland, first Lord of the Manor in the reign of Edward I.; Robert Bacon, who discovered Iceland in 1405; Sir Bartholomew Read, Lord Mayor of London in 1502, and who endowed the Goldsmiths' School at Cromer; arms of the Wyndham family and of the town of Cromer; Lord Suffield, present Lord of the Manor of Cromer Gannars; E. Bond Cabbell, Esq., Lord of the Manor of Cromer; and the family arms of the following:—Samuel Hoare, Esq., M.P., Sir T. Fowell Buxton, Bart., J. H. Gurney, Esq., and S. Gurney Barclay, Esq.

As to internal arrangements, the central doorway leads through a vestibule (with side-rooms for ladies and gentlemen on either side) to a public hall capable of accommodating 900 persons. It is covered with an open timber roof, lighted by windows on one side and roof-lights. The walls are lined with match-boarding to a height of 5 ft. from the floor, and above this red brick work neatly pointed. The floor is laid in wood blocks. The heating is by hot water-pipes. Above the vestibule and cloak-rooms, and approached by a staircase, having a separate entrance from the side road, are the reading and recreation-rooms. At the rear end of the block of buildings is the fire-engine station. Special crush-doors are provided, and all the doors to the hall are arranged to open outwards. Externally the walls of the building are faced with red bricks, and the roof is covered with Dressley tiles. The ornamental brickwork, of which there is a good deal, comes from Mr. George Gunton's Costessey Works. The carving has been entrusted to Mr. Minns, of Norwich. Mr. J. Newman is clerk of the works, the builders being Messrs. Chapman & Son, of Norwich. The heating apparatus will be supplied by Messrs. Sabberton Bros., Norwich. The carving under the pediment represents Robert Bacon's ship approaching Iceland.

ARCHITECTURE IN OXFORDSHIRE.

THE ARCHITECTURAL ASSOCIATION.

AT the ordinary fortnightly meeting of this Association, held on Friday, the 23rd ult., Mr. Leonard Stokes, President, in the chair, the following members were proposed for election, viz.—Messrs. W. G. Legg, S. H. Gordon, G. H. Gill, H. B. Creswell, H. S. Morris, J. Robinson, and H. T. Bromley.

Mr. E. S. Gale (Hon. Secretary), announced the seasonal visits for March, as follows:—March 8, visit to Mr. Sedding's new church, Sloane-square, Chelsea; March 22, visit to the new Central Offices for the Metropolitan Police on the Victoria Embankment (Mr. R. Norman Shaw, R.A., architect); March 29, visit to the new Hospital for Women in Marylebone-road (Mr. J. M. Brydon, architect). Mr. Gale also moved a vote of thanks to Mr. Colcutt for his kindness in connexion with the recent visit of the Association to the Imperial Institute, South Kensington.

The Chairman said he was sorry to say that Mr. William Pite was suffering from a bad cold, and was unable to read his paper on "Architecture in Oxfordshire." Mr. Hooper, however, had kindly undertaken that duty for him. We give the latter portion of the paper:—

"When it was my happiness to start away for Oxfordshire, a tour which extended to four months, I thought I was going to do the county; but, though constantly at work, I was only able to touch four of the principal parts, so vast is the field and so much is there to see and learn, for the village church demands attention as much as her elder sister of the town or city.

Time will not permit me to do more than indicate a few churches,—a catalogue would hardly be interesting without amplification. In the northern part of the county are three important churches,—one, it is true, in three towns, separated only by a canal; but the three within sight of each other, a few miles south of Banbury, each being celebrated for spires of singular beauty. A local rhyme discriminates between their merits, which, though only doggerel, introduces the names of the

three churches, which we will review in order:—

"Bloxham for length,
Alderbury for strength,
King's Sutton for beauty."

They are a study in themselves, in their influence on one another. They were visited by the Architectural Association excursion party in 1885.*

Bloxham, now corrupted to Bloxham, in William the Conqueror's time was part of the estate of Edwin, Earl of Mercia, who, provoked by the Normans, broke into insurrection: being betrayed by three of his captains, he and his brother Morkar, and Berdon, King of Wales, were slain fighting. The estate fell into the Conqueror's hands, and remained vested in the Crown till the reign of Henry III., when Almaric de Armand obtained it of that prince. This doubtless is the key to the architectural history of Bloxham. This noble church (see plan) consists of nave, aisles, chancel, and transept; while on the south side are two very fine fifteenth-century chapels, the outer one being the Milcombe chapel. Adjoining is a fine porch, with priests' residence over, in two floors. In the church is a gigantic fresco of St. Christopher; while over the chancel arch, in a sunk recess, is a Last Judgment. A painted screen divides the chancel from nave. The former is most delightful in delicate Norman sculpture, quite equal to Romanesque as seen at Bamberg and other German places; here are pointed arches to the windows, with the Norman sculpture worked in, showing a studied economy in the Medieval builders. The church is replete with interest. The north porch has a remarkable sculptured arch. In the north aisle are some magnificent traceried windows, with slight remains of stained glass. One of the windows in the north aisle,—a similar one being at Alderbury,—has the tracery converging, and finishing in a sculptured head. When I saw this it was fortunately unrestored. On the north elevation of the church is a remarkable animal and figure corrie, as seen in other northern parts of the county. The steeple rises from an octagon in a square tower, admirably arranged. Remarkable buttresses are at the angles, with niches and canopies; these, running up, finish in pinnacles, a traceried parapet running round the octagon. The west door is a remarkable work of the fourteenth century. The label is stepped, and there are sculptures of a Last Judgment.

Alderbury, the "Edburgherig" of Domesday, which, with Bloxham, was in Earl Edwin of Mercia's estate, and with it passed to the Crown, is a short distance off, and can be seen from Bloxham: its Norman castle has gone, but the magnificent church still remains, containing many features as seen at Bloxham. The chancel is a fine specimen of the work of William of Wykeham, Bishop of Winton, and the living naturally belongs to New College, Oxford; the glass of the east window contains his arms. The detail of the chancel demands long study, with its reredos and canopy-work to sedilia and east wall, which no doubt were once richly decorated. On the north side is a remarkable priests' residence, with second altar in a fine oriel window, and good turret stair leading to the upper chambers and the leads. The church abounds in detail, braces, roof-loft, and screens, a magnificent cusped fourteenth-century roof, and open-timbered. This church has had, as also Bloxham, a western gallery, and one can trace the same hand at work on both churches. The roof in the south transept was restored by an eminent architect, and I have a note asking "Why was it varnished?" Here are also more sculptured cornices, and we get an insight into local life. A husband, presumably, is agitating a fire with the bellows under a four-legged caldron, while his spouse is licking him into shape with a basting-spoon. Animals with gorgeous tails, foliated beasts, and griffins fighting, human beings playing on instruments, wind and otherwise; a man is stroking a donkey, while a dog is licking his own ear. The tread of the roof stair, it is interesting to note, is $\frac{1}{2}$ in. by $\frac{1}{2}$ in. rise. The building presents a mass of questions relating to date and circumstance. The tower and spire are at the west end, the former opening into the nave. The spire and pinnacles do not sit very happily; they

come within a traceried parapet, and angle buttresses taper to the ground.

Of St. Peter, King's Sutton, Northamptonshire, separated from the border by the Oxford canal, suffer but a word. The same bands have been here, and the local lines, attesting the beauty of the spire go without saying. Its wondrous symmetry and simplicity are enchanting; the tapering of the spire to meet that of the tower is very beautifully arranged. It is at the west end, and comes into the church, there being a fine fifteenth-century porch beyond.

A seeming parody on the three great churches are three village ones, lying a little south, but all within view, in a valley of beauty. They are easily reached from Chipping Norton, which latter church has a wonderful fifteenth-century window, with double tracery over the chancel arch, and a most singular porch. The village churches are Wigginton, South Newington, and Barford St. Michael, all of which are studies in themselves. We must away; many delightful experiences may be had by going to by-villages, and putting up at the "waysides." My task already is too great, and to do justice to many of these churches demands an evening to themselves.

The great church of St. Mary, at Witney, however, calls for some notice, as I went there specially, with orders to make drawings of the magnificent tower and spire at the crossing. I should weary you were I to attempt to dissect the parts; I wish, however, to enter a little into the history of its times, and the memories which cluster around it, which will go far to show how our national architecture is enfolded in our national history and daily life, and to offer an interesting suggestion which may call for consideration at your hands. There are remains of a Norman church which had existence previous to the costly reconstructions, adaptations, and additions of the thirteenth, fourteenth, and fifteenth centuries in aisle and transept. The presence of many altars suggests a large establishment; while, without, the one absorbing topic is, whence came such a stately tower and spire, with its intricacy of line, and hold simplicity, and oneness of conception? Let the rolls and records of our land speak. Elfwine, or Alwinus, is reckoned as Winton's thirty-second bishop. Tradition states that there was a scandal about his relations with Queen Emma, mother of Edward the Confessor, who was born at Islip, near Oxford, and that she proved her innocence by the ordeal of red-hot ploughshares at Winchester, on which she walked unharmed. The good king made over the manor of Witney to the acquitted bishop, he likewise doing the same to his church chapter, or establishment at Winton. Dugdale gives a list of others handed over at the same time. Hence arose the episcopal palace on the east side of the church. Stigand succeeded Elfwine, and Stigand was in turn succeeded by Walkelin (Stigand being made Archbishop of Canterbury A.D. 1052, deprived by William the Conqueror in 1070, and dying the same year in prison). Walkelin was a great builder, and much of the nave of Winchester Cathedral is attributed to him. It is not improbable that he built the palace at Witney. For thirty years he is said to have divided his time between Winton and Witney; if that be the case, it is well within reason to expect that he exercised his skill upon the adjoining church. We may possibly credit him with the beautiful north porch, which is of his time; and, though not exactly relevant, it is of the highest interest to recall the fact that in his episcopacy the great Domesday Survey was made or completed. Therefore, we are led to conclude that the great Norman church owed much of its structure to Walkelin, and its inspiration to noble Winton of East Anglia; and here, housed midst shady trees, this not less learned and exalted ecclesiastic, though not so over-worked and over-worried as his more modern brethren of the bench, has added his tribute to what is to us, gentlemen, "a mine of memories." William Giffard, the next Bishop of Winton, was Lord High Chancellor to King Henry I., and in that, like Cardinal Wolsey, he was for his separated profession too much the servitor in the temporalities of his sovereign. He was succeeded by the long episcopate of Henry of Blois, who came to his throne in 1128, and spent a great deal of his time at Witney, and dying in 1174. No doubt the reconstructions were set on foot under this great prelate. But we must hurry on to the thirteenth century, when, after two bishops—to wit, Richard and Godfrey, of

* See the *Builder* for Aug. 15 and 22, 1885, pp. 237, 250; also the numbers for Sept. 12 and Sept. 19 of the same year for various sketches of Oxfordshire churches visited on that occasion.

† See sketch in the *Builder* for Sept. 12, 1885.

‡ See sketch in the *Builder* for September 19, 1885.

whom we know next to nothing—we come to Peter de Oriol (Winton's thirty-ninth bishop), who spent much leisure at the palace and park of Witney. At Cogges there still exists Park Farm, and an open ditch called Emma's Dyke, after the queen-mother of Edward the Confessor before referred to. In 1221 Bishop Peter de Oriol obtained royal warrant from Henry III. to purchase and receive of Robert de Arsic's haru at Cogges, "building timber from his woods." These woods are still at Cogges, a mile or two from Witney. The bishop's clerk, Dionysius, was Rector of Witney—a man of importance in his time. The Fifth Crusade took place under John Brievue in 1217, and the returning warriors, passing through Calvados, stand face to face with the surpassing beauty of the western façade of Bayeux Cathedral. One of the gentlemen present views the fairness of the spire and pinnacles aright for his Witney friends. Whether by a manipulated memorandum or not, we incline to the suggestion that this vision of the beautiful which was once England and bloomed again at Witney,—a French poem translated with consummate art into living English, in Witney's buttressed tower and pinnacled spire. The slopes of the tower are remarkable; also the peculiar angles and differences of the buttressing; and it should be further noted the tower is not central with the transepts. Witney has influenced Bampton and Broadwell in towers and spires, but beyond that it seems to stand alone.

Cogges lies just outside Witney, and has a small but most interesting church, with a fourteenth-century octagonal tower placed obliquely at the west end,—a singular arrangement. The place has a remarkable history in the roll of time, and has a connexion with Witney; it was the church of the Barony of Arsic, of which Manser de Arsic was lord. The family was descended from the Earls of Oxford, and as ancient as the reign of Henry I. The baron sent the Black Monks of the Black Monks of Fiscamp, in Normandy, who sent over part of their convent and founded a cell, which was dissolved by Henry V., with the other alien priories. Some of the ancient stone bars still exist adjoining the church.

Eight miles from Witney, and four from a railway station, is the enchanting town of Burford, little known, possibly through its isolated position. The importance of the place calls for notice at our hands. Delightfully situated on the Windrush, which comes from the Cotteswold, one crosses the ancient winding stone bridge, and stands at the head of the broad High-street,—ancient houses to the right and left making unnumbered mental calls to be inspected. That we cannot do now; our visit is mainly to have a hurried look at the great church, which Mr. Street, with his intimate knowledge of the county, has said that of all the churches in the diocese of Oxford, Burford is not only the grandest in sculpture but also in its architectural detail it is singularly rich and beautiful. A word on its early history gives us the origin of the dedication of the Church to St. John the Baptist. By the Saxons, Burford was known as Beorford, of which the present name is a corruption. In 685 an ecclesiastical synod was held here by the Kings Ethelred and Berthwald, at which Aldhelm, Bishop of Sherborne, was ordered to write against an error respecting Easter. In 752 a battle was fought between Ethelbald, King of Mercia, and Cathred, King of the West Saxons, who had revolted. Ethelbald was defeated, and the Royal Standard, bearing the device of a golden dragon, was captured. To the west of the town is a place called "Battle Edge"—this in all probability is the site. A custom for long was kept up of parading the streets with all "jollity" with a "Golden Dragon" on Midsummer Eve (St. John-the-Baptist's Day). After the Conquest, however, the town was bestowed on Robert, Earl of Gloucester, natural son of Henry I. in Oxfordshire, with such variety, where one sees great churches, as Bloxham, Witney, Bampton, and Dorchester, when we come to look at Burford, for concentrated interest it excels them all. We need only refer to its ground-plan, its many aisles, its great lengths, and manifest additions, to see and admit that there is historical association circling the building, without which we cannot attempt to comment upon its composition. This, again, goes to prove how in the times gone by building arose simply out of the necessities of the case; wants were felt and met, and surely such churches would not

be provided unless there was a far larger congregational demand than that which, at least at the present time, exists either at Burford or elsewhere. It is unnecessary to enumerate the dates at a church like Burford, for it affords to the chaervant student a complete dictionary of Medieval architecture in matter and detail. The church lies very low, and the mill-stream which bounds the churchyard is uncomfortably near. The interest possibly centres in the tower, which has most excellent Romanesque work, surmounted by a late fifteenth-century tower and spire. No doubt the very irregular shape of the church is the result of the linking together of two distinct buildings. Mr. Street thought that what is now called the Sylvester aisle was a chapel standing quite distinct from the church, which was founded in the thirteenth century, and was not joined to the church by the opening of the arches until the fifteenth century, when it was also lengthened eastwards. All this has resulted in detriment to the magnificent south porch, which was once entirely detached, and is now completely imbedded between this aisle and the western of the two south transepts. The altar at the east being a great distance off, and the narrowness of the tower arches being inconvenient for comfortable service, one has little doubt but that they decided to develop the church at the west end. That the porch was distinct from the Sylvester aisle is clear from the fact of there being a buttress and the plinth returning round. A chapel was accordingly erected of stone, with a wooden tester under the eastermost arch of the nave arcade. This, architecturally, is a most ingenious arrangement, which Mr. Street fully restored, and of which he remarked that he knew of no other similar example. Observation on the spot shows that most people can see better at this position than at any other; though the position is probably open to serious and divided ecclesiastical opinion. The church contains an excellent fourteenth-century sculptured font, and it is curious to observe that the sedilia to the font are only 9 in. high. Pulpit-roofs, ironwork, and many beautiful windows call for the undivided attention of the student. In the south transept is a Parbeck tomb, the inscription being on the interior soffit of the arch with a canopied niche over it; it thus runs:—"Orate pro animabus patris et matris Johannis Leggare de Borford pro quem ista fenestra decoratur." No less interesting is it to read an early specimen of English prior to the Reformation, when the people were aching to be done with the hauds of "Latinity." Here is a specimen of English as she was spoken in 1437:—

"Mary moder mayde cler, hane mercy on me. Jon Spiker."

And on me Alys his wyf, lady for thi joles fyve.

I trust my task has not been in vain in having endeavoured to show you that the characteristics of a few churches, the nave arcades of Oxford, and some other subjects, as the roofs and porches, &c., provide matter for others to take up with very great profit, and I trust that as the summer comes upon us we may have the opportunity of again seeking and studying noble work in ancient stones.

Mr. H. D. Appleton, in proposing a vote of thanks to Mr. Pite for his paper, and to Mr. Hooper for having read it, said that the paper was one of great interest to them, notwithstanding that it had been stated, during one of the annual excursions of the Association.

Mr. L. A. Shuffrey seconded the motion, which was supported by Mr. F. R. Farrow (Hon. Sec.), and Mr. C. H. Brodie, who said he was somewhat surprised to find Mr. Pite suggesting, in the first portion of his paper (which we have been obliged to abbreviate), that mouldings should be drawn one-eighth, one-quarter, or one-half full size. He thought it a good thing for Mr. Pite that his brother was not present.

The Chairman, in putting the vote of thanks to the meeting, begged to include in it the name of Mr. Bolton for his kindness in having made a large number of the many plans of churches which were exhibited on the screens.

Mr. Hooper having said a few words in reply, the meeting terminated.

The Sanitary Institute—The Council have accepted an invitation from the Town Council of Brighton to hold the Autumn Congress and Health Exhibition in that town in September next.

FREE LECTURES TO ARTISANS AT CARPENTERS' HALL:

PROFESSOR W. H. CORFIELD ON "MODERN SANITATION."

The third of the present series of free lectures to artisans and others on matters connected with building, under the auspices of the Worshipful Company of Carpenters, was delivered on Wednesday, the 19th ult., by Professor W. H. Corfield, M.A., M.D., his subject being "Modern Sanitation." Mr. Joseph Preste presided, and there was a large attendance.

Professor Corfield said the subject of "Modern Sanitation" was a very wide one indeed, and taken in its widest possible sense, it could be embraced within the limits of a single lecture. He would, therefore, limit his remarks to the question of the removal of refuse matters from our houses; and, in the first place, would consider the improvements that had been made in recent times in the materials used in the sanitation of houses; in the second place, the improvements made in the arrangement, trapping, and ventilation of drains, and other waste-pipes, and in the third place, the improvements made in appliances and apparatus. Until comparatively recent times all drains were made of stone, brick, or pervious agricultural pipes. The first and greatest improvement that was made in the construction of drain-pipes for houses was the one which consisted of making them of water-tight material. It was recognised that for the first time that pipes which had to carry away foul water should be, in themselves impervious to water, and in the first place they had pipes made of a material known as glazed stoneware. But though it was very well to have a pipe which was impervious to water, these pipes could not be made of indefinite length. Their ordinary length was 2 ft.; hence the question of jointing them, so that they might be impervious to water throughout, was of great importance. The first method adopted was that of making the other end into it, and the pipe and putting a socket at the one end, and putting in some jointing material. Pipes could be put together in that way without any jointing material at all, and so, as a matter of fact, they very frequently were. He would not at the present moment. They were, as it was technically called, "laid dry," without any material in the joints at all, so that they might as well have had the ordinary agricultural pipe drains. Sometimes they were jointed with clay, and no doubt a fairly good joint from one point of view might be made in that way; but clay was a material which easily softened when wet, and so the usual method was to joint them with cement. Several difficulties, however, arose in connexion with that method, the first being that the cement projected into the interior of the pipes, set there, formed bosses in the drain against which foul materials collected, causing obstructions, and gradually blocking up the drain. Another difficulty was that the pipes might be laid and cemented round the upper part of the joint only. Although, when inspected, the drain would look all right, yet there might be no cement in the lower part of the joint at all. That was a very serious difficulty, but it was overcome, like several others of the kind, by more accurate methods of jointing. Before these methods were devised, however, the method was sometimes resorted to of putting what was called a "cradle" underneath the joint, and filling it with liquid cement, so that then the under part of the joint must be filled with cement as well as the upper part. All these difficulties of jointing pipes with cement,—which method, however, was even now one of the very best if properly and honestly carried out,—had led to other devices. One of these was that adopted by Mr. Stamford, who first conceived the idea of making a ring round the end of each of the pipes, one in the socket and one on the spigot. These rings, made of a preparation of asphalt, were carefully made by being cast in steel moulds, and when the end of one pipe was put into the socket of the other, it made a perfectly water-tight joint. That joint of Stamford's had been very largely and successfully used, and it had been improved upon recently by Messrs. Doulton, who had made the surface of the ring curved, to fit into the ring in the socket end of the pipe, so that if the pipes shifted a little the contact still remained complete. This method avoided all the disadvantages of cement. Several other

joints had been devised for stoneware pipes, but he did not think he need do more than merely mention them. One was Messrs. Haassall's joint, and another the "Archer" joint. These, however, were somewhat more complicated. One of the great advantages of glazed stoneware pipes was that they were made of a material which was perfectly unalterable. Another kind of pipe very largely used for drain purposes was the cast-iron pipe. These had several great advantages. Of course they were impervious to water, and they were coated with a material which prevented the iron rusting. They could be jointed with perfectly water-tight joints by means of molten lead, and they were made in lengths of 6 ft., thereby lessening the number of joints. These great advantages were put forward by those who advocated these pipes of cast-iron drain-pipes, but against these had to be set the disadvantage that iron was a material which was destructible by water, moist air, acids, &c. So long as the coating was perfect it was all right; but if the pipe was chipped or knocked, or the coating became removed by abrasion or other cause, all these formed weak places, which were likely to lead to the destruction of the pipe. However, after all, that was a matter of experience. They had come to understand in recent times that it was essential that drains laid under houses should have a firm bedding, and now this was recognised as practically essential in all cases, although it was more or less of an innovation to cover them with concrete. Whatever material was used for the construction of drain-pipes, they must insist that they should be water-tight.

The lecturer next proceeded to consider the materials used for, and the improvements in, the construction of soil and other waste-pipes. Two materials had been used for a very long time,—namely, iron and lead, so that one could not say that there was much improvement in materials. Lead, generally speaking, was a better material for soil-pipes than iron; and that it was not used to the exclusion of iron was due to the fact that it was much more expensive. Not so long ago, water-closets were almost universally connected with the rain-water pipes of houses, but such a monstrosity was not allowed in "modern sanitation." Lead soil-pipes were better than iron ones, for the most obvious reason that they could be jointed with the same material, so that the joint was at least as good a part as the other portion of the pipe. Iron pipes were always jointed with a different material, and, as a general rule, when they made a joint with a different material it sooner or later leaked. Iron pipes should never be allowed to be used inside houses for soil-pipes. He had spoken of the disadvantage of iron pipes as drain-pipes owing to their liability to rust. That disadvantage became more considerable when they were used for waste and ventilation pipes, and if there was one thing he would warn his hearers against it was against ever allowing a ventilation-pipe to be made of iron, because he undertook to say that such a pipe after being in use for five years got blocked up at the bottom and did not ventilate the drain. In order to get rid of these disadvantages of iron-pipes various means of protecting the pipes had been resorted to. One was to cover the pipe with a material known as Dr. Angus Smith's solution, and another plan was to coat the pipes with an insoluble oxide. Pipes coated by this process were not universally used for sanitary work, because in the vast majority of cases the pipes protected with magnetic oxide of iron had defects in them. He had even seen pipes used for supplying houses with pure water specially prepared by this process taken out some two years afterwards because they leaked. They were simply eaten through and through by the pure water, and, therefore, they must always be on their guard against reliance upon processes for protecting a perishable material like iron. Until comparatively recent times lead pipes were made in the way in which the Romans made them, and were called "seamed" pipes. Now, they had pipes known as "drawn" lead-pipes, and these were a great improvement on the others, the soldered joint throughout the whole length of the pipe having been a source of weakness. Slip joints would not stand any test, and so the only proper joints for lead-pipes were wiped soldered joints.

Passing on to the consideration of the improvements made in the arrangement, trapping, and ventilation of drains and waste-pipes, the Professor said that not very long ago the drains

of houses used to be made to end in receptacles called cesspools, and it was found necessary to prevent in some way or other the foul air getting into the house; therefore, the contrivance known as the "dip-stone" or "mason's trap" was devised. That trap sufficed, no doubt, to prevent a rush of foul air from the cesspool or sewer into the house; but it was a most defective contrivance, because, even if it did that, it allowed an enormous accumulation of foul matter to take place in the trap itself, which became a sort of small cesspool, and very often a large one. A "dip-stone" trap, whether large or small, was really a cesspool, and Yorkshiremen, with their characteristic love of truth, always called them cesspools. Another reason why that was a most defective contrivance was that the "dip-stone" and the stone at the top were in a very large number of instances not properly fitted. In those days, too, nobody thought of ever providing ventilation for the house-drain; if any was provided, it was by accident. The most essential improvement which had been made in regard to the trapping of drains was made after the adoption of stoneware drain-pipes by the construction of the siphon-trap. That was a very unfortunate name, because if it acted as a siphon it was not a trap at all, and he preferred to call it the "U" trap, from its shape. The improvement made in traps then was by making a bent pipe, and that improvement was due to the fact that it allowed less sediment, if any, to collect. They, therefore, came to recognise that the first important function a trap should possess was that it should not allow sediment to collect in it, and they laid down now as the one important characteristic of a good water trap that it should be self-cleansing. With regard to ventilation, in the first place, it was recognised to be necessary to provide something more than outlet ventilation for drains and soil-pipes. If they had merely outlet ventilation they only provided that foul air should not accumulate under pressure; but it was now a recognised necessity to provide a means for the inlet of fresh air into the drains and soil-pipes. If the ventilation-pipe at the top of the soil-pipe was carried up above the ridge of the roof into the open air, every wind that blew across it would cause an up-draught. The air inlets might be made, and were frequently made, by an open grating in the front area or outside the house; or by a pipe with open grating, often provided with a talc flap to prevent back-draught. In all sanitary appliances and apparatus an arrangement which did the work without any moving part was always better than one that did the work with a moving part. That was a good general law, and applied, for instance, to air-inlets and cowls which had no moving parts. Another important improvement was the provision of a manhole for access to the siphon-trap. It almost went without saying that drains ought not to be laid underneath houses if such a course could possibly be avoided. That very day he had seen a large house in the country underneath which he was informed a drain 70 ft. long was going to be laid. It was quite clear, therefore, that even now it was necessary to insist that, where practicable, drains should be laid outside of houses, and that soil-pipes should be placed against the outside walls, and not inside. Another matter of recent improvement was that drains and sewers should be laid as straight as possible. Until comparatively recent times the drains used to be laid where most convenient, without any idea of inspecting or cleansing them. Now, they insisted on having them laid as far as possible in straight lines. However, that could not always be done, and so it became the more necessary to provide means for inspecting the drains at different places. There were several ways of doing this, but the best way was to have inspection-chambers in the areas. Just as the drains required to be disconnected from the cesspools and sewers, so the waste-pipes of all the sinks and baths and lavatories required to be disconnected from the drains. That was one of the greatest improvements that had been made in "modern sanitation." It was necessary to have subsidiary ventilation-pipes, or anti-siphonage pipes, in the case of water-closets as well as sinks. In large houses, a great deal of greasy water and sand was thrown down the scullery sink, which solidified in the trap and drain, and blocked them up. It was necessary to provide against this, and the method adopted up to within the last two or three years was to construct what were known

as fat or grease traps. These grease-traps were an abomination. They had to be cleaned out from time to time, and it was felt that if they could be done away with it would be a very great improvement. That had been achieved in modern times by the construction of a gully known as the grease-gully, which was large enough to hold sufficient water to chill any hot water that came into it. By means of an automatic flushing-tank, the grease and sand were washed away every day. The arrangement of water-closets against outside walls wherever possible, instead of in the middle of houses, might be regarded as a modern improvement. The improvements made in traps had been of the very greatest importance. The bell-trap had been replaced by the stoneware siphon-gully. The D-trap was at one time almost universally used for water-closets and sinks, but it had now been largely replaced by the round-made siphon or O-trap, which again had been improved by Mr. Hellyer, who had constructed what was known as the "anti-D-trap." Referring to the improvements made in water-closet apparatus, he remarked that the "short hopper" was a great modern improvement on the long hopper. The trap of a water-closet should not be regarded as part of the apparatus, but as part of the soil-pipe or drain, and they might unhesitatingly condemn all water-closets of which the trap was part of the apparatus. Other improvements which had taken place consisted in the re-substitution of the valve-closet for the pan-closet, and in the making of certain minor improvements, like the flushing-rim. Lastly, Professor Corfield exhibited an improved siphon-trap for deep disconnecting-chambers, provided with a valve by which the sewage could be easily allowed to escape in case of any blockage of the trap, which had been made by Messrs. Crapper & Co. at his suggestion.

PROFESSOR ARMSTRONG ON "THE DOMESTIC FIREPLACE."

The fourth lecture of the series was delivered on Wednesday, the 26th ult., by Professor Armstrong, Ph.D., F.R.S., his subject being "The Domestic Fireplace." Mr. Charles Barry, F.S.A., F.R.I.B.A., presided, and there was a large attendance.

Professor Armstrong said that the domestic fireplace justified that well-known adage that "Familiarity breeds contempt." They were so accustomed to it that, perhaps, they had got into the habit of considering too little whether they were constructing it properly. In these days, when they were taking stock of the efficiency of the machinery and processes which they made use of, there was a good deal that made it appear that the time had come when it was very desirable that some greater share of attention should be paid to this very simple contrivance. The domestic fireplace, in fact, was one of those time-honoured English institutions which, like most of our ancient institutions in these days of progress, had frequently of late been more or less called in question; but, like so many of our old established practices, it proved on examination to embody sound theoretical principles which, in the opinion of capable judges, entitled it to survive. But it could not be denied that it was too often wasteful, and that, while ministering to our comfort within our houses, it was in a large measure the determining cause of the great discomfort which arises from the prevalence of fog in all our large cities. If the fireplace was to continue to enjoy our confidence, the objections to its use must be met, and this could only be done by those whose business it was to construct fireplaces, and by those who had to use them, learning to understand more fully than they did the nature of the changes which occurred in an ordinary fire. They had had "smoke-objection exhibitions" all over the country, and at public meetings at the Mansion House and elsewhere the smoke-producer had been held up to universal execration; generally the comparatively guiltless manufacturer had been blamed, and the chief culprit,—at all events, in London,—the householder, had escaped notice. Only a few of the more far-seeing had pointed out the enormity of the aggregate effect of the petty misdeeds of which we were one and all guilty in this respect. It had been suggested that smoke-objection should be made compulsory by Act of Parliament, not only in the case of manufacturers, who undoubtedly, as a rule, were in a position to minimise, if not to altogether avoid, the pro-

duction of smoke, although often with very considerable difficulty and at some extra expense, but also in the case of householders. He imagined, however,—and he thought those present would agree with him after hearing his argument,—that the only effect of such legislation would be to promote the business of purveyors of reputed smokeless grates. The fact was that the production of smoke was inseparable from the use of bituminous coal in our grates, and it was idle to pretend that it could be avoided. This was but insufficiently understood, however, although it had been clearly recognised, for instance, by no less an authority on sanitary matters than Sir Douglas Galton, Sir Douglas, in the course of a lecture delivered at the Smoke Abatement Exhibition in 1882, said—

"Even if we succeeded in compelling all manufacturers to consume their own smoke, we should still have a very plentiful supply of smoke in the air of London and of every large town from the domestic fires; and we may be certain that if the smoke from domestic fires were stopped, the manufacturers would very soon follow the example, because the manufacturer is only one of the community, and smoke is allowed to exist because the community is not sufficiently educated as yet to realise the necessity of getting rid of it."

Sir Douglas Galton, both in that lecture and in a later lecture, delivered on December 1, 1887, at the Parkes Museum, had come to the conclusion,—which was the conclusion to which he (Professor Armstrong) desired to bring his hearers,—that there was no hope of solving the problem of getting rid of the nuisance unless they were content to abandon the use of bituminous coal. In order to make clear his first point,—that it was practically impossible to avoid producing smoke whatever grate they used so long as bituminous coal was burnt,—the lecturer pointed out that coal was the remains of the vegetation of ages long past, but of no ordinary vegetation. Most people knew how very differently logs or shavings of our common English woods,—beech, elm, or oak,—burnt in comparison with woods full of resin, such as pine. He illustrated the difference by burning pieces of ordinary cotton-wool and resin, and showed that the cotton-wool burnt with a perfectly smokeless flame, whereas the resin burnt with an intensely smoky flame. It might seem absurd to contrast such substances,—especially the wool,—with woods and coal; but, as a matter of fact, they were truly typical, inasmuch as vegetable structures generally largely consisted of what chemists called cellulose, which was known to them in an almost pure form in cotton-wool. In the case of most of our English woods the cellulose was not associated with resin, but most coniferous woods, such as pine, were rich in resin. The vegetation from which coal such as they usually burnt had been derived was, no doubt, highly charged with resinous matter, and when such coal was burnt it behaved very much as resin did. The consumption of coal in a fire was effected in two ways—at two distinct stages. In the first instance, the coal did not burn, if they used this expression in the sense in which it was commonly understood by chemists, but it underwent change in precisely the same way as it did when heated within a retort at the gasworks; its volatile constituents were given off: the contained resinous matters were volatilised, a complex series of changes taking place, and the volatile matters,—gases and vapours,—which were given off burnt with the bright smoky flame so familiar to and so loved by the Englishman. The coal which they usually burnt contained about 85 per cent. of combustible carbon, and 30 per cent., on the average, was volatile. The residual non-volatile matter or coke soon took fire, and, becoming red-hot, burnt away more or less rapidly provided the air had free access. Having illustrated the two stages by burning sugar and heating resin, the Professor proceeded to point out that the vapours which were given off in the first instance from coal were very much of the character of those which were produced on heating resin or bituminous shale, such as is so largely used in Scotland in the manufacture of lamp oils and paraffin. They were the vapours of hydrocarbons,—substances akin to ordinary petroleum and turpentine,—which burnt with a very smoky flame. Why did such substances burn with a bright smoky flame? The flame was bright in the first instance because it was smoky and hot. Vapours or gases which burned with smokeless flames did not give bright smoky because the hydrocarbons did not burn as wholes; the one constituent, the hydrogen,

was more combustible than the other, the carbon. Unless the vapour were intimately mixed with sufficient air to secure its complete combustion, it was impossible, therefore, to prevent the separation of some of the carbon as smoke, and the conditions which obtained at the top of a fire were such that combustion must be incomplete and must involve production of smoke. To burn turpentine completely its vapour must be mixed with fourteen times its bulk of oxygen. But the oxygen in air was mixed with four times its bulk of nitrogen, a perfectly inert gas, so $14 + (4 \times 14) = 70$ times its bulk of air at least must be mixed with the turpentine vapour. They succeeded in burning gas and petroleum without smoke production by very carefully so arranging the rate of burning, and so adjusting the supply of air, that complete combustion was secured. The gas flame had the form of a thin flat or circular sheet given to it, and a great surface was thereby presented by it to the air; and in a petroleum lamp not only was a particular shape of flame secured, but air was supplied by creating a draught round the flame by means of a chimney of proper size. Such arrangements could not very well be made, however, in the case of a fire. They could not well fix a glass chimney over it, and they had also to bear in mind that only one face of the fire was exposed to the air. In the case of a gas flame every face was exposed to the air. The combustion of vapours of hydrocarbons was rendered incomplete not only by the insufficient supply of air, but also by the cooling effect of air present in excess. When the carbon was once separated in the form of smoke it was very difficult to burn it. They were accustomed to think that carbon was a very combustible substance, but their ideas on that subject had undergone a complete change within the last few years: thus they had learned that the burning of the carbon was dependent upon water vapour being present. Hence it would be seen that many influences were at work in a fire to render combustion incomplete. In the first place, there was the shape of the flame; in the second place, the dilution of the combustible gases by the products of combustion from the fire below; and in the third place the rush of cold air, tending to produce the cooling effect to which he had alluded, rushing up the chimney. What remedies had been applied in order to meet these difficulties? How did the manufacturer prevent smoke? In the first place by never doing as they did in their domestic fireplaces—pitching on a scantful of coals. He fed in fuel gradually, and was careful to introduce air not only from below, through the bars of his furnace, but also above the fire at a point some distance beyond that at which the distillation went on. In the case of the domestic fireplace, the difficulty had been met by putting coal into a hopper at the back of the fire, or by feeding it in underneath, so that the volatile substances passed up through the fire. That was one method, and probably the most efficient method that had been contrived for getting rid of the smoke; but such an arrangement was only effective when they had got a good roaring red-hot fire. The harm was chiefly done in the morning when the fire was lit, and unless cinders were then used they could not prevent smoke being given off in the first instance. Another method was to introduce a sloping back and haffle-plate. A form of grate was described which was supposed to be a smoke-preventing one, having an air-chamber at the back of the fire, the idea being to burn the hydrocarbons at the top of the fire by bringing them into contact with fresh air. Such an arrangement might produce a certain amount of effect, but it could not produce any great result. In the official report of the Smoke Abatement Committee of the Exhibition of 1882, the results of a series of tests made with a considerable number of grates with reference to the prevention of smoke were given, and the difference between the worst and the best, after all, was very little. The worst had an average smoke shade of 3.2, and the best 2.6, so that after all the improvement was not very great. It followed, therefore, that bituminous coal must be abandoned if they wished to avoid smoke; they must be content to sacrifice the bright, cheerful flame over the top of the fire. It was one of those cases in which they could not have their cake and eat it. They did not want to raise the temperature of the air in rooms to any considerable extent, because, in the first place, hot air was unpleasant to breathe, and, in the second place, because

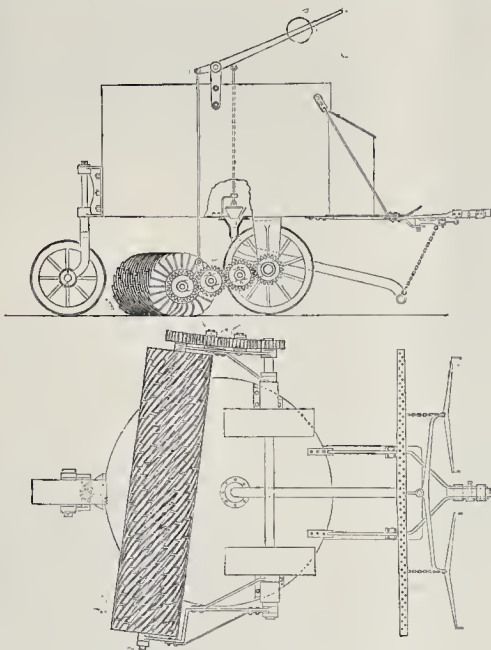
hot air produced an unpleasant effect on the skin. What they did want in their English system was to heat all the surrounding objects to such a temperature that heat radiated from them to persons in the room, instead of the heat radiating towards them. The lecturer proceeded to deal with the second stage, namely, the stage at which true combustion takes place in a fire. What happened? There was no production of smoke possible under these conditions, but they might be lost owing to incomplete combustion caused either by an insufficient or an excessive supply of air. Most of the grates in use in recent years were excessively wasteful, the either gave what everyone knew under the name of a black fire, and therefore did not radiate sufficient heat into the room, or excessive draught caused too rapid combustion, and great waste in consequence. The modern slow combustion stoves were an enormous improvement in this respect. Care was taken to control combustion at as slow a rate as possible in order to secure a good result, and that was done mainly by checking the draft. There was no least doubt that the mere introduction of a small baffle-plate was the secret of the success which had attended the introduction of modern stoves. The modern stoves were also very much better in the sense that all superfluous iron-work which tended to take away heat had been got rid of; any stove might be made a slow-combustion stove, in the very simple manner advocated by Mr. Prigden Teale in his book, "Economy of Coal in House Fires." He said that if they were to get rid of smoke at all, they must abandon the use of smoky coal. What, then, were they to use? They must use anthracite coal or coke. A good many people had had experience of these two forms of heating, and, I thought, were quite prepared to make selections, but there were many who had sentimental objections on the score that such fires had a bright flame playing over them. He himself during the last two years had been burning practically nothing but coke, and to him such a fire was certainly as cheerful as any ordinary fire. People generally, however, objected to the use of coke, and there was no doubt that it did require a certain amount of education. The most successful coke fire he had was one he made with a few bricks and a gridiron with very narrow bars as a front. That stove was capable of always exhibiting a perfectly brilliant red-hot face, provided the fire was not allowed to burn too low. It should be mentioned that Sir Douglas Galton, in the lecture he had previously referred to, said:—

"An open fire of smokeless coal, although it may have a glow, is not generally such a cheerful fire as a fire of bituminous coal; and, without care and a rapid draught, which is rarely attainable in the existing open fire-places, carbonic oxide is liable to be formed, and to come into the room."

He (Professor Armstrong) did not think these objections were serious. Architects as a rule had not been in the habit of providing ventilation in their own houses; the air was allowed to come in where it liked. But if the architect were to provide for the admission of air into the room at all times the objection would be dispensed. There was one other point to be called attention to in regard to the burning of smokeless coal and fuel, viz., that if they were to make some arrangement by which the air introduced at the front of the fire could be made hot they might secure a hotter fire. There were very many other points which, if time permitted, might be entered upon with advantage, but he would conclude by expressing the hope that he had succeeded in bringing home to the one point which he was anxious to make, that so long as they used coal containing volatile matter they could not hope by any practical arrangement to prevent smoke.

The fifth of this series of lectures was delivered on Wednesday evening last by Professor A. B. W. Kennedy, F.R.S., his subject being "The North Bridge," illustrated by a series of lantern views. Mr. Alfred Preston presided, and there was a crowded attendance.

The London County Council.—There was no business of special interest to our readers generally transacted at Tuesday's meeting of the London County Council, which was mainly occupied with a discussion of the provisions of the Bill promoted by the Council for the regulation and control of theatres and music-halls.



The "Hercules" Street-cleansing Machine.

THE "HERCULES" STREET-CLEANSING MACHINE.

We recently had an opportunity of being present at some trials of this machine on the roadways of Victoria-street, Westminster, and some adjacent streets in the locality. The locale was well chosen for such a purpose, for on the authority of Mr. Strachan, late Surveyor to the Chelsea Vestry, supported by our own observation, "as plentiful as mud in Victoria-street" is fast becoming not only a synonym for abundance, but a reflection on the scavenging operations of the local authority; whilst it is also somewhat of a satire on the municipal and other engineers whose offices so thickly stud this part of London.

The trials which we witnessed were very successful, and proved the capacity of the machine, which appears to be equally well suited for either asphalt, wood, or stone paving,—for any kind of road, in fact, but macadam. As will be seen by the accompanying illustration, the machine, briefly described, consists of a circular water-tank, with a revolving brush beneath it, there being a water-pipe or spreader pierced with fine holes, which travels in advance of the brush, and facilitates the operations of the latter. It seems to be quite clear to us that the continual use of this machine would not only keep our town streets clean and free from dust, but that it would confer a great boon on the horses, whose struggles and sufferings of late have been painful to witness, owing to the stiff, glutinous, pasty, greasy mud, which is very disgracefully allowed to accumulate with little or no attempt to remove it, being mostly left alone until the rain comes to wash it away. We are speaking of leading thorough-fares, such as Holborn, the Strand, Fleet-street, and Ludgate-hill. The sooner the local authorities adopt the lesson so clearly demonstrated by this machine, and use water in conjunction with the scavenger's brush for street cleansing, the better it will be for the public and their hardy-treated helpers, the horses.

Change of Address.—The United Asbestos Company, Limited, have removed from Queen Victoria-street to more commodious premises at Dock House, Billiter-street, London, E.C., lately in the occupation of the East and West India Dock Company.

ARCHITECTURAL SOCIETIES.

Birmingham Architectural Association.—At a meeting of this Association, held on the 21st ult., under the chairmanship of Mr. T. Naden, Mr. W. H. Kendrick read a paper entitled "Notes on Woodwork," which had been jointly composed by Mr. H. H. McConnell, A.R.I.B.A., and Mr. Kendrick. After a brief account of the history of the craft of the joiner, Mr. Kendrick described some local examples of his art, amongst them being the fine timber-built house of "The Oaks," at West Bromwich, which retains its artistic masses and outline and its delicately-finished details as designed by its original designer without any intervention on the part of the present day restorer. The internal fittings of Tong Church, near Shifnal, with its fine screens and beautiful stalls, which are particularly noteworthy for their harmony as a whole and for the everywhere varied detail of the parts and the screen in the south aisle of Hamstall Midway Church were given as examples of Gothic joiners' work in parish churches, and the west gallery in St. Peter's Church, Wolverhampton, as a typical example of seventeenth century work. The Bishop's throne in Lichfield Cathedral, of seventeenth century work, and probably erected by Bishop Hackett, was chosen as a final example of the noble woodwork of that period, and as being, with a few bench-ends, the sole remains of Bishop Hackett's fifty-stalls which had survived Wyatt's various efforts to beautify the cathedral. The paper was illustrated by a large number of exceptionally interesting drawings of these and other examples of woodwork in the district prepared by Messrs. Kendrick and McConnell.

Leeds and Yorkshire Architectural Society.—"The Revival of Applied Art" was the title of a lecture delivered before the members of the Leeds and Yorkshire Architectural Society, in the Law Institute, Leeds, on Monday evening, by Mr. Mervyn Macartney. Of the revival of applied art in England, said the lecturer, there was certainly no doubt so far as painting, sculpture, and architecture were concerned. Larger fortunes were made in those arts now in this country than ever before. But that did not necessarily show that the various arts were in a more flourishing condition than formerly. Painting was, or had been up to quite a recent date, very prosperous, as regarded material prosperity. That success was

to some extent owing to State patronage, and to artists producing what was eminently adapted to the wants of the present. The revival in sculpture was due largely to the same cause. Relatively sculptors had reached the highest average of excellence; and that, too, in spite of their being followers almost to a man of the Classic school, and not the popular realism of the Italians. As to architecture, he believed that there were never so many real architects as at the present day. He dwelt upon the relation of those arts to applied art, and referred to the dependence of the decorative crafts on architecture. People had found out that there was often more beauty in the thousand and one objects of every-day use than in the paintings that adorned their walls or the statues that graced the hall.

Liverpool Architectural Society.—At the meeting of this Society on Monday evening last a paper was read by Mr. James M. Hay on the "Decorative Panels of St. George's Hall." The history of the panels was given from the time when the first panel was set up in 1835, the adverse criticisms which it drew forth from all sides, its disapproval by the Council of this Society, and its forwarding the same to the City Council; the setting up of the second panel, and (for the first and only time) a description of the work and the intentions of the sculptor from the pen of Professor Conway, published in the *Liverpool Daily Post* in December, 1887. Mr. Hay strongly criticised the panels, which, he contended, ought to have been in high relief, and attached to the field of the panel, not set on a shelf or ledge. The figures are too tall for the place they occupy, and there is a paucity of oblique lines in the composition. The figure of Joy should have been merrily skipping along in front of the procession, strewn her flowers, and not standing sulking in the rear. The nude in both panels is forced and unnatural, and instead of heightening, seriously detracts from artistic expression. If the child Justice, in the first panel, had been provided with a short skirt, and the naked female figure in the second clothed in the fine Classic tunic of the Greeks, veiling without concealing the beauty of the form, the idea of "purity" would have been better symbolised, the art would have been finer, and public decency would not have been outraged. The work altogether betrays the pernicious influences of the realistic school that is doing so much in France to degrade both her literature and her art. Allusion was made to the generous and public-spirited offer of Mr. Philip Rathbone to pay the expense of completing the four remaining panels of the series. But Mr. Rathbone forgot that it was not the cost, but the unfitness of the panels that prompted the City Council to discontinue the work, and this the generous offer in no way changes. It was inconceivable that a Corporation which has spent 300,000 on a building would grudge a paltry thousand towards its completion. In conclusion, he considered that it was an injustice to one of the finest buildings in the city that those panels should remain a patch and disfigurement on the face of it; that it was an injustice to the memory and fair fame of Elmes; that it was an injustice to the citizens of Liverpool, and an outrage to public decency; and that they should respectfully ask the City Council to take immediate steps to have the offending panels removed and the stone imposts restored before any further arrangement was entered into with any sculptor.—A discussion followed, but no practical result was arrived at. [We print a *resumé* of the paper, to show what some Liverpool critics are capable of in regard to this matter. The idea that the French, who are far at the head of the whole world in imaginative sculpture, are degrading the art by realism, is truly delightful.]

Sam Deards & Co., Limited.—The report of the Directors of this Company, submitted to the shareholders at the first annual general meeting, held on Monday, the 24th ult., congratulates the shareholders on the accounts showing a profit of nearly 12½ per cent., after paying all expenses and allowing for depreciation of the patents, &c. The Directors, having regard to future operations of the Company, recommended that a dividend of 7½ per cent. be declared, and that the balance be carried forward. We are asked to add that the unallotted shares in the Company are being issued, and any one applying for same must do so at once to the London offices of the Company.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

THE twenty-third annual general meeting of the donors and subscribers took place on Tuesday, March 4, at 21, New Bridge-street, E.C., Mr. H. E. Bartlett (President-elect) occupying the chair, supported by Mr. E. Brook (Treasurer), M.srs. E. C. Roe, H. W. Parker, C. K. Tarpin, J. Robson, T. H. Winny, E. B. Gammon, A. A. Stanger, W. D. Gilbert, and other gentlemen.

Mr. Wheatley, the Secretary, read the report, which stated that during the past year the income had been well maintained, the amounts being 288*l.* 12*s.* annual subscriptions, 317*l.* 1*s.* donations, and 98*l.* 7*s.* 5*d.* dividends; total, 704*l.* 18*s.* 5*d.* The expenditure was 472*l.* 11*s.* 7*d.*, of which amount 377*l.* 18*s.* 4*d.* was for pensions and temporary relief. Two elections had been held, the result being that Mrs. Charlotte Tucker and Mrs. Susan H. Fisher had been added to the pension-list. One pensioner, Mr. J. T. B. Miles, had died during the year, leaving a present total of nineteen pensioners now on the books, and three children at the Orphan Working Sch. of, per presentation of the Institution. The seventh annual dinner took place at the Holborn Restaurant on April 2, 1889, Mr. John Aird, M.P., presiding. The attendance was very large, more than filling the Venetian Chamber, and, as the result of the Chairman's appeal, subscriptions and donations were announced amounting to 350*l.* This sum included a large number of contributions from the builders' clerks themselves. The Committee return their best thanks to Mr. Aird for his kindness in having served the Institution as President, and for his handsome assistance in support of the funds. A further purchase of stock had been made during the year, bringing up the total of invested funds to 3,650*l.* The committee announce with great regret the death of Mr. Charles Richardson, one of the trustees, and also vice-president of the Institution. Mr. Richardson had been a regular and liberal supporter of the funds from the foundation to the period of his lamented decease. The report concluded by thanking the master builders, architects, and merchants connected with the building trade for their past help, and by expressing the hope that the same would be continued, to the end that the usefulness of the institution might be well maintained.

The Chairman, in moving the adoption of the report, expressed the pleasure it gave him to meet the subscribers and donors, and to find the Institution in such a flourishing condition. Much had been done during the past year in assisting widows and those who needed relief, additional funds had been invested, and the balance at the bank was satisfactory. He hoped to do what he could for the welfare of the Institution, and trusted that at the close of his year of office the funds would not be in a less satisfactory state than at present. He had much pleasure in proposing "That the report and balance-sheets, as read, be adopted and printed, together with the list of subscribers and rules of the Institution."

Mr. E. B. Gammon seconded the resolution, which was put from the chair and duly carried. Mr. E. C. Roe, in proposing a vote of thanks to the ex-President and other retiring officers, remarked that Mr. Aird's parliamentary and other duties had prevented his attendance at the ordinary committee meetings, but he had done the Institution good service in having acted as President. As to the future, there was one thing to consider with reference to the increasing number of pensioners, and that was the importance of adding to the invested funds, so that a steady income might arise from that source.

Mr. Stanger seconded the motion, which was carried, Mr. C. Brown replying on behalf of Mr. Aird and the other retiring officers.

Officers for the present year were then elected, and Mr. Brooks (the Treasurer) spoke in complimentary terms of Mr. Bartlett, who headed the list, and also referred to the valuable services rendered by some of the members who had already served, and whose names were included amongst those re-elected that evening.

On the motion of Mr. Gilbert, seconded by Mr. Stansfeld, a vote of thanks was presented to the Chairman, who, in replying, said that although he was a busy man, with not much time to spare, he yet hoped to come amongst them, and what he could do to the help of the Institution he would do with pleasure.

The proceedings then terminated.

BUILDERS AND THE SANITARY INSTITUTE.

SIR,—I feel sure that the remarks of "Builder and Decorator" in your last issue [p. 158] will meet with approval, and for one I wish to give more than tacit assent to the same by now to this expressing my agreement with him as to the good policy (say nothing of more sentimental reasons) of the Sanitary Institute providing such a curriculum as to meet the requirements of various trades, and at the same time satisfy the demand so rife at the present moment, which is made by both the young "go-with-the-times" tradesman and the "alive-to-

own-interests" general public, for certificates or evidences of technical knowledge.

Sanitary science is recognised as of the highest importance (richly so), and it would be well for the public, and equally well for those who give the subject their careful attention, if builders were expected to have more acquaintance with the rules and principles, which often suffer in their hands, from no bad intention, but from lack of information.

I have many times advised anxious inquirers to get the prospectus of the Sanitary Institute, and take up the subject; but have always allowed the objection to have weight,—viz., that the demands of the Institute took them over studies they could not appreciate and should never benefit by.

Whole sections of the Public Health Act could be spared the builder, and many Acts,—notably the Rivers Pollution, Canal Boats, Food and Drugs, Nuisance Removal, &c.—might be entirely passed over for something more practical in the shape of building construction. For a builder or tradesman it would be waste of time to study the Acts above-named, and would only encourage cramming, of which there is already too much.

The plumber is provided for by registration, and other branches of the building trade with similar helps by the City and Guilds and South Kensington Institutions; but it does seem to me to be eminently the work of the Sanitary Institute (if it will rise to its own position) to monopolise the particular field which is opening before it, and meet the public demand.

The Sanitary Institute has the machinery and the public confidence, and I see no reason why the builder's certificate would not be as much sought after and be as much appreciated as the ever-growing and popular one which they now give,—the Inspector of Nuisance Certificate.

AN ASSOCIATE OF THE SANITARY INSTITUTE.

VALVES TO FRESH-AIR INLETS.

SIR,—In regard to the use of valves on the fresh-air inlets to drains, I may say that for the hundreds and thousands of fresh-air inlets I have put in or caused to be put in I could not put to half-a-dozen cases where valves have been used for such. In some odd cases they are used, however, & I had a side fresh-air inlet into one of my drains, for a drain where the inlet grating was on the ground beside a lawn-tennis green. In that case it was considered advisable to put in a valve to let air in but to shut against air coming out. In cases where the fresh-air inlet is in the face of the wall of house, say, about a foot above ground, and close to a door or window, or between both and close to them, then it is a good precaution to put in a valve, but such need not be dead-tight.

W. P. BUCHAN.

Glasgow, March 1, 1890.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—X.

LAW OF THE ELECTRO-MAGNET.

THE simplest form of electro-magnet consists of a cylindrical bar of soft iron, surrounded by coils of insulated wire. When a field as intense as possible, but of limited volume, is required for practical purposes, the bar is bent into the horse-shoe form, with the ends facing each other, and the flux between these two polar faces made up of.

Many endeavours have been made to find some simple relation between the ampere-turns in the coil or coils and the strength of the magnet produced by them.* Dr. John Hopkinson published the results of a valuable investigation on this subject in 1855. It is disappointing to find that apparently before it would be possible to predict, with absolute accuracy, to what extent a given number of ampere-turns would magnetise a piece of iron, the whole previous history of the metal would have to be known. It is, however, possible, by taking mean values, to easily arrive at results which are very near the truth, and which are, moreover, sufficiently accurate for practical engineering purposes. What, therefore, is given as the law of the electro-magnet must be accepted with this reservation.

The field produced by an electro-magnet at any point can be measured in various ways, for instance the strength of the field of a dynamo-machine can be determined by finding the electro-motive force set up in its moving conductors as they cut the lines of force with a known velocity; or the field may be compared with one of known strength by means of an ordinary magnetometer. As, however, full details are to be found in all books specially devoted to practical electrical and magnetic measurements, it is unnecessary to give here any

* An interesting summary of the formulae suggested by various investigators is given in Thompson's "Dynamo-Electric Machinery."

detailed description of how the measurements may actually be made.

When two quantities vary together according to some law the mathematical equation which is not known, the results obtained are best shown by means of a curve. In the case under consideration the magneto-motive force of the coils is laid off along the horizontal line OX, and the flux produced along the vertical line OY, some convenient scale being chosen.

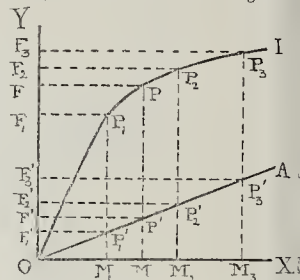


Fig. 24.

Suppose an M.M.F. equal to OM₁ produces a flux equal to OF₁, then a point P₁ in the curve is formed by raising a perpendicular M₁P₁ equal to OF₁, or the same point may obviously be got by drawing a F₁P₁ equal to OM₁. When a sufficient number of data have been got from actual experiment a series of these points are found and a curve drawn through them. Such a curve will enable us to find by means of a T-square and pair of dividers the flux produced by any particular M.M.F. or the M.M.F. required to produce the flux needed. As a simple example, let it be desired for some purpose to produce a flux value represented by OF. With the dividers measure off the length OF along OY, & means of the T-square draw a perpendicular through F until it cuts the curve in P, the FP is the M.M.F. required to produce the flux wanted. The equation expressing the relation between M.M.F. and flux is the equation to the curve in rectangular co-ordinates. What the equation is has yet to be found, and when found it will be too complicated to be of very much practical use, although certain approximate expressions are of service to those who do not care to use graphical methods. In the figure only three points, P₁, P₂, P₃, are drawn; it would, of course, be impossible in practice to accurately draw the curve through but three points, & great many more experiments than three must be made.

The curve of magnetisation for the electro-magnet having been found, remove the iron core and determine the points P₁, P₂, P₃ for the "soft core"; it will be found that the flux is in excess much less than when the iron was present, but that the curve for air is a straight line, since OM₁:OM₂:OM₃:M₁P₁:M₂P₂:M₃P₃.

The results shown, recorded by means of the straight line OA with air alone, and the curve OI with iron placed inside the coils, may now be considered in connexion with the magnetic circuit; the form of magnet shown in figure

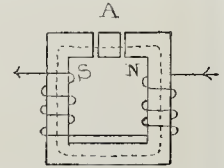


Fig. 25.

is made to closely represent a portion of a circuit such as is to be found in practically all dynamo machines and will, therefore, be of use in considering the actions of these machines in later periods. Everyone who has been to an industrial exhibition of late years must be familiar with the general appearance of dynamos that are always on view. Apart from details, a dynamo-machine consists essentially of two parts, the field-magnets and the armature. As a rule, the magnets are attached to the bed of the machine, while the armature revolves; but, since relative motion alone is necessary, some makers prefer to keep the armature stationary and revolve the field-magnet or magnets, to which we

at present confine our attention, consist of a single horse-shoe, or is built up of a combination of such magnets. Fig. 25 may therefore be taken as an elementary form of this part of a dynamo; it represents an iron core of uniform cross section (S) bent so that the polar faces are opposite each other, the limbs being wound with suitable coils of insulated wire.

Returning to fig. 24. We may suppose that the points on O A were obtained from experiments on the coils alone, before they had been placed on the iron cores. Let M = M.M.F. in any one experiment, F' the flux, and R' the magnetic resistance of the air throughout the circuit, thus:—

$$R' = \frac{M}{F'}$$

but when air alone was in the circuit, $\frac{M}{F}$ was found to be a constant, no matter how the values of M and F' are varied, hence the specific magnetic resistance of air is independent of the flux passing through it. When, however, the iron cores are in use the points P, P', P'', &c. do not lie in a straight line, but along a curve O I, and the general shape of this curve shows that the magnetic resistance of iron increases as the flux passing through it increases. In other words, the value of μ for iron decreases as the metal becomes more intensely magnetised.

Since the resistance of any circuit is equal to the M.M.F. divided by the flux, the resistance in any particular case can be found; if from this be subtracted the resistance of the air, the remainder will clearly be that of the iron, and from the quantity so obtained the value of μ can be easily got by means of the formula already given. As, however, the calculation of the air-resistance presents mathematical difficulties owing to the way the lines of force spread out in curves, it is customary in making experimental determinations of the value of μ on a sample of iron for different degrees of magnetisation to make the circuit as nearly as possible entirely of iron, only a comparatively narrow slit of air-space being left for the purpose of getting at the flux to measure it. Since the lines of force will go nearly straight across the air-space, its resistance can be allowed for, and only an extremely small error introduced.

This subject is of such pre-eminent importance that it is worth while to give a numerical example by way of illustration. In fig. 25 suppose the core of the magnet to be made of a bar of annealed wrought-iron, of which the cross-section (S) is 5 square centimetres, and the average length (L) 20 centimetres. Between the two centres long (L), cut from the same bar, the air-space on each side being (d) 0.1 centimetres across. We will calculate how many ampere-turns (A) will be required to send a flux of 38,000 lines through the block. Two assumptions, neither of them perfectly true, will be made—firstly, that lines of force which go across the air-spaces are straight; secondly, that lines do not leak across the limbs of the magnet. Employing the symbols already used, the resistance of the iron portion of the circuit is $\frac{L}{\mu S}$ that of the two air-spaces $\frac{2d}{S}$ hence

$$F = \frac{4\pi A + 10}{\frac{L}{\mu S} + \frac{2d}{S}} \quad \text{that is, the flux is}$$

equal to the M.M.F. set up by the coils, $\pi A + 10$, divided by the total magnetic resistance of the circuit, or

$$A = \frac{10 F}{4\pi S} \left\{ \frac{L}{\mu} + \frac{2d}{S} \right\} \dots \dots (1)$$

Now, F is to be 38,000, that is, 9,000 lines per square centimetre, and, on referring to tables of experimental results, it will be found that under these conditions the value of μ for annealed wrought-iron is about 2,250, substituting these various values in equation (1).

$$A = \frac{10 \times 38000}{4 \times 3.142 \times 5} \left\{ \frac{20}{2250} + \frac{2 \times 0.1}{5} \right\}$$

$$\log 18000 = 4.2553$$

$$\log 472 = 2.6739$$

$$\log 3.142 = 0.4972$$

$$\log 2250 = 3.3522$$

$$\log 3.8491 = 0.5838$$

$$\log 3.0798 = \log 3.1021$$

$$\therefore A = 1201$$

RECENT PATENTS. ABSTRACTS OF SPECIFICATIONS.

4,698, Marble-pattern Papers. W. B. Blaikie and Others.

This invention 'comprises a new or improved system for producing marble-pattern or such like papers by printing them from metal plates or blocks made so as to give a finer effect than the ordinary mode of producing such blocks, and to enable the same pattern to be represented any number of times and in any variety of colour, and with lines, shadows, or relief effects. The printing-blocks are of soft metal, run so as to produce a mottled or marble effect.

4,958, Glazed Structures and Sash-bars. W. Lindsay.

The sash-bars, which are the subject of the patent, are made with ratchet-like teeth projections or corrugations upon the rib, serving to give a better hold to the putty, or with enlargements along the outer edge of the rib of the sash-bar for a similar purpose and to support strut-pieces. In glazed structures the glass is sometimes held in place by the strut-pieces so attached.

5,083, Improvements in Water-closets. W. Dunn.

The object of this invention is to construct water-closets in such a manner that they occupy but little space and can be hidden from view when not used. The pan and seat are hinged to the upper part of the syphon or water-cast trap by means of a horizontal axle and hutch-hinge placed immediately underneath the pan, and the sides of the syphon extend upwards beyond the hinge, so as to overlap and cover the sides of the pan. A flushing-basin is fixed above the pan and fits into it when the latter is turned up into its vertical or folding position. The whole apparatus is preferably enclosed in a rectangular frame fixed in a recess in the wall.

6,152, Ventilator. W. C. Williams.

According to this invention, an ornamental and efficient ventilator is made of earthenware or iron; the outer face being an ornamental plate with openings, and in the centre an ornamental solid piece with two arms which act as detectors; the inner part is of a box-like form at each end, with a passage out towards the centre. The air blowing straight against the ventilator is deflected by the wings, and passes around each of the chambers before it can pass through the central passage into the buildings.

19,611, Bench Plane. J. Crane and W. H. Winkle.

The plane-iron, which is the subject of this patent, is secured by a lever, which, being down in the front of the body of the plane, forms a forward handle, while the plane is worked by this and a wood handle at the back end of the plane. The cutting-irons are immediately released on raising the handle or lever.

20,452, Metallic Lathing. G. Hayes.

In order to better hold the plaster, the metallic sheet is, by this invention, stamped or punctured with holes, to each of which two small tongues or strips of metal are made by the process of punching out. These tongues, being bent into a hook or clip form, serve to retain the plaster, which, when applied, completely surrounds them, so that they become embedded therein. The plaster also sets into the apertures, and, protruding at the back of the lath, forms into knob-boutons, thus affording a more secure hold.

NEW APPLICATIONS FOR PATENTS.

February 17.—2,539, C. Thomson, Sheet Metal Roofing.—2,542, P. Bird, Sewer Ventilation Columns or Shafts.—2,560, R. & F. Ambrose, Window Sashes and Frames.

February 18.—2,570, J. Walford, Wedge for Securing Windows, Doors, &c.—2,609, C. Rogers, Screw Nails.—2,619, J. Schultz & E. Hoff, Flooring for Roofs, Terraces, &c.—2,625, J. Stevens & T. Birch, Weather Bars for Cement Sills.

February 19.—2,652, J. Sloan and E. Bell, Antifouling or Preservative Paints.—2,685, H. Haizan, Ventilating and Cooling Cellars, Rooms, &c.

February 20.—2,721, W. Fryer, Portable Stoves for Removing Oil Paint, &c.—2,739, E. Ingham, Draught Preventers for Doors.

February 21.—2,737, E. Seddon, Apparatus for Sand-papering Wood.—2,806, A. Bowie, Window fastenings.—2,808, W. Noad, White Lead.—2,828, R. Friend, Opening and Closing Skylights, Casements, Fanlights, &c.—2,841, R. Milde, Dwelling and other Houses.

February 22.—2,858, M. Syer, Syphon Cisterns.—2,862, J. Williamson, Door and Gate Latches.—2,879, J. Libs, Pattern Book for Wall and Ceiling Papers.—2,881, J. Offord, T-Squares, &c.—2,896, W. Joy, Manufacturer of Cement.—2,900, P. Bawden, Machinery for making Bricks and Tiles.

PROVISIONAL SPECIFICATIONS ACCEPTED.

608, J. Becker, Scaffolding.—1,074, W. Ellis, Cutting Wood for Laths, &c.—1,139, Hurdell, Self-lubricating Palleys for Window-sashes, &c.—

1,379, J. Japson, Locks for Gates and Doors.—1,527, T. Jones, Gas-fitters' Blow-pipes.—1,908, R. Wilford, Screw-fastenings for Windows.—2,021, S. & W. Dearden, Cutting Stone, &c.—2,077, E. Barlow, Water, Gas, and Drain Pipes, and Joints for same.—2,169, W. Barnes, Joiners' Cramp or Flooring.

COMPLETE SPECIFICATIONS ACCEPTED.

Ossent to Opposition for Two Months.

6,555, H. Allan, Kitchen Ranges.—6,603, I. Sarginson & J. Noble, Chimney Cowl.—6,760, J. Sizer, Fire-grates and Stoves.—6,815, R. Melvor and others, White Lead.—12,232, E. Osander, Floor Plates and Floors for Bridges, &c.—915, E. Norton, Paint-cans.—946, J. Radford, Securing Door-knobs to their spindles.—1,095, E. Smith, Veneer-cutting Machines.

RECENT SALES OF PROPERTY: ESTATE EXCHANGE REPORT.

FEB. 24.—By WILKINSON & SON.

Balham—7 to 10, Victoria-ter., u.t. 80 yrs., g.r. £32, r. £105 4850

Bethnal Green—5 and 7, Waverley-st., f. 500

By SLEE & SON.

Islington—15 and 16, Waterloo-ter., u.t. 42 yrs., g.r. £13, r. £72 p.a. 520

18, 20, and 22, Barnsbury-grove, u.t. 64 yrs., g.r. £15, r. £111 810

By T. WAKEFIELD.

Bloomsbury—3, Montagu-mews, u.t. 0 yrs., no g.r. Islington—19 and 21, Blundell-st., u.t. 60 yrs., g.r. £12 330

By BEARD & SON.

Hammermith—11 and 12, Argyle-pl., u.t. 80 yrs., r. £45, 10s. 225

Chiswick—3, 4, and 5, Britall-grove, u.t. 17 yrs., deductions £36, r. 470 150

FEB. 25.—By DEBENHAM, TAYSON, & CO.

Strand—14, Buckingham-st., f. area 3,811 ft. 10,500

Hyde-pk.—1-g.r. of £35, u.t. 44 yrs., subject to a g.r. of £2 610

1 g.r. of £100, u.t. 44 yrs., free of g.r. 1,975

1 g.r. of £20, u.t. 44 yrs., free of g.r. 470

Lewisham—1-g.r. of £47, 10s., u.t. 70 yrs., subject to a g.r. of £4 300

By J. DAWSON & SON.

Hammermith, Queen-street.—The residences "Temple Lodge" and "Rosemeath," f. about 1½ acres 5,020

By BOYTON & PROGRAM.

Walham Green—2, Tournay-rd., u.t. 90 yrs., g.r. £7, r. £38 350

1, Chapel-ter., u.t. 97 yrs., g.r. £7, 10s. 350

Fulham—30 to 36, Ewald-rd., u.t. 96 yrs., g.r. £20, r. £104 p.a. 605

By F. J. BIRLEY.

Bermundsey—85, Jamaica-rd., f., r. £40 p.a. 495

26 and 28, Strathairn-st., u.t. 47 yrs., g.r. £10, r. £66 505

102 and 104, Fort-rd., u.t. 47 yrs., g.r. £10, r. £67, 10s. 585

By A. WATSON.

Greenwich—6 and 8, Horseferry-rd., f., r. £42, and a ground-rent of £3, with reversion in 15 yrs. 530

28, Beacon-ter., u.t. 19 yrs., g.r. £2, 8s., r. £23, 8s. 95

By R. TIBY & SON.

Kingsland—5 and 13, Ardleigh-rd., u.t. 34 yrs., g.r. £11, r. £65 490

By W. R. SMITH.

Old Kent-rd.—39 to 45 (odd), Asylum-rd., n.t. 19 yrs., g.r. £13, 10s., r. £93, 15s. 300

By R. J. COLLIER.

Leytonstone—1 to 6, Queen's-ter., u.t. 89 yrs., g.r. £30 425

Clapton—83, Median-rd., u.t. 76 yrs., g.r. £6 275

Stoke Newington—8, Gainsborough-rd., u.t. 69 yrs., g.r. £5, r. £36, 8s. 280

Walthamstow, Cumberland-rd., a plot of land 57 Manor-rd., a plot of f. land 132

By DEAL, SON, & CHAFFERS.

Fawkham, Kent.—The Harley Manor Estate of about 600 acres, f. 10,000

By INMAN, SHARP, HARRINGTON, & ROBERTS.

Vauxhall—31, 33, and 35, South Lambeth-rd., f. £155, 2,700

Lancaster-lane.—The Sunnybank Steam Laundry, f. 6,000

The Goodwill and Plant of the Effra Works, f. 900

By H. N. NEWTON & CO.

Westbourne-pk.—133, Ledbury-rd., u.t. 69 yrs., g.r. £10, r. £50 540

FEB. 27.

By MESSRS. TROLOPE.

Raton-sq.—84, Hobart-pl., u.t. 78 yrs., g.r. £37 2,100

Belgravia—73 and 75, Belgrave-rd., u.t. 47 yrs., g.r. 2s., r. £280 3,850

By C. & F. MOORE.

Limehouse—30 and 32, Acland-st., u.t. 84 yrs., g.r. £9, r. £72, 10s. 590

Stepney—73, Charles-st., and 49, 61, and 53, Jamaica-st., u.t. 11 yrs., g.r. £5, r. £108 350

Hackney—235, Dalston-lane, u.t. 49 yrs., g.r. £4, 10s. 360

By ROGERS & TEMPLE.

Edgware-rd.—No. 118, u.t. 19 yrs., g.r. £5, 8s., r. £145 1,250

Westgate-on-Sea, Ramchurch-rd.—"Donneva House," f. 850

St. Mildred's-rd.—A plot of f. land 610

By R. A. SAVAGE & SON.

Mill-end—1, Bridge-st., f., r. £30 (licensed) 830

3, Bridge-st., f. 430

By NEWBON & HARDING.

Camden-town—15, 16, and 17, Prebense-st., u.t. 32 yrs, g.r. £14, r. £88	2750
Homerton, Homplur-lr.—E. of £14 ss, with reversion in 70 yrs.	340
Pentonville, 36, Warton-st., u.t. 36 yrs, g.r. £4	425
Islington—77 and 79, Barsbury-st., u.t. 19 yrs, g.r. £16, r. £82	400
Waterloo-rd.—No. 62, u.t. 33 yrs, g.r. £9, r. £70 p.a.	635
Stoke Newington—43, Carrow-rd., u.t. 33 yrs, g.r. £10	550

By E. STIMSON.

Peckham—47 to 50, Manaton-rd., u.t. 75 yrs, g.r. £18, r. £96, 88.	640
32, Queen's-rd., u.t. 29 yrs, g.r. £7	200
23 and 30, Langdale-rd., u.t. 53 yrs, g.r. £8, 88, r. £62, 88.	315
Newington Butts—77 and 79, Crompton-st., and a lgt. of 45, u.t. 53 yrs, g.r. £12	550
Brixton-rd.—105, 195A, 197 and 199, u.t. 11 yrs, g.r. £24, r. £128	310

By WILKINSON, SON, & WELCH (at Brighton).

Brighton—9, Royal-crescent, l.r. r. £155	2,320
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F.R.S.—By BROAD & WILTSHIRE.

South Kensington—9, Giltton-rd., u.t. 40 yrs, g.r. £7	800
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By BAKER & SONS.

Hampstead, Child's Hill—Highway House, l.r. £25, r. £27, 6s.	820
Tottenham—48, Eastbourne-rd., u.t. 80 yrs, g.r. £5, r. £27, 6s.	185

By WAGSTAFF & WARMAN.

Hampstead-rd.—Nos. 250 and 261, u.t. 28 yrs, g.r. £16	1,000
Islington—56, Brooksby-st., u.t. 19 yrs, g.r. £6, 6s, r. £90	645
Barsbury—33 and 40, Beulah Villas, profit rent of £12, u.t. 40 yrs.	100
St. Luke's, Royley-st.—Profit rent of £20, u.t. 15 yrs.	150
Tottenham—18, Nether-ton-rd., u.t. 91 yrs, g.r. £8, 10s, r. £35	310
Upton-pk.—2, Seymour-buildings, u.t. 62 yrs, g.r. £5, 10s, r. £15, 18s, r. £48	60
City-rd.—An lgt. of £210, u.t. 4 yrs, subject to £110 g.r.	20
St. George's, E.—20 and 21, Prince-st., u.t. 23 yrs, g.r. £14, 18s, r. £48	21

[Contractions used in these Lists.—E.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

MEETINGS.

SATURDAY, MARCH 8.
 Architectural Association.—Visit to Mr. Seading's new church, Stann-street.
 Royal Institution.—The Right Hon. Lord Rayleigh, M.A., F.R.S., on "Electricity and Magnetism." IV. 3 p.m.
 Junior Engineering Society.—Visit to the London Hydraulic Power Company's Pumping Stations. No. 1 at Falcon Wharf, Blackfriars (near the bridge). No. 2 at Millbank-street, Westminster (near the Houses of Parliament).
 Edinburgh Architectural Association.—Visit to Free Library and Old University Buildings.

MONDAY, MARCH 10.
 Surveyors' Institution.—Mr. T. W. Wheeler, Q.C., on "Bettlements." 8 p.m.
 Institution of Civil Engineers.—Students' visit to the a.s. Juvana. 12 noon.

TUESDAY, MARCH 11.
 Society of Arts (Applied Art Section).—Mr. James Orrock, R.L., on "The Claims of the British School of Painting to a thorough Representation in the National Gallery." 5 p.m.
 Institution of Civil Engineers.—Discussion on the following papers (1): "The Hawkesbury Bridge, New South Wales." By Mr. C. O. Burge. (2) "The Construction of the Buffin Bridge over the Gauges at Benares." By Mr. F. T. G. Walton. (3) "The New Blackfriars Bridge on the London, Chatham, and Dover Railway." By Mr. G. E. W. Craitwell.
 Sanitary Institute (Lectures for Sanitary Inspectors).—Mr. Charles E. Cassal, F.C.S., on "Food (including Milk), Sale of Food and Drugs Act." 8 p.m.

WEDNESDAY, MARCH 12.
 Society of Arts.—Sir Douglas Galton, F.R.S., on "The Chemin De Fer Oisants, or Sliding Railway." 8 p.m.
 Architects Benevolent Society.—The Fortieth Annual General Meeting of the Subscribers and Donors. 5 p.m.
 Free Lectures in Art.—Professor Marshall Ward, M.A., on "The Tree, from the Sapling to the Bench." Carpenter's Hall, London-wall. 8 p.m.
 Sanitary Institute.—Mr. W. Kimmimond Barton on "The Sanitary Condition of Japan." 8 p.m.
 Liverpool Engineering Society.—Adjourned discussion on Mr. C. H. Yeaman's paper on "Central Station Electric Lighting." 8 p.m.

THURSDAY, MARCH 13.
 Institution of Electrical Engineers.—Adjourned discussion on (1) Mr. J. Swinburn's paper on "The Theory of Armature Reaction in Dynamos and Motors"; (2) Mr. W. B. Esson's paper on "Some Points in Dynamo and Motor Design." 8 p.m.

FRIDAY, MARCH 14.
 Architectural Association.—Mr. Henry Holiday on "Mohrism in Art." 7.30 p.m.
 Sanitary Institute (Lectures for Sanitary Inspectors). Mr. Shirley F. Murphy on "Infectious Diseases and Methods of Disinfection." 8 p.m.
 Junior Engineering Society.—Mr. A. H. Tyler on "Hydraulic Machine Tools." 7.45 p.m.

SATURDAY, MARCH 15.
 Royal Institution.—The Right Hon. Lord Rayleigh, M.A., F.R.S., on "Electricity and Magnetism." V. 3 p.m.

Miscellaneous.

"Fresco-Cement."—On Wednesday, March 5, Mr. Edwin Lucas read an interesting paper before the Civil and Mechanical Engineers' Society (Mr. H. Adams in the chair) on a new medium for fresco-painting, called "Fresco-Cement." The composition, invented by Mr. Kreymer, consists largely of tufa, together with Portland cement and lime, and the patentee claims for it that being hydraulic, absorptive, and acid-proof, it is absolutely unaffected by the severest climate. The author gave a highly interesting *resumé* of the history of the art of fresco-painting, and of the various methods employed by great Italian masters, by the modern German school, and by artists in this country, dwelling on the great difficulties with which votaries of the art had to contend, on the elaborate nature of the processes required, and the want of permanence in the completed work. In illustration of the last defect, especially in our climate, he pointed to the fact that English artists had from the twelfth century devoted great attention to works of this nature, and asked, "Where are those works now?" He then proceeded to quote a favourable report from Mr. H. Fajja, M.I.C.E., who had tested the strength of specimens which had been immersed in water for ninety-eight days. The average tensile strength of five specimens was found to be 312 lbs. per sq. in. The paper concluded with a practical demonstration of the extreme simplicity of the process by means of the portable fresco panels, which form a striking feature of the new invention.

The English Iron Trade.—The English iron market has not improved during the past week; if anything, it is rather flatter. There is also still the difficulty with the miners, the London conference having proved a failure, and this result cannot fail to disturb the iron trade. The Durham miners, on their part, have settled with the masters by accepting an advance of five per cent., and there is still a chance of wiser counsels prevailing in the southern coal-fields. The course of the warrant market continues downwards, and Scotch makers have followed by further lowering quotations. Although Cleveland pig-iron has been sold at 62s. and 51s. 9d. by merchants, makers hold on to 60s. Producers elsewhere are easier in their prices, yet not to the extent expected by would-be buyers. Makers of Bessemer iron in the north-west have gone back 5s. a ton, to 75s. Old materials have experienced a considerable drop. Manufactured iron is quieter, and lower in price in Scotland and the north of England, but steady further south. Steel can be bought at lower figures generally, rails especially. Orders for new ships are not to be secured at present, but builders have plenty to do. Engineers continue fairly busy; there is, however, a falling-off in new work.—Iron.

Drainage of Cairo.—We understand that Mr. Baldwin Latham, who left England early in November to advise the Egyptian Government as to the drainage of Cairo, has recommended a scheme for the sewerage of the city on the hydraulic system, at an estimated cost of 565,700*l.* That sanitation is receiving very great attention at the present time in the East, is evidenced by the fact that Mr. Latham, whilst at Cairo, was requested to extend his journey to Bombay, and has since been asked to advise as to the sewerage and water-supply of several other towns. Mr. Latham will have completed his investigations at Bombay shortly, and is expected in England about the middle of April.

Obituary.—The "Dombanmeister" of Strassburg, Herr A. Hartel, died last month, a few days before his forty-seventh birthday. He was known to be one of the first, if not the first, Gothic architect of the day in Germany; and his name is to be found among the winners of nearly all the great competitions of the last fifty years. He had only occupied his present post some twelve months, and it will be difficult to find so snitabile an artist to fill up the very important vacant place at Strassburg.

East Dereham Local Board.—The work of repaving the town has just been completed by the contractor, Mr. W. D. Hubbard, of East Dereham, the material used being the Imperial stone paving; in addition to this, granite channelling has been laid to the principal streets—the total cost being about 1,900*l.* The works were carried out under the directions of the Surveyor to the Board, Mr. F. W. Skipper.

Surrey Archaeological Society.—At a recent annual meeting of this Society, held at Wandsworth 26 ult., at 8, Dames'-lan, Strand, J. W. Butterworth, F.S.A., president, Mr. J. Stephenson, F.S.A., hon. secretary, read a report of the Council, which stated that the appointment of a new Hon. Secretary in the place of Mr. T. Milhourn, resigned, having been referred by the last annual meeting to the Council, they, at a special meeting, held Mar 20, 1889, elected Mr. Mill Stephenson, F.S.A., and the Rev. T. S. Cooper, M.A., as Joint Hon. Secretaries. The question of the removal of the headquarters of the society to Guildford had also been referred to the Council, and a special committee was appointed to consider it. The committee had a conference with the Mayor and Corporation of Guildford with regard to the tenancy of a house in Castle-street, and it was determined to wait until such time as the house in question should be vacant. At the afternoon meeting of the Society was held Wandsworth on June 1, under the presidency of Viscount Milderay. The Mayor, Hon. Church, and Public Library were visited, 70 papers on their read. The annual extract fixed for July 25, at Limsfield and Tithe had to be abandoned at the last moment owing to the sudden death of Mr. Romley Leveson-Gower. The Council regret that it was found impossible to arrange another such short notice, and hope to be able to hold one or more afternoon meetings during the coming summer, in addition to the annual excursion. Part 2 of Vol. 9 was issued to members in June last. The volume for the year 1890 is now in the printer's hands, and will be issued in due course. The Council hope to be able for the future to publish with regularity. During the year vacancies have occurred on the Council; the death of the Rev. J. M. Balthwate, M.A., Vicar of Croydon, and Lieut. Colonel Eustace Ansdon, Mr. John Clark Scott, F.S.A., has elected a member of the Council. The number of members now is 302. The reserve fund consists of 338*l.* 13s. 3d. The library continues to increase by exchange with societies in north and has also received several gifts from members. The Council has determined to proceed at once with a catalogue of the church plate of the county. The Rev. T. S. Cooper, M.A., of the hon. sec., and a small committee in the matter in hand, and are now engaged drawing up a circular to issue to the clergy. The Archbishop of Canterbury, the Bishops of Rochester and Winchester, and the Archdeacon of Surrey, Southwark, and Kingston-on-Thames have signified their approval of the scheme. The Council appeal to members for help, visiting the various districts, &c. Any member willing to assist are requested to communicate with the hon. sec.

Christ Church, Bristol.—The new organ gallery at Christ Church, Bristol, is to be decorated with a series of eight carved panels, four of these have just been fixed in position. One of them represents St. Cecilia seated at an organ, attended by St. Urban. This has been given to the church in memory of the late Rev. Benson. The other is a fine group, illustrating the Shepherds and the Herald Angel. This forms the centre or principal panel. The panels are the work of Mr. George Honghton of the Society of Bristol Sculptors.

PRICES CURRENT OF MATERIALS.

		TIMBER.		£. s. d.		£. s. d.	
Greenheart, B.C.	.....	ton	7	0	7	15	0
Teak, P.L.	.....	load	13	0	0	14	0
Squids, U.S.	.....	foot cubic	0	2	3	0	0
Ash, Canada.	.....	load	3	0	4	5	0
Birch	.....	.....	3	0	4	15	0
.....	.....	.....	3	10	0	15	0
.....	.....	.....	2	0	3	10	0
.....	.....	.....	2	10	0	10	0
.....	.....	.....	5	10	0	7	0
.....	.....	.....	2	10	0	14	0
.....	.....	.....	3	0	5	0	0
.....	.....	.....	4	10	0	5	10
.....	.....	.....	5	0	0	6	10
.....	.....	.....	0	0	0	0	0
.....	.....	.....	8	10	0	11	0
.....	.....	.....	7	0	0	8	0
.....	.....	.....	2	10	0	3	10
.....	.....	.....	11	0	14	0	0
.....	.....	.....	9	0	0	10	10
.....	.....	.....	9	0	0	10	0
.....	.....	.....	3	10	0	10	0
.....	.....	.....	9	0	0	17	0
.....	.....	.....	16	0	26	0	0
.....	.....	.....	11	0	17	0	0
.....	.....	.....	8	0	10	10	0

* The old Manor House, since pulled down, was found illustrated in the Builder, August 24, 1889.

Table listing various goods and their prices, including timber, iron, and other materials.

Table listing METALS (continued) with prices for various types of metal and their uses.

Table listing HESWALL and other construction-related items, including quantities and prices.

COMPETITIONS, CONTRACTS & PUBLIC APPOINTMENTS.

Table for COMPETITIONS section, listing Nature of Work, By whom Required, Premium, Designs to be delivered, and Page.

Table for CONTRACTS section, listing Nature of Work or Materials, By whom Required, Architect, Surveyor, or Engineer, Tenders to be delivered, and Page.

Table for PUBLIC APPOINTMENTS section, listing Nature of Appointment, By whom Advertised, Salary, Applications to be in, and Page.

Table for TENDERS section, listing various construction projects and their estimated costs.

Table for CHINGFORD section, listing works of sewerage and other local projects.

Table for EAST DERHAM section, listing works for the erection of a mortuary for the East Derham Local Board.

Table for LONDON section, listing various construction projects and their estimated costs.

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LONDON.—For alterations and additions to the "Earl of Warwick" public-house, Goltbourne-road, Westbourne Park, for Mr. Geo. Branson. Mr. E. E. Niblett, architect.

Table with 2 columns: Name and Amount. Includes Burman & Son, Ransom & Co., Spencer & Co.

Gasfitting.

Table with 2 columns: Name and Amount. Includes Morris.

LONDON.—For alterations and repairs at "The Rotherfield Arms," Shepperton-road, Islington, N., for Mr. B. P. Lucas. Mr. C. A. Legg, architect, 13, Crafston-street Mile-end.—

Table with 2 columns: Name and Amount. Includes F. Schroeder & Co., Shurmar, Anley, Pickford, Webbing (accepted), Chillingworth.

LONDON.—For additions to No. 31, Endell-street, St. Giles, for Mr. W. W. Langley. Mr. E. P. Loftus Brock, P.S.A., architect.—

Table with 2 columns: Name and Amount. Includes Patman & Fotheringham, Puzey & Lumley, Kynoch & Co., Matthew Scott.

LONDON.—For alterations to the "Bell" Tavern, High-street, Shoreditch, E.C., for Messrs. Garner & Leng. Mr. Joseph G. Needham, architect, 11, Powerscroft-road, Lower Clapton, N.—

Table with 2 columns: Name and Amount. Includes Walker Bros., J. Anley, G. Lusk, W. Kellaway, Mower & Son, A. Hood (accepted).

Gasfitting.

Table with 2 columns: Name and Amount. Includes J. Steadman (accepted).

LONDON.—For constructing about 160 ft. of 4 ft. by 2 ft. 6 in. brick sewer, in portion of Myddleton-street, for the Vestry of Clerkenwell. Mr. William Iron, surveyor.—

Table with 2 columns: Name and Amount. Includes G. Bell, Tottenham; Mowlem & Co., Westminster; J. Plazzy, Haringey; J. Dickson, St. Albans.

LONDON.—For laying out churchyard of St. James, Clerkenwell, as the public garden, and also for throwing part of the churchyard into the public way in St. James's walk, for the Vestry of Clerkenwell.—

Table with 2 columns: Name and Amount. Includes Mowlem & Co., Westminster; W. Benedict, Newington Butts; G. Bell, Tottenham.

LONDON.—For fitting-up shop, No. 22, Sloane-street, for Mr. L. M. Pearce.—

Table with 2 columns: Name and Amount. Includes Robert Eddie (accepted).

LONDON.—For alterations and additions, for Mr. Hart, 2, Settle-street, Commercial-road, E. Mr. Lewis Solomon, architect, 55, New Broad-street, E.C.—

Table with 2 columns: Name and Amount. Includes Lusk, Mile End; Triggs, Prescot-street; Roberts, Islington; Bramley, Stoke Newington.

ORPINGTON.—For additions and alterations to the Board Schools, Orpington, Kent, for the Orpington School Board. Mr. St. Pierre Harris, architect, 1, Basinghall-street, E.C. Quantities by Messrs. C. Stanger & Son, 21, Finsbury Pavement:—

Table with 2 columns: Name and Amount. Includes R. A. Lowe, G. Stevenson, Wm. Simms, R. Batley, M. Marsland, T. Knight, C. Satchell, D. Payne, D. Holt & Son, Akers & Co., Somerford & Son (accepted), A. & W. Garner, W. A. Grubb.

[This list was received too late for insertion last week.]

LONDON.—For rebuilding No. 85, Mansell-street, Aldgate. Mr. R. W. Hodden, architect. No quantities supplied:—

Table with 2 columns: Name and Amount. Includes Joselyne & Young, J. O. Richardson, A. Allard (accepted).

TWICKENHAM.—For constructing and fixing a carved pine fitment and cornice for drawing-room, and laying an oak parquet floor in same, for Major-General Bonus, The Cedars, Strawberry Hill. Mr. J. A. Stenhouse, architect:—

Table with 2 columns: Name and Amount. Includes C. Hindley & Sons (accepted).

WIMBLEDON.—For the erection of a steam laundry at Raynes Park, Wimbledon. Mr. M. Gray Ogden, architect, Wimbledon:—

Table with 2 columns: Name and Amount. Includes Monday, Wimbledon; Gibbard, Wimbledon; James, Wimbledon.

No senders' names.—Lists of tenders for works at Chislehurst, Richmond, Rushley Green, and Swanley, received without senders' names, are ineligible for insertion on that account.

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TO CORRESPONDENTS.

P. R. W.—A. W.—W. H. K.—Ignorance is not our business to answer idle questions. You seem to have chosen a suitable name de plume, at all events.—W. T. H. (your communication is an advertisement)—A. V. & H. Co. (we cannot publish tenders without amounts)—E. F. (such items are of no general interest, and it is necessary that there be such a title as "one iron beam"—R. S. (no space this week)—N. R. J. & S. (too late for this week)—E. H. (ditto).

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The Builder.

VOL. LVIII. No. 2453.

FRIDAY, MARCH 15, 1890.

ILLUSTRATIONS.

The New Lessing Theatre, Berlin: Front Elevation.—Herrn V. Hude and Hennicke, Architects.....	Double-Page Ink-Photo.
Section through Vestibule and Auditorium of the New Lessing Theatre, Berlin.....	Double-Page Ink-Photo.
Design for a Timber Octagonal Spire.—Mr. J. A. Pywell.....	Double-Page Photo-Litho.
Entrance Gate, Manor House, Cold Ashton, Gloucestershire.—Drawn by Mr. Mowbray A. Green.....	Single-Page Photo-Litho.
House, "Scatwell," Wargrave.—Mr. Arthur Ardron, Architect.....	Single-Page Photo-Litho.

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"Gothic Architecture."



O much has been said and written of late years on Gothic architecture, and so much done in its illustration, that it is perhaps hardly possible for a new writer to hope to draw attention to new disquisition on the subject except by being paradoxical. We do not quite make out whether Mr. C. H. Moore's book,* which dates from the (now) æsthetic shades of Cambridge, Massachusetts, and is published on both sides of the water, is intended more especially for English or for American readers. If for the latter, and if it be adopted as a text-book by them, it is rather a dangerous one, since it takes a very one-sided view of the subject. If it is intended for English readers, it can hardly be a success, for a great deal of the reasoning about Gothic architecture, which is put forth in the book with much solemnity and importance is so familiar in England now that it is almost a commonplace: and the greater part of what is new in the book will be at once recognised by English readers as, if not paradoxical, at least involving a curiously distorted representation of the facts in order to support an adopted theory.

We may admit at once that the book is both ably written and well illustrated, and that there is evidence of great pains and study having been given to its production. The author evidently writes for the most part from direct study and observation of the buildings referred to, and many of the excellent illustrative sketches with which it abounds are reproduced from his own drawings made on the spot. It is essentially a student's book, not one for the general public, who will not be likely (in this country at least) either to understand or care for the demonstrations and diagrams of various methods of vaulting and buttressing. It is perhaps as well they should not, for if a book like this became popular at Mudie's, we know very well that the paradoxical and heretical element in it is exactly what the general reader would lay hold of at once, and parrot

about everywhere. Architectural students are not liable to be carried away in the same manner.

The author appears to have laid out his book with the special object of showing that there is, properly speaking, no Gothic architecture at all out of France. In leading up to this position he goes into a demonstration of various critical views which may possibly be new to American readers, but are certainly not new in England. That the pointed arch is not an entirely essential element in the character of Gothic architecture has been long recognised, though it must still be held that its employment in place of the round arch constitutes so important a change in the architectural expression of a building as to justify the strong line of demarcation which was drawn by Rickman and succeeding classifiers of Gothic between the round-arched and the pointed periods. That France is the central home and birthplace of Gothic architecture has been also long admitted in this country. But Mr. Moore is satisfied with nothing less than denying the term "Gothic" to either English or German architecture, on grounds which have no doubt a show of logic as the writer puts them, but which show is mainly achieved by putting undue stress on a single element in architecture, and shutting the eyes to a number of others which, if they are none of them, perhaps, as important separately as the one which the author emphasises, are collectively of the highest importance in their coordinate effect upon style.

The proposition which Mr. Moore lays down is that Gothic architecture is essentially a system of building by equipoise, of reducing all the walls to the mere skeleton framework which is necessary to construction; of treating all this structural framework, architecturally, in such a manner as to express its function, and admitting no members into the architecture which do not form an expression of constructive function. In leading up to this conclusion the author goes through the old demonstration of the gradual development of the buttress system from the Roman through the Romanesque to the fully developed Gothic, much as it has been illustrated by other writers before him; his demonstration is clearly made, but contains no new point of any kind. The special point in his deduction is that, instead of regarding Gothic architecture as a special and recognisable artistic form of architectural design, he regards it only as consisting in a particular form of building, represented by the typical French cathedral.

It is, he tells the reader, a building in which the plan consists of a nave and side aisles, terminated eastwards either by a polygon or a semicircle around which the aisles are continued. "The vaults are furnished with a complete set of ribs—namely transverse ribs, diagonal ribs, and longitudinal ribs. These ribs are independent arches, of which the transverse and longitudinal ones are pointed, while the diagonals are usually round; and upon them the vault masonry rests—the one never being incorporated with the other. The ribs spring from slender shafts, compactly grouped, and often detached, though having their bases and capitals incorporated with the great piers which rise from the pavement, through the successive stories, to the nave cornice. . . . Upon the piers are concentrated all the side pressures of the vaults, but these side pressures are so neutralised by the buttressing that the piers require only to be massive enough to bear the weight of the vaults. The clearstory buttresses, which receive the thrust of the nave vaults, are reinforced by flying buttresses springing over the aisle roofs, and rising from the vast outer buttresses, which are incorporated with the respond piers of the aisles. The walls, required for enclosure only, are reduced to a minimum of thickness, and are confined to the ground story, and to the spandrels of the arcades."

These sentences form the salient portions of a series of definitions of Gothic architecture, of which we have not space to quote the whole. The author adds, "It will thus be seen that the full development of the Gothic system is brought out only where the plan of the building includes a central nave and side aisles." No doubt the full system of building by equipoise is only fully developed in such a building; and Mr. Moore adds, as will be seen above, that a Gothic building has a polygonal or semi-circular termination eastwards. That is to say, a Gothic building is a French cathedral; and we observe in fact that in another portion of the book the author distinctly asserts that Gothic is a church style only, and was only developed in ecclesiastical buildings, and apparently only in French ecclesiastical buildings, and of these, only in three-aisled buildings! The Sainte-Chapelle, he graciously admits, is Gothic as far as it goes, or at least such a building "may be" Gothic, but only in an inferior sense. Only by the use of the flying buttress, in connexion with that of the pointed arch in the ribs of the vault, "is

* Development and Character of Gothic Architecture. By Charles Herbert Moore. London and New York: Macmillan & Co., 1890.

the Gothic attenuation of supports rendered possible."

The plain meaning of all this is that the author has carried to excess an important principle in regard to the definition of architectural style, which was no doubt comparatively neglected and passed over by English architectural critics earlier in the century, viz.: that a true style demands the consistent carrying out and expression of one predominating principle of construction. It is true that this consistency of construction and of constructive expression is the most important element in style. But to select one form only of that construction, to ignore all others, and to ignore the whole combined effect of detail, general design, and feeling, in influencing and giving distinctive character to a style, is to carry this constructive logic to an absurd and unphilosophical excess. It reduces itself, in fact, merely to a readjustment of nomenclature. We have been accustomed to apply the term "Gothic" to a certain style of architecture prevalent over great part of Northern Europe during the Middle Ages, and the main characteristics of which, some of them capable of distinct definition, some of them rather felt by the perception than definable in words, are quite familiar to all who have paid any attention to architecture and architectural style. No one who has done so has any doubt as to the kind of architectural art represented to his intellectual perception under the term "Gothic architecture." Mr. Moore proposes to restrict this nomenclature from henceforth to one class of buildings, the construction of which shows the most complete carrying out of the constructive system of equipoise of weights. All the other innumerable buildings in which this system has not been carried out fully and on the same plan are not Gothic. Then what are they? We presume King's Chapel is architecture; architecture moreover of remarkable completeness and consistency of design. If it is not Gothic, what is it? Is Mr. Moore prepared with a new nomenclature? Or what is Cologne Cathedral? or the west front of Peterborough (a somewhat important architectural production)? Mr. Moore, self-satisfied and dogmatic as he is in his style of writing, can hardly expect that the world will allow him to sweep away these buildings, and Lichfield, and Lincoln, and Canterbury, and Salisbury, &c., &c., out of the category of architecture (Westminster we observe he gives a kind of grudging allowance to, because it resembles French work to some extent). Then what style are they?

Gothic architecture is the great antithesis to Greek in the history of the art. The absurdity of Mr. Moore's manner of reasoning and classifying as to style may be best shown by applying a similar logic to Greek architecture. Let us say, then, that Greek architecture is represented by a type of building of entirely trabeated construction, consisting of an oblong chamber called a *cella*, enclosed by solid walls, sometimes divided into two apartments by a cross wall; it is surrounded externally by a colonnade of columns standing free, and supporting also cross lintels from the wall of the *cella*, which carry a coffered ceiling, the whole forming a covered aisle round the exterior of the building, which is absolutely symmetrical in regard to its two sides. The whole combined width of the *cella* and the aisles is covered by a sloping roof in one span, the end of which forms a triangular framework for decorative sculpture at each extremity of the building. This is the only true and complete form of Greek architecture, which is essentially a temple architecture. Ergo, the Erechtheion and the monument of Lysicrates are not Greek architecture. One of them contains three compartments of different sizes irregularly tacked on to each other, and both of them exhibit engaged columns or pilasters. This is not a whit more one-sided or illogical than Mr. Moore's position as to Gothic architecture.

The fallacy in both cases consists in resting

the definition of style on some elements of a building and ignoring others which are of nearly equal importance. Greek architecture is a consistently trabeated style; Gothic architecture a consistently arched style. Those are the broad facts of the constructive basis of each. To this we may add the differentiation, in the case of Gothic, that it is a style in which the thrust of the arched roof is collected on certain points of the walls, forming buttresses, instead of thrusting against the whole length of a thick wall (for this gives a character to the whole architecture radically different from that of a barrel-vaulted building with continuous walls), and this involves the pointed arch, because only with the pointed arch can we practically carry out the vaulted roof. And the pointed arch being thus thrust upon us by practical necessity in one part of the building, we must employ it throughout in order to lay claim to completeness of style. Otherwise, and but for these practical difficulties with vaulting, we might have a building in all essentials of style purely Gothic, carried out with round arches throughout. Our author's further argument is that as the arch is a form of construction supported by abutments, and not exercising vertical pressure, the complete realisation of the system is only attained when the building is reduced entirely to a system of constructional frame-work of arches and abutments, any walls between these points being only walls of enclosure unconnected with, or at least not necessary to, the construction. This is true in a certain sense, no doubt; but two important considerations seem to have been overlooked. In the first place, it does not always follow that the most complete carrying out of a system to its logical conclusion produces the most satisfactory artistic result. As a matter of fact it has been questioned by architectural critics whose judgment is worth respect at all events, whether the system of reducing the piers to the smallest possible area and propping everything with a scaffolding of flying buttresses, which has been carried out so completely in many typical French cathedrals, is really consistent with the highest aims and the highest expression of architecture; whether it is not devoid of the repose, the calm, and the dignity which should characterise the highest class of architectural monuments; and if so, then it is a questionable credit to French Gothic to have carried out a system to its utmost logical development at the expense of monumental mass and solidity of expression. The other point that seems to have been overlooked is the importance of mouldings and ornamental details in characterising style. This is, of course, not so easy to define as a matter of construction; but it is not the less important on that account. As in the case of the Erechtheion above referred to, the mouldings and the style of ornament and the general feeling of the whole design connect a building with a certain recognised style, in spite of important differences in general plan and construction. In like manner an English Gothic church or cathedral, although not cut down to the lowest limit of pier area and not dependent on a scaffolding of flying buttresses, is nevertheless, in its general character and detail, a building in the same style as the French Cathedral; and it is really a *reductio ad absurdum* to say otherwise.

It must be observed also that while Mr. Moore is never tired of picking out the logical defects of English architecture, he appears completely blind to defects of logical design in French architecture. He quotes (in his illustrations) a bay of the Cathedral of Sens and the sections of piers determined by the intended plan of the vaulting, entirely ignoring the fact of the intermediate circular pier having no suggestion on plan of the transverse groins of the sextipartite vaulting, or the fact of the vaulting shaft for this beginning over again, with a new base of its own, from the abacus of the ground story cylindrical pier. This system of placing

little hases for the vaulting shafts on the abacus of the lower piers, which is more used in Early French Gothic than anywhere else, is in fact one of the most illogical and distinctly un-Gothic features in Early Gothic architecture; it entirely breaks the connection between the vaulting and the ground story, and it materially weakens the homogeneous character of the design; yet this the author passes over without reprobation, and even in silence, because it is a French defect. I think that Gothic architecture is only church architecture it is half amusing and half vexatious to see brought up again now after the great lights of the English Gothic revival had spent so much strenuous pleading in trying to convince people of the contrary. They perhaps carried their theory a little too far in claiming that Gothic was equally suitable for any form of building, and of course we know that all the great works of Gothic architecture as a matter of fact were churches; but we find refectories and hospitals built on the same principle; a pretty clear proof that the actual workers out of the style did not look on it as an exclusive church architecture: and this appears to us in fact, to be putting the accidental before the essential.

The only really new point we have noticed in the hook, besides the general and paradoxical view of Gothic of which we have been speaking, is Mr. Moore's suggestion (pages 6 & 7 *et seq.*) as to a reason for keeping the springing of the wall rib adjoining the clearstory windows much higher than the springing of the free vaulting ribs, thus producing that curious "ploughshare" form of vaulting in the severe between the wall-rib and the diagonal rib, with which we are all familiar. This has generally been regarded merely as a device for cutting out as much of the clearstory as possible into a window; but the author points out some examples, and illustrates one from St. Len d'Esseret, in which the window does not fill up the space within the wall-rib but there is a certain degree of wall-space between the vaulting rib and the jamb of the clearstory window. Mr. Moore's view is that the object of stilted the wall arch and thus cutting back and narrowing the severity of the vault, was to confine the pressure of the vault against the wall within a narrow space, and he ingeniously points out that in his sketch from St. Len d'Esseret the flying buttresses outside is seen shutting against the wall just at the level of this stilt of the wall-rib. There is certainly reason in this, and it is a very clever suggestion worth considering; though, when the author speaks rather contemptuously of Scott for not having perceived it, and for having said that the stilt was only done to make a larger window, we should like to have heard what Scott would have to adduce in reply, and whether he in his turn could not have brought forward examples to show that the theory was untenable. However, it is worth attention and Mr. Moore is to be thanked for it; it is new and ingenious, but we are not convinced of its truth. We may observe in regard to the example given, that though the window is smaller than the space left for it, the architects might have had in view, in stilted the wall-rib, the more harmonious effect of a line concentric with the main line of the window-arch. And we may also observe that if the explanation is really what Mr. Moore suggests, it must be accepted considerably at the expense of the logical character of his beloved Gothic style, in which the builders laid out on plan quadripartite or sextipartite vaults which they could not actually carry out on the spreading and symmetrical lines of the plan, from inability to get over a constructive danger.

The criticisms which Mr. Moore makes on English Gothic are in some cases valuable and interesting; but one cannot lose sight of the fact that the chapters devoted to it are almost one continuous string of fault-finding and of picking out, in various matters of detail, undoubted weaknesses of English Gothic and representing them as typical. To say that

the Early English capital is "rarely a capital of good profile" is nonsense; and to give such an example as fig. 146, as a typical one, is "saying the thing which is not." Of such a grand portal as Peterborough he has nothing to say except a passing allusion to it in mentioning one or two German churches with triple aisles of equal height, which he strongly condemns, and says the only parallel to it is the grouping at the west front of Peterborough, which is not a parallel case; while Bristol, which he does not seem to know, is one. The condemnation of the façade of Lincoln, on account of its not representing the three-aisled section in the rear of it, is a criticism to which there is another side. Lincoln façade is unfortunately a patchwork of different dates, and therefore as it stands is in some respects hardly a fair specimen of this method of treatment; but there is something to be said for the method, in spite of its falsity in one sense. This class of façade is really a great decorative "stop" to a form of section which it is exceedingly difficult to treat in a grandiose manner if frankly shown; and we do not know that it is to be by any means regarded as an incontrovertible architectural truth that a building with a nave and lean-to side-aisles should not have this awkward form masked by a decorative screen. We are disposed to think, at all events, that Lincoln west front is more effective as it is than it would be if treated *à la Pisa*, as the author thinks it ought to have been.

There is a good deal of very clever and even brilliant writing in this book, and those portions in which the author explains and illustrates special features of Gothic architecture, such as the vault, in the generally accepted manner and without trying to twist new theories out of them, have the merit of saying what the author's predecessors have said before, in a better, clearer, and more incisive way than many of them have attained to. But in its general scope the book seems to be a curious illustration of the admiration for things French, both social and artistic, which has of late years taken possession of the American mind, coupled with a desire to "take the shine out of the Britisher." No persons in the same line of business are so jealous of each other as relations; and the feeling seems to be that if Americans have no old cathedrals of their own to boast, it is at least desirable to let "the Britisher" know what poor concerns his really are, after all. Now the discreet Britisher is quite alive to the fact that France is the centre and birthplace of Gothic architecture, and that the great Gothic monuments of France are superior to ours in scale and in monumental expression, and in some respects in completeness of method. But we consider also that a great deal of English Gothic has an artistic beauty and refinement peculiar to itself in character, and which makes it superior to French work in some points, though it is inferior perhaps in more important ones. Of the author's blindness to these English characteristics it is sufficient to note that he has not a word to say about so graceful and characteristic an invention as fan-vaulting, or such a unique and complete work as King's Chapel; and, as before observed, passes over such a façade as Peterborough with an implied sneer. He is obviously an architectural student of no small ability and industry, and might have produced what would have been a typical text-book of its class on the subject of Gothic architecture. He has unfortunately spoiled the success of his own work by weighting it with paradox and prejudice.

Moscow.—According to the *Moskauer Deutsche Zeitung*, the sewage system of the town is to undergo a thorough re-organisation. In accordance to the wishes of the authorities, a scheme has been worked out by a committee consisting of five engineers of repute and one of the civic officials, and the plans are now to be laid before the representatives of the town for adoption.

THE MAINTENANCE OF COUNTY ROADS.

BY THE REV. E. ELMHIRST, J.P.*

READ with very great interest and with general approval an article in your publication of February 1, from the pen of Major-General Luard, R.E., treating of the various proposals for the future maintenance of county roads. Very properly General Luard lays great stress upon the fact that the condition of the roads in the counties surrounding the Metropolis is a matter of no small moment to the inhabitants of the Great City. Good roads, however, are of immense benefit to the entire community. And, looking at the general condition of roads in many parts of England, it would be, as the *Times* puts it, of the greatest benefit to this country, and most of all to the more remote and more unattractive parts, if the roads were all much improved, and rendered not only passable but even pleasurable to travellers. People are so accustomed to howl along without any other sensation than that of easy motion, that they cannot bear the perpetual discomfort and occasional peril of deep ruts and big stones. In the interest of society the whole country ought to be brought within the reach of every vehicle and every horse at all fit to be used. And that does not apply to carriages and horses of a certain description only, but also to all vehicles and horses. By having good roads the draught is reduced; and a less number of horses will do a given amount of work, thereby reducing the cost of the work, and saving damage to carriage, waggon, cart, and horse of the traveller, the farmer, and the general user of the road.

The necessity of good roads everywhere being undisputed, the next question is, "Under what system can we best ensure having them?" Turnpike trustees, through the agency of competent surveyors, and with funds collected from the users of the roads, were, in not very far remote times, responsible for the repairs. But since the abolition of toll-gates, on the expiration of the Turnpike Trusts, the several turnpike roads were at once repaired by the parishes through which they passed; they became main roads, or where Highway Districts were established were repaired by the Highway District Boards, aided by contribution from the County and the Consolidated Funds; but now they are under the direction of the County Councils in each county. The ordinary highways are repaired by the parishes in those counties wherein no Highway Districts have been established, or by the Highway District Boards where they are established under the present state of the law. Speaking of the ordinary highways, our only choice is between the old parochial system, where the roads are repaired by the parish surveyor, and the highway district system. The parochial system I once heard described by a former Member of Parliament for Leicestershire who had mastered the road question, and who, when it was proposed to dissolve a Highway District Board in this county, exclaimed, "Nobody would wish to return to that old, crude, dark, unlightened system, which was a curse to the roads of this county, and is still a curse to the roads of every county that remains under it."

Since the creation of County Councils the repair of the main roads is, by sec. 11, subsec. 4, under their direction. Every road in a county which is for the time being a main road, shall be wholly maintained and repaired by the Council of the county in which the road is situated, and such Council shall have the same powers as a Highway Board. And whenever District Councils shall be established, they may contract for the undertaking by the *District Council* of the maintenance of any main road, and if the County Council so require, the District Council shall undertake the same. I observe that the County Council of Kent propose to contract with Highway Authorities for the repair of

the main roads in the East Kent district, and with private firms for the repairs in the West Kent district. It may be well to adopt the plan, as far as the East Kent district is concerned, but we cannot say; the scheme has not had time for trial; but as to that for the West Kent district, if I might presume to say so, I have no confidence in it. The question also arises, Does the Act sanction such contracts with private firms? The County Council can contract with Highway Authorities or with District Councils whenever they shall be constituted; but can County Councils contract with "private firms" so as to come within the terms of the section? I have my doubts; but I will not discuss the point further; it would be unbecoming in me to call in question the action of my brother County Councillors of another county.

To go back to what I asked,—What is the system we have to resort to for the repair of the roads, main and ordinary? The parochial system is condemned. There is the other alternative, under the present law,—the "Highway District." On my preference for that I have on many former occasions, and in many ways,—by speech, by pamphlets, by periodical reports of the working of the system in my own county, Leicester,—and by my evidence before the Select Committee of the House of Lords on the Highway Acts,—spoken with no uncertain sound, and it would be wearisome to repeat it. Let me guard myself by saying, I have spoken always with an eye to the present law, but never contended that it was beyond amendment. I am now confronted by General Luard's proposed amendment, but it is too extensive to admit of a minute examination in the space you would be able to allot to me.

Not only has General Luard thrown out suggestions for an alteration in the Highways and Locomotives law, but the County Surveyor of Hertfordshire, Mr. Urban A. Smith, contributed a very sound and practical article upon the subject in the *County Council Magazine* of January in the present year.

These two proposed amendments in the law are worthy of close examination. They differ materially from one another. The General suggests the grouping, or "uniting the highway districts, even as the parishes have been united." Each Board to be represented on the County Roads Committee, or Board, which, in such case, would be composed partly of County Councillors and partly of *ex officio* delegates, in some cases the chosen representative of the Board being the Councillor for the district. The legislative distinction between main roads and ordinary roads no longer to exist. This was pointedly recognised by the Committee of the House of Lords in their Report on the Highway Acts in 1881, p. xxi., *if the proceeds of some local tax could be contributed by the county in aid of highway rates.*

Mr. Urban Smith, amongst other objections to the present state of the law, alludes to the Act of 1878, which provided that all the expenses incurred by a Highway Board in any parish should be deemed to be incurred for the common benefit of the whole district, and should be a charge upon the general district fund. Although, says he, the soundness of this provision appears unquestionable, the effect was that, whereas, prior to 1878, the majority of waywardens on a Board had no interest in opposing proper expenditure in any individual parish after the passing of the Act of 1878, they seemed to have felt that they had a direct interest in avoiding expenditure which must be met from the common fund. Mr. Smith goes on to observe that the only remedy for this state of things is to be found in having under one competent management an area sufficiently large to admit of an intelligent and uniform system being adopted—large enough to enable a proper staff to be employed; large enough to free the governing body from petty local influences; large enough to admit of machinery being employed where desirable; and large enough to secure as chief surveyor

* And Member of the County Council of Leicestershire.

an engineer possessing technical knowledge, administrative ability, and sufficient status to enable him to carry on his duties. The whole of the roads in the county, he maintains, would be far more easily and economically maintained by such a Board than by making the fruitless effort of getting at the desired result through the medium of District Boards and their surveyors. The system has to a certain extent been tested in Ireland, Scotland, South Wales, and the Isle of Wight, as well as under the French Government, and with general success.

A scheme of a similar character, though limited to the maintenance of main roads, has been recently submitted to the Highway Committee of the Leicestershire County Council by the County Surveyor; but as the repair of the main roads has been entrusted to the Highway Districts for the coming year, the scheme of the County Surveyor stands over for the time.

In any comments upon General Luard's schemes for the maintenance of county roads, it is necessary to bear in mind the present state of the law which limits the power of dealing with the two classes of roads,—namely the main and the ordinary roads. Were our hands clear to propound and adopt any scheme whatever that we might deem most advisable, our difficulties would be vastly diminished; but, as the law now stands, we are fettered by diversities of operations which stand in our way. We have the diverse system of the old parochial Highway Surveyor, the Highway District system, and the new County Council system, which latter authority at present deals only with main roads. I need not dwell on the almost obsolete parochial system, which must very shortly give way to a more enlightened one. I know that the Highway District system has its faults and its opponents; ostensibly in the charge that is brought against it, that by the Highways and Locomotives (Amendment) Act of 1878, all expenses incurred by a Highway Board in any parish are to be deemed to be incurred for the common benefit of the whole district, and be made a charge upon the general district fund. Although the soundness of this last-mentioned provision appears unquestionable the effect was (observes Mr. Urban Smith, the County Surveyor of Hertfordshire) that prior to 1878 the majority of waywardens on a Board had no interest in opposing proper expenditure in any individual parish; after the passing of the new Act they seem to have felt that they had a direct interest in avoiding expenditure which must be met from the common fund. This alteration in the law appears, says Mr. Smith, to have been a severe blow to the Highway Board system, and many districts have since been dissolved. The maladministration of the functions of Highway Boards has never, I am glad to say, been exhibited in the Highway Board of Lutterworth, with which I am connected, though I cannot dispute the impeachment elsewhere.

The institution of County Councils now forces itself upon our serious consideration, inasmuch as the entire control of the main roads has been taken out of the hands of the other two authorities above-mentioned, and it will be necessary to deal only with this last-constituted authority in the remarks which I have to make bearing upon the maintenance of main roads. Though the repair of the main roads is thus thrown upon the County Council, the prospect of the institution of District Councils at no distant time, and the want of special organisation for undertaking this important work, have induced the County Council to shift the burden of the work from their own shoulders, in some counties at least, and to request the highway authorities, who have hitherto performed the work, to continue to repair the main roads for a certain period,—in some instances a twelvemonth,—recouping the Highway Authorities the expenses incurred. The County Council of Leicestershire has adopted that course. In Gloucestershire, however, as stated by Sir John Dorrington,

Bart., M.P., and Chairman of the County Council, the Council undertook on "the appointed day" the administration of all the main roads in the county, and so far have every reason to be satisfied that their roads are as well maintained as in the past, and with the prospect,—almost the certainty,—of spending less by 6,000*l.* in the twelve months than was paid in the previous year to effect the same result. Sir John Dorrington informs us that nine other counties have taken the same course, either from the first, or more recently, and that many others are contemplating similar action. It would occupy too large a space in your columns to give a detail of the mode in which all appointments of officers and all expenses are managed; but these are very simple, and present no difficulty, being under the charge and control of the Highway Committee of the County Council.

General Luard, not approving of the scheme of the Committee for Roads and Bridges in Kent, which they had evolved for the future management of the main roads of the county, which they had laid before the Council of that county, and which consisted, as already observed, of two plans,—one for contracting with Highway Authorities, the other for contracting with private firms,—made certain suggestions in opposition to those plans; amongst them was one that "The Highway Boards of Kent be invited to form a Roads Union under the auspices of the County Council." These suggestions were not accepted by the Council, the Council probably having in view, according to the promise of the Local Government Board, the introduction at the earliest opportunity of the District Councils Bill. Passing on from the consideration of what has been done in some of the counties, in conformity with the law as at present in existence, I should like to glance at some of the suggestions which have been made by General Luard, by Mr. Urban Smith and others, for an alteration of the law as regards all roads, both main and ordinary highways.

I will preface their suggestions by declaring that, in my opinion, there comes in now a very wide question upon the subject of the roads. Has not the time arrived for reviewing the present state of the law, and for calling upon the legislature to amend the various enactments connected with the highways? Is it not time that the recommendation of the Select Committee of the House of Lords on Highway Acts in the Session of 1881 should be adopted, and relief given in the terms of their report, which runs thus:—"In view of the great hardship complained of by ratepayers of the charge of half the cost of the main roads upon the county rate fund under the existing system, the Committee are of opinion that it is desirable to abolish the distinction between main roads, as defined by the Act of 1878, and ordinary highways." In the event of this taking place, the proceeds of some local tax, apportioned according to the mileage of roads, might be contributed by the county in aid of the highway rates. In the promised District Council Measure it is to be hoped that provision will be made for undertaking the repair, not only of main roads, but also of all ordinary roads. The distinction, as General Luard remarks, is one which has always proved exceedingly difficult to define, and the necessity for it, at all events, no longer exists.

Royal Marylebone Theatre.—This house, together with Nos. 67 and 69, Chureb-street, Paddington, will be put up for sale by auction, at the Mart, on Thursday, the 27th instant. Lately known as the "Royal Alfred," this once popular place of resort was opened as a "penny house" in 1842, but was enlarged in 1854. It is distinguished by the unusual depth of its stage, and covering an area of 9,000 sq. ft., superficial, accommodates an audience of 2,000 persons. The premises are held for a term, whereof thirty-one years are yet unexpired, and are let at a present rental of 988*l.*, which will shortly be raised to 1,040*l.* per annum.

NOTES.



THE important discussion on Mr. Slater's paper, at the last meeting of the Institute of Architects, which was kept technically "private," and of which therefore we gave no report, is now in the hands of members of the Institute, and those who were not present at the meeting will probably agree, on reading the discussion, that it was well that the unwise and rather reckless proposition to send a copy of this *mélange* of differing opinions to the County Council, as a spur to their interests in building legislation, was quashed. We can imagine nothing less likely either to promote the cause of a wise reform in building legislation, or to contribute to the dignity and status of the Institute of British Architects, than to send before the County Council a report of a meeting the general result of which would be to show that there were many differences of opinion on the subject among members, and which included no definite proposition or resolution as the expression of the meeting. If the Institute of Architects wish, as no doubt they ought to wish, to influence in what they believe to be the right direction any impending reform in building legislation, they should crystallise the result of their deliberations on the subject into definite propositions representing the opinion of the majority of a meeting formally adopted and put on record. If they wish to be heard with respect by the London County Council, let them exhibit to that body their unanimity, and not their differences. But in regard to any chance of wise and effectual Parliamentary reform in building legislation, there is one very important consideration to be borne in mind, *viz.*, that it is no use whatever to come before Parliament with a Bill for improvement and codification of the existing building law combined. Any attempt to do so would result in debates which only further complicate and entangle the whole subject,—

"And find no end, in wandering mazes lost."
What is necessary is first to get such separate improvements in detail passed as are necessary, as new subsidiary Acts. Then, and not till then, will be the time to come before Parliament and say "the existing building legislation is now good in itself, but inconveniently dispersed through a number of various enactments: these represent what we want; now codify these." That is the only way to set about a permanent and satisfactory settlement of building legislation.

THE anticipations expressed by the counsel for the railway companies, that their evidence at the Board of Trade inquiry might be made use of for other purposes, has very soon been realised,—though not exactly in the manner they apprehended, or, indeed, to their prejudice. At the recent conference between the coalowners and their employés, held for the purpose of discussing the wages question, the men, as is well known, pressed for a 10 per cent. advance on the strength of the increased charges for coal. "The price paid by the public is the barometer which indicates the prices," urged the men. "House-coal represents but a small proportion of the output," replied the masters. "The bulk of the coal is disposed of to gasworks and railway companies, and is subject to long contracts." Upon this the men appealed to the evidence given by Mr. Findlay, who had stated at the Board of Trade inquiry that the London and North-Western Railway were paying 20 to 30 per cent. increase upon their coal; while Mr. Shaw had stated that the Lancashire and Yorkshire would have to pay an advance of 4*s.* 4*d.* a ton upon their new contracts. On the other hand, the evidence of Welsh colliery proprietors might have been quoted. It was stated that in many cases the Welsh collieries were worked at an absolute loss, it being remarked that the railway companies always charged their full maximum rates unless they had a purpose of their own to serve by adopting a different policy.

This evidence, however, had not been given at the time the conference was held. Mr. Jeune, Q.C., is representing the coal-owners before the Board of Trade, and he also alluded to this part of the railway case. He considers that the companies are so protected by the contract system that they should not be given such a margin for contingencies as that to which they lay claim. He suggests that in the event of anything quite unexpected happening, the proper course would be for them to go to Parliament and make out a case. The companies doubtless consider that they are before Parliament now, and that they are, at considerable expense, making out a case now, in order to provide for "the unexpected," without having to go all over the ground again at some future time. Lord Balfour and Mr. Courtenay Boyle are getting well furnished with figures; too well, probably, for, as far as figures go, each side has made out an exceedingly strong case.

THE scheme for the amalgamation of the South-Eastern and London, Chatham, and Dover Railways, which is aired periodically, has received a severe check,—if not a death-blow. A circular was recently sent to the proprietors of the former company by Messrs. Arthur Anderson & Co., setting forth the desirability of such an amalgamation; upon which a letter was addressed by the South-Eastern Secretary to the London, Chatham, and Dover Board, the greater part of which was taken up,—to use the words of the *Times*,—with the amenities which usually appear in correspondence between these companies. It contained, however, among other matters, a definite suggestion as to arbitration upon the Continental agreements between the two companies, which have long been a source of contention. The adoption of these proposals, it was urged, "would remove the friction which must continually recur while the common fund is depleted by competition, and would at the same time smooth the way for any complete fusion of receipts which might be deemed in accordance with public policy." A reply has just been sent to the proposals, which, so far from being accepted, are spoken of by the London, Chatham, and Dover Board as being utterly impracticable and impossible of attainment. The Continental agreement alluded to, works, presumably, in their favour,—indeed, the decisions of the Law Courts point in this direction,—and they decline most emphatically to submit to its revision. The letter is anything but a "soft answer," and the relations between these two southern lines will not have been at all improved by this attempt,—if it can really be so described,—to arrive at an understanding.

VERY interesting and important report has been made by Mr. St. John Hope to the Corporation of Leeds in regard to the state of the ruins of Kirkstall Abbey, of which the Corporation are the custodians. Mr. Hope finds various parts of the building in a condition in which they require attention and repair in order to prevent further decay and downfall. The principal repairs recommended in the report are these: The walls of the presbytery, which are decayed in the upper part by percolation of water, should be carefully pointed. The gable is falling outwards and should be under-pinned. The tower has nothing to support it on the north side, and the slightest failure or a violent gale might bring it down. Mr. Hope thinks the only thing that can be done is to rebuild the fallen pier and arches, and the wall above, so far as to afford an efficient buttress to the tower. "The old stones might be used as far as they will go, and the deficiency made up with new, only roughly hewn into form, so as to mark it as a modern repair." The clearstory of the nave should be freed from ivy, and the aisle walls pointed to prevent further percolation of water. The report goes very fully into the condition of the ruins of the conventual buildings and the steps desirable to be taken to prevent them becoming further dilapidated. The whole report forms an in-

teresting and valuable record of the present state of Kirkstall. The work suggested may cost some money no doubt to carry out, but we do not suppose the Corporation of Leeds will grudge that. If they do, however, they might apply to Lord Grimthorpe, who will be willing, very likely, to remove the present ruins and build a brand new and superior abbey from his own design, or that of his builder.

A LETTER from Dr. Waldstein to the Roman correspondent of the *Times* (March 6) gives some very valuable further information as to the important discoveries made last year at Lykosura in Arcadia, by Mr. Kabbadias; discoveries, it will be remembered, we commented on last October. A considerable proportion of the sculptures have now been transported—no easy matter—from Arcadia to the Central Museum at Athens, where, though they are not yet exposed to the public view, Dr. Waldstein has inspected them. The temple excavated was dedicated to Despoina (Persephone), and we may remind our readers that Pausanias describes in detail the great cultus statue, or, rather, group of four statues, that stood within it. He says, "The images of the goddesses Despoina and Demeter, and the throne on which they are seated, and the footstool below their feet, are all of one and the same stone, and neither any portion of the drapery nor the decorations are fixed or clamped in, but the whole is one block. And this stone was not brought from a distance, but was dug up in the precinct, in accordance with a dream, and each of the images is about the size of the image of the Mother at Athens, and they are the work of Damophon. Demeter carries a torch in her right hand, and she has laid her other hand on Despoina; and Despoina holds a sceptre, and has on her knees what is called a cista, and this she holds with her right hand. And on one side of the throne near Demeter stands Artemis, wearing the skin of a deer, and a quiver on her shoulders, and in one hand she holds a torch, in the other two snakes; by Artemis is a hunting dog; and near the image of Despoina stands Anytos, represented as a man in armour." Pausanias proceeds to tell the story of Anytos. With the help of this full description, it is confidently hoped that the main composition of the whole group may be completely restored. It is scarcely possible to over-estimate the importance of the discovery. As Dr. Waldstein points out, we have here for the first time "an original *agalma*—a genuine temple statue of a good Greek period, which we can identify with a noted local artist, Damophon of Messene, who flourished about the middle of the fifth century B.C. "What most struck me," he adds, "were some large fragments of drapery belonging to the colossal figures. The folding is beautifully free, and one piece is decorated with figures of Niké and Tritons, in very flat relief, reminding one of gold *repoussé* work. There is one still larger fragment with flowers, worked in similar relief. There can be no doubt that all this class of work is a reminiscence of the gold and ivory statuary carried over to the marble work of the fourth century." Wholly in the dark as we are on the chryselephantine technique, and without hope of the recovery of a single fragment, this echo of it is simply invaluable.

THE first issue of the *Corpus* of ancient sarcophagi reliefs is promised almost immediately, and its publication will mark a distinct epoch in archaeological method. The corpus of reliefs is to be one of a series of works undertaken by the German Archaeological Institute, in which all salient examples of particular classes of antiquities are to be published collectively. Gerhard's work on Etruscan mirrors was the prototype of the series, but his example was for many years not followed. What has long been done systematically for inscriptions must be done for certain branches of sculpture, for terra-cottas, for vases, &c. Until it is done, archaeologists can not be said

to have their material in manageable form. The first series is, according to a too prevalent German custom, the second volume of the whole publication. It is to deal with such sarcophagi as represent complete mythological cycles. The volume is to be edited by Dr. Carl Robert, whose name is a sufficient guarantee for the brilliancy as well as thoroughness of the text. It is to consist of 222 pages of text, 65 whole plates, partly copper, partly heliotype according to the subject, and 293 smaller cuts in the text. This volume is to be followed at no long intervals by five others, embodying the reliefs that treat of "Daily life" of "Individual myths of the Bacchic cycle," the "Maæss, Nereids and Eroses," and "Decorative subjects." We hope there will be some arrangement by which the volumes (225 marks each) can be had separately.

TWO drawings—exterior and interior views—are now on view at St. Saviour's Church, Southwark, showing the proposed new nave, as designed by Sir Arthur Blomfield. It is to be of seven bays, with aisles and clearstory, the lines both of exterior and interior following pretty closely those of the existing choir. There is a south porch projecting but slightly beyond the aisle walls, and at the outer angles of the west end are two bold octagonal turrets carried up clear of the aisle parapets, and terminating in conical lead roofs. Lancets occur throughout the design, single lights in the clearstory and aisles, and a triplet at the west end. The two western bays of the nave are emphasised by a larger column and an arch spanning the centre aisle, and dividing them from the other five. We are informed that this feature occurred in the old nave, and it serves to break the long lines of the church, although not apparently placed for any structural purpose. The whole scheme is an attempt to bring the appearance of the church back to what it was in the thirteenth century, and if there is a lack of originality, the result will certainly be dignified, and make St. Saviour's one of the finest of the London churches. It is calculated that about 50,000*l.* is necessary for its proper completion, of which a little over 20,000*l.* has been already subscribed.

THE Society of Antiquaries issue a circular stating that they are endeavouring to found a "Research Fund" by raising a capital the interest of which should from time to time be applied towards the expense of excavations on ancient sites, "or in such other methods of advancing archaeological knowledge as the President and Council of the Society may think fit." The Society consider that a capital of 3,000*l.* would enable them to do much useful work; and towards this they are already able to announce subscriptions to the amount of 1,750*l.* We hope they will receive every support, even to a far greater extent than the 3,000*l.* spoken of, for the idea is an excellent one, and would do something towards supplying help which is often much wanted and vainly looked for towards the prosecution of researches of the highest interest in archaeology, and of course our enlightened Government is too wide-awake to "practical" considerations to assist in such schemes. As an example we may call attention to the appeal made in a letter from Mr. Penrose in another column, for assistance in illustrating the Byzantine antiquities of Greece. If the Society of Antiquaries Fund were formed and in operation this would be almost an ideal case for assistance.

AN interesting paper was read before the Geological Society on Wednesday last by Mr. W. Whitaker, F.R.S., of the Geological Survey, in which the author described certain irregularities in the occurrence of superficial deposits in the eastern counties, which have seriously interfered with the calculation of the depth of projected wells. It appears that a series of superficial clays, sands, and gravels lies in a valley

on the chalk, and a line of wells has been sunk into them, in some cases to 200 ft. or 300 ft. without reaching the chalk. This great thickness of superficial deposits is very unusual, and there is nothing at the surface to indicate the circumstance. The chalk comes to the surface only a few hundred feet off, and under ordinary conditions the well-sinkers might reasonably have expected to reach the chalk at less than 60 ft. or so. It seems that a ravine has been cut by natural agencies through the chalk, which ravine was subsequently filled up by the superficial deposits in question. It is an excellent illustration of the difficulty sometimes experienced in accurately estimating the thickness of strata to be passed through in well-boring, though fortunately the phenomenon does not often occur.

THE annual Schinkel Competition for the medallion and travelling studentship, the highest honour attainable in Germany by competition, has been won by Herr "Regierungs-Bauführer" T. Boethke, who is at present on the staff of a well-known Government Bureau at Leipsic. The subject (a Royal College for Music on the Lützow Platz, Berlin), although as interesting a one as any architect could wish for, only enticed two competitors to send in designs, and of these two, one was a mere absurdity. Herr Boethke's, on the contrary (although it shows some mistakes in the planning and little originality in the design), may be termed an excellent, as well as exceedingly laborious, piece of work for so young a member of the profession. The elevations are in a strict Palladian renaissance; the planning, which has been worked out on academical lines, shows that the author was well acquainted with the plans of the new Concert House at Leipsic, and those of the new Imperial Law Courts which are being built in the same town.

THE vacant place of "Dombaumeister" at Strasburg has already been filled up, Herr Franz Schmidt, of Cologne, having been elected to hold this very responsible post. We here find the somewhat rare occurrence of a master being chosen to take the place of his former pupil. August Hartel had worked under Herr Franz Schmidt from 1863—1868, at the time when the latter artist was occupied with his great publication of the Cologne Cathedral; and it was really during this period that the then young architect, thanks to the kind advice and directions of his "chef," formed that sound basis of knowledge of German Gothic which afterwards brought him so much fame. The new "Dombaumeister" (who has already reached his sixtieth year) is well known in German architectural circles, and is considered to be one of the leading Gothic architects of Prussia, his occupation at Cologne being the only cause of his name not having such publicity as that of his pupil.

AN interesting description is given in a foreign contemporary (*Dingler's Polytechnisches Journal*, vol. cclxvii, p. 194) of a chimney built on loose soil; thus rendering a light structure necessary. From the foundation four upright, and somewhat tapering, lattice girders were carried up, and connected together by cross-bracing. On the inner edge of the frame thus formed the chimney proper was built of tiles, about 5 in. in thickness, and having lap-joints. Angle iron bands were introduced at intervals to bind the whole firmly together. The total height of the chimney is 140 ft., and the inside diameter 8 ft. 6 in. The total weight is 543 tons; which gives a pressure of 17 lb. per square inch on the foundation. This would be about equal to half the weight and pressure per square inch of an ordinary chimney. The whole chimney was erected in thirty-nine days, the iron work occupying thirty-one days of the time. The cost is set down at 19,200 f., and it is estimated that a brick

chimney of the same height and size would have cost 14,300 f.

IN the Transactions of the Institution of Civil Engineers (Vol. xcii.) are some particulars of tests made by two American experimenters, Messrs. W. R. Nichols and J. K. Russell, to ascertain the action of water on galvanised iron pipes, such as are fitted for the Boston (Mass.) water service. It is generally possible to detect zinc in water which has passed through any considerable length of zinc-coated pipe; but it has been thought that the quantity in suspension as a hydro-carbonate, or in solution, is too small to be an objection from a sanitary point of view. Messrs. Nichols and Russell's experiments were made with a length of 39 ft. of $\frac{1}{2}$ -in. galvanised pipe, connected in such a manner that water could be introduced into the pipe to displace that which had been already standing there, but without allowing air to enter. Zinc was found, in solution and suspension, whenever the water had stood in the pipes from seven to seventy hours. Water that had remained in the pipe for several days did not contain zinc in solution in greater proportion than for shorter periods, but the quantity of zinc in suspension was augmented. The water held in solution was 0.3 to 0.6 parts of zinc per 100,000 parts of water, and in suspension from 1.5 to 2 parts per 100,000 parts of water; or 0.3 grain per gallon in solution, and 1.0 grain per gallon in suspension. In water in regular flow no zinc was discovered.

THE Duke of Newcastle's Workop Manor estate, in Nottinghamshire, will be offered for sale by auction in the course of the ensuing season. This freehold property, extending over some 6,000 acres, to be divided into lots, lies in Bassetlaw wapentake, at the northern side of Sherwood Forest. The existing manor house stands on high ground, in a finely-timbered park of about 200 acres; to the south is a range of hills, known as Manor Woods. The sale will include the Lodge (312 acres), Shireoaks Park (368 acres), twenty farms, with houses and homesteads, pasture ground, some building land adjoining the town, together with Workop and Shireoaks Manors, and the market dues and tolls of Workop itself. The manor, held in turn by the De Lovetots, the Furnivals, the Talbots, Earls of Shrewsbury, and the Howards, Dukes of Norfolk, was sold in 1843 by Henry, thirteenth Duke of Norfolk, for, it is said, 380,000 l. to the Duke of Newcastle; and the manor-house was afterwards partially dismantled. The Priory Church, strictly speaking of Radford, was founded, 3 Henry I., by William de Lovetot, for some Augustine Canons, and dedicated to St. Mary the Virgin. Its present dedication to St. Mary and St. Uthbert reminds us that De Lovetot had taken the parish church for his priory and that the parishioners, as at Crowland, Ely, Ripon, and elsewhere, subsequently enjoyed for their own use its western portion. The church is conspicuous for its two western and large central towers and long nave of ten bays, cruelly restored about thirty-five years ago. Its architectural features are described in the letterpress to a two-page illustration, published in the *Builder* on July 14, 1888, of Messrs. Carpenter & Ingelow's design for rehabilitating the fabric eastwards of the central tower.

STAINED glass will shortly be fixed in the west window of Chesterfield church. It has been executed by Messrs. Heaton, Butler, & Bayne, and consists of large figure subjects from the Life of Joshua. The window itself is of seven lights, but the glass has been treated pictorially, and the subjects extend across three of the lights on either side, the centre being occupied by a figure of Moses on Mount Sinai. There are a large number of figures, and the general effect, although fine in colour, and the figures in many cases powerfully drawn, is somewhat crowded, and it is doubtful whether a more conventional and decorative treatment would not have been more suitable.

AS will be seen in our lists of "Tenders" printed last week, Mr. Rowland Plunbe has been engaged by the Governors to make plans for some extensive alterations and additions to the London Hospital. This hospital represents the "London Infirmary," originally established in the year 1740, at a large house in Prescot-street, Whitechapel. In 1758 the hospital was incorporated, and shortly afterwards removed to its present premises in Whitechapel-road, just eastwards of "the Mount." The Mount derived its name from having been formerly the situation of one of the numerous forts upon the environment of earthworks that were thrown up around London in the winter of 1642-3, the King's headquarters being then at Oxford. This particular fort they called the Horn-work, or Mill Mount, as standing close to the mill in Whitechapel-road. It lay on the curtain between two other forts on the east side of London,—one at the Hill by the northern end of Brick-lane, another in Old Gravel-lane, Ratcliff (St. George's-in-the-East). Mount-street, Grosvenor-square, commemorates the site and name of "Oliver's Mount," upon the same line of circumvallation; hard by stood another, having four bastions, where is now Hamilton-place, Piccadilly. Some suppose that Castle,—renamed four years ago Farnival,—street, was so styled from the fort which was constructed in Holborn.

MR. CHAMBERLAIN affords us the latest example of the necessity under which those who are termed "public men" seem now to feel placed, of talking about art on some occasion or other. They are not all, however, as amusing as he is. The spectacle of Mr. Chamberlain solemnly explaining to the Birmingham Jewellers' and Silversmiths' Association that the ancient jewellers' art of Egypt and Greece was "not barbarous or savage" is as good as anything we have come across for some time back. We sincerely hope it will not escape the notice of *Punch*. No.: if Mr. Chamberlain had wanted to give an illustration of "barbarous and savage" goldsmiths' art he could have referred his hearers to some examples of their own native manufacture, which have managed on some pretext to get exposed in the cases of the Birmingham Art Gallery. We observe Mr. Chamberlain in his speech always spoke of jewellers' work as a "trade"; like the manufacture of screws, we presume. In Birmingham no doubt jewellery is a trade; in Greece it was an art; and that makes all the difference.

THE PROPOSED BLACKWALL TUNNEL.

THE question of constructing a tunnel or tunnels beneath the Thames at Blackwall, for the accommodation of vehicular and pedestrian traffic between the right and left banks of the Thames is an exceedingly difficult one, and the London County Council are acting wisely in giving careful consideration to the subject. It will be remembered that it was upon this question that, very nearly a year ago, the "appointed day" for the extinction of the Metropolitan Board of Works was accelerated by some ten days, the late Board having, in its last week of existence, accepted a tender, amounting to 318,340 l., for the construction of a footway tunnel only at this part of the river, the proposed footway tunnel being intended as the preliminary and trial portion of the complete tunnel scheme, which included, besides this footway tunnel, two larger tunnels for vehicular traffic. The then newly-elected body, the London County Council, which was about to take over the government of London from the Metropolitan Board of Works, objected, and rightly so, to be saddled by their predecessors with so heavy a responsibility as the tunnel scheme involved, just as they were entering upon office, and before they had had time to consider the project, and their objection gained additional weight from the fact that the designer of the tunnel, Sir Joseph Bazalgette, the Engineer to the Board, had resigned his appointment, and would not supervise the construction of the tunnel.

That some permanent means of crossing the river at or near this point ought to be provided,

* See *Builder*, March 8, 1890.

if possible, seems very clear. The Select Committee of the House of Commons on Thames Communications below London-bridge, appointed in 1884, reported in favour of a bridge near the Tower (now being constructed by the Corporation of London), a bridge or tunnel at Shadwell, and a tunnel at Blackwall. The Metropolitan Board of Works, in 1886, determined to obtain power to construct a tunnel at Blackwall.

It was to its determination to commit its successors to this scheme that the late Metropolitan Board of Works owed its somewhat premature decease as a body corporate, under the circumstances already referred to. Defenders of the Board's conduct in that matter were not wanting at the time. The Board, they said, had given years of consideration to the subject, and had come to their resolution on the advice of their Engineer, the practicability of whose project was testified to by other eminent engineers who were examined by the House of Commons Committee on the Thames Tunnel (Blackwall) Bill, which became an Act in 1887. Having obtained their Act, the Board considered themselves bound to proceed with the works, in fulfilment of pledges given to the local authorities of the eastern and south-eastern portions of London. There was, of course, a great deal to be said for that view of the situation, and we hope that if it should now be determined to proceed with the tunnel, the results will be such as to justify the action of the late Board, and even to realise the hope, expressed by some of its admirers, that its action in this matter would "keep its memory green."

When the London County Council entered upon office, the Bridges Committee was charged with the consideration of the late Board's Blackwall Tunnel scheme, and at the meeting of the Council on April 11 last year they presented a report stating that they had had under consideration the subject of the formation of the proposed foot-tunnel at Blackwall, for which a tender amounting to 318,840*l.* (including approaches), was accepted by the late Metropolitan Board; and had also considered as to the construction of the two tunnels for vehicular traffic, which, together with the foot-tunnel, were estimated to cost about 1,500,000*l.* The Committee had also submitted to them a scheme for a single tunnel of sufficient dimensions to accommodate two lines of vehicles and foot-passengers, and an estimate of the cost, amounting to about 1,200,000*l.* The Committee thought it desirable that the Council should have an independent opinion upon the relative merits of these two schemes. They therefore recommended:—

"That the reports, plans, specifications, and estimates of the three tunnels authorised by the Thames Tunnel (Blackwall) Act, 1887, together with the scheme for a single tunnel to accommodate two lines of vehicles and foot-passengers, be referred to an eminent engineer for examination and report."

This was agreed to, although not without an attempt to further shelve the question by the advocates of a ferry.

At the meeting of the Council on June 22 last, the Bridges Committee reported that they had proceeded upon the resolution of the Council of May 7, instructing them to take into consideration the report of the Committee appointed by the House of Commons in 1884, expressing the opinion that three means of communication were absolutely necessary east of London Bridge, viz., a bridge at or near the Tower, a tunnel at Shadwell, and a tunnel at Blackwall, and to advise the Council which of the latter should be first constructed. The Committee, in considering the matter, had had regard to the fact that an Act of Parliament had been obtained for the construction of a tunnel at Blackwall, and that contracts had been entered into and purchases completed for property required for the approaches amounting, approximately, to 150,000*l.* The Committee recommended:—

"That the Blackwall tunnel take precedence of all other schemes of trans-communication, and that the Committee be instructed to consider the other schemes proposed, with a view of reporting as to their probable cost, and as to the order in point of time in which they shall be proceeded with."

This recommendation was agreed to.

Subsequently, at a meeting of the Council held on July 2 last, it was resolved, on the recommendation of the Bridges Committee, that Mr. Wolfe Barry be retained to advise the Council upon the scheme for the construction of the proposed tunnel or tunnels.

Mr. Wolfe Barry's report to the Bridges

Committee is now before us. The reference to Mr. Barry recited the following among other particulars:—The Act of 1887 authorised the late Metropolitan Board of Works to construct a tunnel at this part of the river; it also allowed the Board to make the tunnel, if they thought fit, by either two or three separate borings, so that the tunnel might consist either of two separate and parallel tunnels for vehicular and foot traffic, or of two separate tunnels for vehicular traffic and a third for foot traffic. The size of the two tunnels for vehicular traffic was 23 ft. internal diameter, and the foot passenger tunnel was to be 15 ft. internal diameter, and to have a headway of 10 ft. The Parliamentary estimate for that portion of one footway and the two carriage tunnels, which would be constructed under compressed air, was 768,000*l.*, and the total estimate was 1,124,000*l.* for works. The estimate laid before Parliament for the whole of the scheme, including the purchase of property, was 1,568,200*l.* Towards the end of 1888 the Board invited tenders for the construction of a footway tunnel of cast-iron lined with brickwork, with approaches thereto on both sides of the river, partly in tunnel and partly in cut and cover and open cutting. Two tenders only were received,—one from Messrs. S. Pearson & Son, amounting to 354,513*l.*, and one from Mr. W. Webster, amounting to 357,601*l.* The engineer's estimate was 280,000*l.* As the lowest of these tenders was so greatly in excess of the Engineer's estimate, the Board resolved to re-advertise for tenders, and to omit the words, in clause 21 of the specification, to the effect that the contractor would not be allowed an extra charge for any modifications in the method adopted. The result was that three tenders only were sent in, viz., Messrs. Kirk & Randall, 348,212*l.* 3*s.*; Mr. W. Webster and M. Coisean, 327,745*l.*; and Messrs. S. Pearson & Son, 318,840*l.* The London County Council, upon taking over the duties of the late Board, declined to confirm the acceptance of the tender for the construction of the pedestrian tunnel, and the Bridges Committee directed the [acting] Engineer to submit to them sketch-drawings and an estimate for a tunnel which would accommodate two lines of vehicles and foot passengers. He recommended that the tunnel should be 22 ft. in diameter, and constructed within 5 ft. of the bed of the river. The method proposed for constructing this tunnel was the same as that proposed for the 15 ft. pedestrian tunnel. The total length of the subway, with its approaches, was nearly three miles, of which 10,734 ft. would be constructed upon the surface or by open excavations. The Engineer's estimate for the 22 ft. combined vehicular and pedestrian tunnel was 1,113,000*l.* The Bridges Committee asked Mr. Barry to advise them (1) as to the practicability of the schemes as set out; (2) as to the most economical way to provide for the traffic, i.e. one or more tunnels, and the dimensions he would recommend to be adopted, having regard to (a) first cost of construction, and (b) cost of maintenance, including lighting, draining, ventilating, and safeguarding by police; (3) as to drawing the specification in such a form as to provide for two prices,—one for undertaking the whole of the work and risk connected with the execution of the contract, and the other for the execution of the contract with the provision of a certain sum for pumping, such sum to be increased or lessened upon the certificate of the Engineer, as the necessity for greater or less expenditure in pumping might arise; and (4) generally.

Mr. Wolfe Barry, in his report, says, as to the practicability of the schemes set out in the terms of reference, that the nature of the soil below the bed of the river has been to some extent ascertained by borings which have been made at various points on each side of the river, and at four places in the bed of the river itself. The nature of the soil, consisting as it does of alternate bands of clay and sand, is anything but favourable to tunnelling operations, and contrasts very greatly in this respect with the impervious stratum of London clay through which tunnels have been made near London Bridge. Mr. Wolfe Barry goes on to say that there are very few examples of tunnels constructed through water-bearing strata such as exist at Blackwall. There is, of course, the well-known example of the old Thames Tunnel, which extraordinary engineering work was constructed before the days of the pneumatic system of construction. A large part of the Thames Tunnel was made through ground superior to that at Blackwall. Another well-known example

is the partially-completed double tunnel under the Hudson River. This work, constructed on the pneumatic system, but without a shield, is not nearer to the bed of the river than from 12 ft. to 15 ft. The Severn and Morsey tunnels, so far as construction is concerned, are not cases in point, as the rock through which they pass is so widely different from the soil under the Thames at Blackwall that the use of any pneumatic system was unnecessary. The Tower Subway and the City and Southwark Subway, being wholly in the impervious London clay, were made without difficulty, and without the use of any special appliances.

We quote the next two paragraphs of Mr. Wolfe Barry's report *in extenso*:—

"It is clear that at Blackwall, tunnelling by the pneumatic system is the only plan which promises success. There are numerous examples of the success of this system in the sinking of the foundations of piers, but in considering its application to a tunnel, this important difference has to be borne in mind, viz., that when working in a vertical direction, as in the case of cylinder or caissons for bridge piers, the external and internal pressures are approximately equal over the whole of the surface of ground exposed, whereas in tunnelling horizontally under water or through pervious strata, the external pressure of water will be considerably greater at the bottom of the tunnel than at the top. The pressure of air must of course be at least equal to the highest external pressure, and there is thus a great tendency for the air-pressure within the work to escape along the line of least resistance, that is, from near the top of the tunnel. The result of any such sudden escape is what is known as a 'blow,' when the air issues from the tunnel faster than the pumps can supply it; the water, as a consequence, rushes into the tunnel, and carries with it large quantities of soil. Thus any large exposure of surface in constructing a tunnel gives rise to difficulties and dangers, and these considerations point to the necessity for a shield which will not only limit the surface exposed at any one time, but which also can be so arranged that the air-pressure in its various divisions can be graduated to the external pressure opposite each division. The designs submitted to me in connexion with the footway tunnel contemplate the employment of such a shield as would render these precautions possible."

The details of the best shield require much anxious thought, and the most advantageous design will probably not be arrived at except after a certain amount of experiment; but I am of opinion that an efficient shield can be designed and constructed, under which larger tunnels than those already designed for the Metropolitan Board of Works can be carried out."

Mr. Wolfe Barry then proceeds to consider in detail the two proposals of the footway tunnel and the tunnel for combined vehicular and foot traffic. As to the smaller or footway tunnel, he considers that a tunnel of this nature is practicable, "considered as an engineering work," but he thinks that some important modifications of the proposed shield would be necessary. He is also of opinion that the top of the extrados of the arch should not be nearer to the bed of the river when dredged than 10 ft.; any less depth would, he thinks, give rise to greatly-increased difficulties of construction, and would be a source of serious danger to the tunnel when finished. Of course, depressing the tunnel will increase the gradients. Mr. Wolfe Barry also is of opinion that the larger tunnel which had been suggested by the acting Engineer of the Council is practicable as an engineering work, but he does not think that it would satisfactorily accommodate the traffic. He believes that a tunnel large enough for vehicular traffic can be made which will accommodate the footway traffic without serious addition to the size which is necessary for vehicular traffic alone.

As to the second head of the terms of reference, the most economical way of providing for the traffic, whether by the construction of one or more tunnels, Mr. Wolfe Barry says that this question is governed by the question of the design of a successful shield. If that be conceded, he thinks that one large tunnel would not be dearer in first cost than two smaller and independent tunnels, while in other respects it has great advantages. He considers that any

* It has been pointed out in the course of the discussion that the further extremity of the City and Southwark Subway has been constructed at Stockwell through water and gravel, the pneumatic shield being used.

roadway of the length of the tunnel and its approaches, which is only wide enough for two lines of heavy traffic, will not be satisfactory, and that provision should be made for one line of passing traffic in addition to two lines of slow traffic. All things considered, he recommends under the second head a tunnel circular in cross section, with an internal diameter of 31 ft. This would provide a roadway 22 ft. wide between the kerbs, with a headway of 15 ft. over the whole roadway, being a space of 2 ft. 3 in. on each side between the wheels and the kerbs for carriages and others, and to prevent the walls from being touched by loads. The foot traffic could be accommodated in an upper gallery suspended from the roof, and would have a width of 12 ft., with a height of 8 ft. in the centre, and there would be space on either side of the roadway for ventilating purposes, and for pipes, telegraph cables, &c. An alternative to this arrangement would be a tunnel also circular in cross section, but with a gallery below the roadway for foot-passengers.

On the third head of the reference to him, Mr. Wolfe Barry reports that he is inclined to think that there might be an advantage in drawing the specification in the alternative way, so as to provide for two prices, as suggested.

Lastly, under the head "generally," Mr. Wolfe Barry discusses, as alternatives to the proposed tunnel, a steam-ferry and a high-level bridge. He thinks that possibly a really good and convenient ferry, which would cost a small sum compared with a tunnel or bridge, might sufficiently accommodate the traffic for some years. A tunnel or bridge must of necessity occupy some years in construction; a ferry could, however, be set to work quickly in the meantime, and while the larger work was being matured and executed it would guide the Council as to the proper amount of accommodation to be provided, and as to the capital which could with propriety be expended on a tunnel or bridge. Any proposal for a high-level bridge would, he considers, involve raising the traffic by hydraulic lifts. There would, however, Mr. Wolfe Barry says, be no difficulty in so arranging these lifts that no delay would occur. On the whole, he sums up in favour of a high-level bridge rather than a tunnel.

The consideration of the subject is now before the Council, the greater part of two sittings having been already devoted to it. As we reported in the *Builder* for the 1st inst., the Bridges Committee, having considered Mr. Wolfe Barry's report, recommended—

"That the Council do proceed with the formation of the tunnel authorised by the Thames Tunnel (Blackwall) Act, 1837."

"That the Bridges Committee be authorised to nominate an engineer of experience in tunnelling with a pneumatic shield, to prepare the necessary plans and specifications for carrying out the works, exhibiting the whole to the Council."

To these recommendations Mr. Arthur Arnold moved an amendment as follows:—

"That the Council doth disagree with the recommendations of the Committee, and is of opinion that the report of Mr. Barry should be adopted so far as it is opposed to the construction of a tunnel at Blackwall, and that the best efforts of the Council should be directed to providing such other means of communication as may appear most desirable."

So far as the debate on the subject has yet proceeded, opinions seem to be pretty evenly divided between tunnel and ferry, while the idea of a high-level bridge seems to be generally regarded as inadmissible. But we do not quite gather from the latest report of the Bridges Committee, published by us a fortnight ago, nor from the speech of the Chairman of the Committee, in moving that report, whether the Committee are in favour of three tunnels, as proposed by Sir Joseph Bazalgette, or one tunnel to accommodate all traffic, as proposed by Mr. Wolfe Barry. It seems now to be the intention of the Bridges Committee to leave this an open question until the "engineer of experience in tunnelling with a pneumatic shield" whom they propose to appoint to prepare the working drawings and specifications advises them as to the best course to pursue. In their report as first presented to the Council on February 11 (see *Builder*, February 15, p. 119) they recommended

"That the Council do proceed with the formation of the tunnel authorised by the Thames Tunnel (Blackwall) Act, 1837,—namely, by three lines of borings, one being for foot passengers and the other two for vehicular traffic."

It will be noticed that in their recommen-

dation now before the Council the Committee have deleted the words which we have here put in italics.

Mr. Walter Hunter, J.P., who is himself an engineer and a member of the County Council, has issued a pamphlet commenting on Mr. Wolfe Barry's report. He is strongly in favour of the construction of the tunnel, and cites the opinions of Sir Frederick Bramwell, Sir Benjamin Baker, Mr. Henry Law, and other eminent engineers, as to the perfect practicability of the work. He also appends a letter from M. Coiseau, of Antwerp, who constructed the foundations of the Forth Bridge, and who has also constructed works under the Scheidt. M. Coiseau is so confident as to the practicability of executing the tunnel by the compressed air method that he last year, in conjunction with Mr. Webster, submitted a tender for the construction of one of the tunnels. Mr. Hunter and the other supporters of the tunnel project urge that if a communication is to be made across the Thames at Blackwall, it must be of a permanent and non-intermittent character, and must not interfere with the shipping. The tunnel scheme, they contend, is the only one which fulfils all these conditions. A ferry at this point, they urge, would be liable to interruption for days together by fog,* and would be at all times a serious danger and hindrance to the ships constantly passing in and out of the East India Docks.

On the other hand, the advocates of a ferry, among whom is Mr. J. G. Rhodes, point with some force to the success of the Woolwich Ferry, and lay great stress upon the uncertainty of the cost of the tunnel. They contend that, all things considered, the ferry will be amply sufficient to accommodate the traffic. The first cost of a ferry will, of course, be much less than that of a tunnel, but the yearly cost of working and maintenance will probably be as great or greater than the yearly cost of maintaining the tunnel—including, of course, interest on capital sunk.

A great many able speeches have been delivered on both sides, and the debate was to be resumed on Friday afternoon, March 14.

A FEW NOTES CONCERNING ANCIENT SEDILIA, PISCINE, AND AUMBRY'S.

ANCIENT sedilia are generally found on the south side of the chancel. These seats for the officiating clergy are most frequently recessed into the wall, and present a beautiful variety of treatment, some of them having rich canopies over them ornamented with crockets and finials. In most instances they are not more than three in number, though there are sometimes four or five of them, and occasionally only one or two. Most frequently they graduate in height eastwards; but are also to be found on the same level, especially when there are only two, as at Wolsey, in Leicestershire. Occasionally the sill of the south-eastern window forms the sedilia, as in St. Martin's Church, Brasted, in Kent. In some instances they are made to represent stone chairs, as in St. Michael's Church, Spennithorne, in Yorkshire, where the seat is wide enough for two priests, and there is a lower bench for another. These stone chairs are made with or without arms, and they are always placed in the position usually occupied by recessed seats, and we may be sure that when there are no traces of either sedilia or stone seats for the officiating clergy, there must once have been substitutes made of wood.

There is a single simple sedile in the south chancel wall of Chalk Church, in Kent. Adjoining it is the piscina. Both have trefoiled headings, whereof the two outer labels, which follow the same contour, are finished with rosettes, and the central terminal, which serves for both, takes the form of a mask. The piscina has a shelf, and the drain is in the centre of a scooped bracket which projects from the wall, and is supported on the head of a cherub. There is a single one, too, at St. Mary's, Dennington, Suffolk. In Maidstone Church the sedilia are quintupled.

In some of the ruins of ecclesiastical buildings that form such picturesque additions to many of our loveliest landscapes, we come upon sedilia open to the sky, of course, and fringed with ivy and other creeping plants; and set as they are in a background com-

* In regard to this point, we may observe that the ferry traffic between Liverpool and Birkenhead, across a much wider river, is never allowed to be interrupted by fog, though of course the transit is slower.

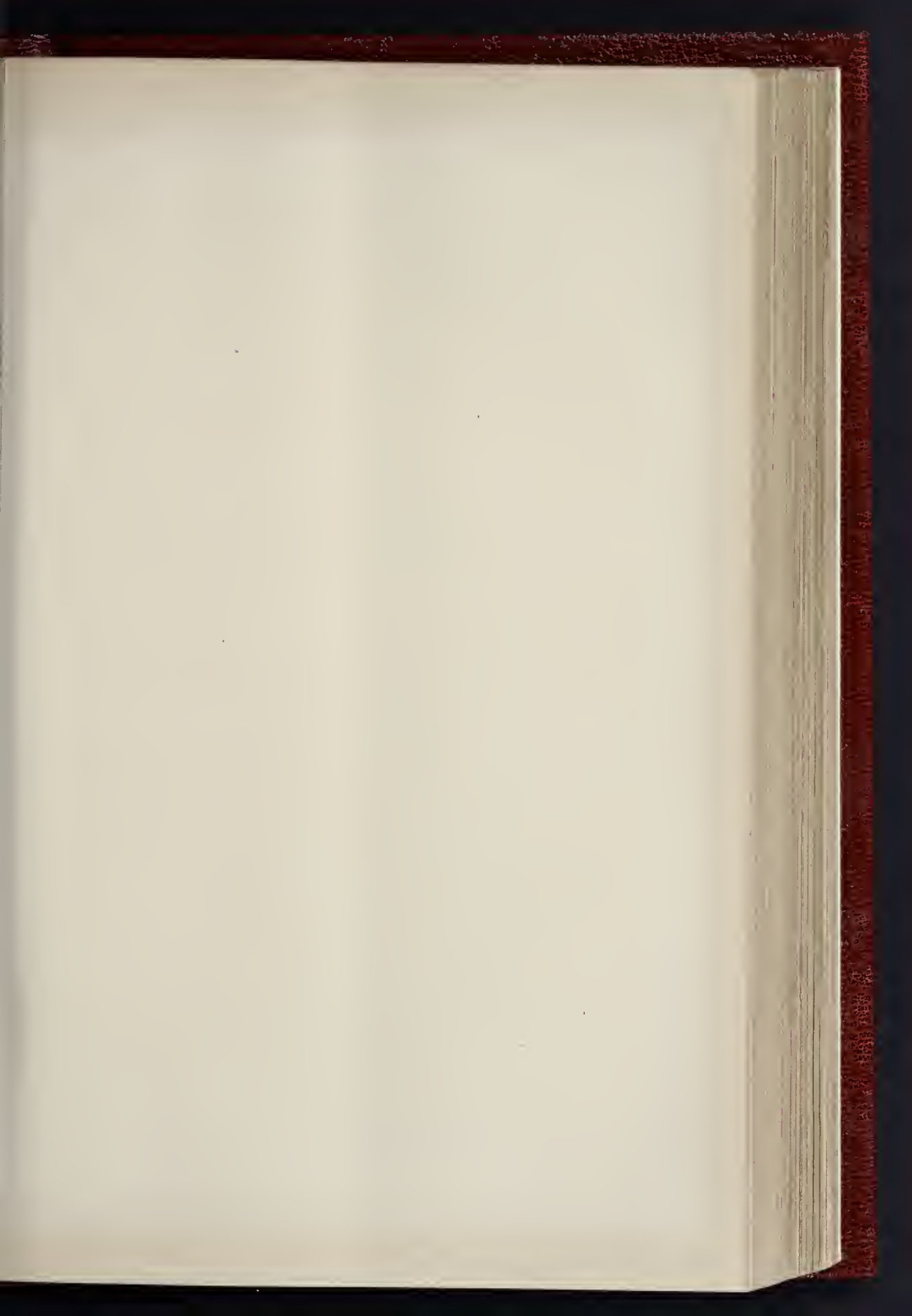
posed of the rest of the remains, consummate arches, pillars, traceried windows, and reticent doorways, they hold their own in the matter of interest. There is a ruined priory church standing on a knoll on the banks of the Alse, in Northumberland. Close by, on the other side of the river, is a mound, said to resemble Mount Carmel, though it is all heather, bracken, boulders, mosses, and ferns up to its breezy summit. There is a wide, strong, mellow curtain wall, with projecting battlements at the angles running round the piece of table-land on the head of this knoll, and within this enclosure lies the ruined priory. There is a strong tower in it, built by one of the ancient Percies for its protection, that is still whole and sound, even to its topmost stage, in which is a charming oriel looking over to the Carmel like mound across the river; but the monastery buildings are bare to the great canopy that covers all things. And crossing the grassy floors, in which is a dark, sunken tomb-hall here and there, we come upon the graceful sedilia, empty, silent, and windworn, but truly an exquisite and pathetic memorial.

These features are to be found in most counties. They are to be seen in the northern district that William the Conqueror gave to Robert de Uffville, on condition that he would keep it free from wolves and thieves, in Eldon Church, where, on the floor, may yet be seen the talons of Robert aforesaid. They are to be seen down in the Devonshire valleys, in several Cheshire churches, in Cambridgeshire, Buckinghamshire, Huntingdonshire, Gloucestershire, Bedfordshire, and, in short, in most counties, east and west. In Lincolnshire, especially, there are sedilia of the finest workmanship in nearly every church. Cornwall, however, appears to have disregarded them, and to have but few piscines. In different parts of the kingdom there are about half-a-dozen examples of a larger and plainer recess on the western side of the sedilia which may have been the bare bases of seats, or thrones, used only in grand ceremonials, when they may have been decorated for the occasions for which they were intended. In the church of St. Mary, Great Sampford, in Essex, besides three sedilia in the side of the chancel, there are eleven stone seats on each side of the chancel.

There are a few ancient churches in which we do not find a piscina or more than one. It was a necessary appendage to the altar in old times, and those churches that had more than one altar were furnished with more than one piscina. It has been noticed they were frequently double till the thirteenth century, when an alteration was made in an item of the service that made single piscines the rule after that date. There is an example of a triple piscina in Holy Trinity Church, Rothwell, Northamptonshire. They were nearly always placed in the south wall of the chancel, or of the aisle in which an altar was provided. The exceptions to this rule are rare. One occurs, though, in Rochester Cathedral; and another in Ditchling Church, Sussex, where they may be seen on the north side.

The most general form of a piscina is that of a small low niche, or recess, in the wall, with a shallow bowl-like base, in which is the orifice of the drain that carries off the water used in rinsing the chalice; and sometimes the drain runs down a shaft or column. Occasionally they are furnished with a shelf, which is supposed to have been used either as a credence table or as a place on which to place the cruet. The openings were finished according to the taste of the day, either plain or with columns and arches that were plain or foliated. Trefoiled piscines are, perhaps, the most common. There is one in a small Early English church at Leshury, in Northumberland, where the tall, alert, narrow, lofty arches in the nave and small window-openings are testimonies to Plantagenet masons. In the chancel, opposite to an old tombstone embedded in the north wall setting forth the memory of a vicar who lived to be more than a hundred years old in the seventh century, is the trefoil opening in question. Cinc-folled and sept-folled piscines also occur, and where there is no foliation we may sometimes find the encompassing arch of an earlier workmanship, and decorated with ball-flower and other ornament.

There is a piscina in the east wall of the south aisle of Alnwick Church. From a lingering tradition, which calls the east window of this aisle the Mary window, we may conclude there was once an altar here dedicated to the Virgin.

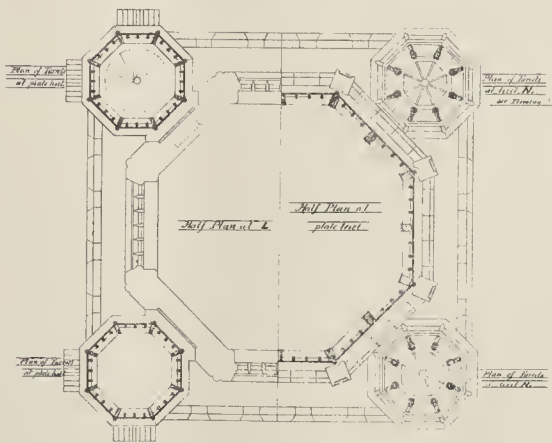
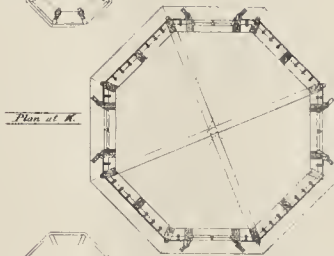
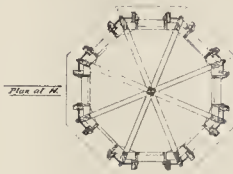
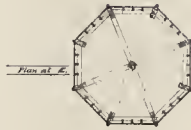




Medal of Merit: R.I.B.A., 1890.

GRISSELL Medal Competition.
 Design for a timber octagonal spire
 By W. J. G. Pywell.

Transverse Section



forms. One of the most interesting of these archaic gems was one in the British Museum, which represented the conflict of Herakles and Nereus as it was to be seen on the frieze of Assos. The gem was no doubt rude in comparison with the frieze, and possibly was a good deal older; but the conception was the same, and we might fairly argue that both gem and frieze belonged to an artistic period or movement in which the Greek genius, with its true love of human form and heroic legend, was beginning to assert its supremacy over the influence of the East, to which it had owed its first instruction. During such a movement we could easily conceive that artists employed on public monuments or temples would not stand on their dignity as superior to the engravers of gems or the painters of vases; a common bond would unite them all. Indeed, we knew from actual tradition that the greatest of the early sculptors, Theodoros, was at the same time a gem-engraver. He also was a native of Asia Minor, and possibly was a contemporary of the sculptor of Assos. Both the frieze and the metopes of Assos were sculptured in low relief, and were, so far, true to the archaic influence of Assyria, with its vast array of sculptures in low relief. For the frieze that was necessary, but it seemed curious to us now, with our knowledge of later Greek art, to find that the height of the relief was not increased in the metopes. Probably it was thought that as the metopes were so close to the frieze, any noticeable change would have produced an inharmonious effect. But more likely it was force of artistic tradition that determined the point. In any case, it was well for the early sculptors of Greece to keep to the known methods of low relief until they felt themselves to be sufficiently masters of the technicalities of their art. The legendary subjects on the frieze referred to the exploits of the national Greek hero Herakles. The lecturer concluded his reference to the temple of Assos by saying that it was a temple in which metopes and frieze were curiously associated together, as if in one of those experiments which were inevitable in early times of art and architecture. In point of date we had not far to go to find another interesting exception to the general rule previously mentioned, though in point of distance we had to pass from the coast of Asia Minor, in the East, to the Island of Sicily, in the West. In Sicily the town of Selinus had been founded by Greek colonists. It lasted a comparatively short period, but during that period it had raised three temples, the ruins of which had survived to our times. Of these temples it was the oldest that interested us most, because of the fact that its only sculptured decorations consisted of metopes. The pediments were empty, and it had no frieze. Very probably this was no more than incompleteness. The original intention might have been to fill the pediments at least, if not also to sculpture the frieze. Pressure in other directions might have delayed the work until the destruction of the town by the Carthagenians made an end of all hopes. Of the metopes of the temple, three were found nearly complete, and they are now in the museum at Palermo. They were found by two Englishmen, and, through their good offices, casts of them were obtained for the British Museum. The subject of one of them was Perseus, backed by Athene, cutting off the head of the Gorgon Medusa. From a technical point of view these metopes of Selinus suggested a comparison with the reliefs of Assos, but while the latter were sculptured in low flat relief, the metopes of Selinus were in one sense in very high relief, and yet in another sense in very low relief; in other words, they stood out far from the background, but were not modelled with a full roundness reaching down to the background. On the contrary, they were modelled only on the surface, and it was kept flat. Wherever masses of shadow fell on the background it had merely the effect of blackness, and had little or no relation to the actual forms of the figures. In the metope of Perseus and Medusa there was very little background seen, and no doubt the desire of the sculptor throughout was to cover his space with his design, although that was not always possible. Proceeding to speak of the metopes of the Parthenon, the lecturer said there were ninety-two of them. A considerable number still remained on the building in their original places, but most of them had

suffered severely from weather and other causes,—so much so that often the very subject which they were intended to represent could not be made out. Others were destroyed in the course of the Venetian bombardment in the seventeenth century. Those that were best preserved in the early part of the present century were removed by Lord Elgin to the British Museum. There was a difference in style among these. Some of them reminded us in some measure of the metopes of Selinus, inasmuch as the relief, though it projected well from the background, was yet made to present, as far as possible, a flat surface to the front. There was an avoidance of strongly-rounded forms wherever it was possible to avoid or to minimise them. For instance, the drapery which fell between the Centaur and the Lapith, who was snub on his knees, might easily have been left out or forced back; but it was allowed to fill in the space, and thus to help out the desire of the sculptor to obtain as great as possible an extent of flat surface to the front. It was a mode of treatment which would be natural in the frieze of the Partheon, which was kept throughout in very flat relief. In the other variety of metope from the Parthenon, the sculptor had aimed at an opposite effect. He had sought the utmost degree of roundness and projection. Having referred to the presence in certain of the metopes of the Temple of Zeus at Olympia, of small drilled holes in places where the sculpture projects most, the use of which he was unable to conjecture (nor could he endorse Prof. Petersen's view that the holes had been made to contain sharp metal spikes to protect the sculptures from the birds), the lecturer described the metopes and friezes of the Thesalon at Athens, and, in his concluding remarks, said: "Pheidias and his contemporaries were able to startle the Greeks by the splendour of their conceptions and the magnificence of their ideas. Would that their works could startle us, and, making us forget the limitations of time and tradition under which they necessarily laboured, force us always to remember that the sculptures they have left us are an inheritance no less worthy of admiration than the great literature of Greek poetry and prose which has descended to our time, and in descending has had more to do in the fashioning of public spirit and character than almost any other element in our natures."

COMPETITIONS.

Asylum Buildings, near Dorchester.—The competition for additional asylum buildings at Charminster, near Dorchester, which was advertised last November by the Asylums Committee of the Dorset County Council, has resulted in sixteen sets of designs being sent in. Mr. C. H. Howell, the Consulting Architect of the Lunacy Commissioners, was appointed the assessor, and awarded the first premium to Mr. George T. Hine, of Nottingham, and the second to Messrs. Giles & Gough, of London. The Committee have confirmed the award of the assessor, and commissioned Mr. Hine to carry out the work. The present asylum accommodates 320 patients, and the new buildings will give accommodation for 400 more, together with a new administrative department, a large recreation hall, a detached church in the grounds, new laundry buildings, and various alterations to the old asylum. The total cost is estimated at from 40,000l. to 50,000l. Mr. Hine is the architect for the new asylum now being erected at Claybury, in Essex, for the London County Council, of which a view and plans were published in the *Builder* for Nov. 23 last.

Grant Monument, New York.—The result of "the international competition for a monument in honour of General Grant" has at last been published, after the designs have been in the hands of the promoters rather longer than seemed reasonable. Although the jury do not consider any of the competitors' designs suitable for erection, five prizes have been distributed. Of these the first has fallen to Messrs. Cluss & Schulz, of Washington; the second to T. P. Rinn, of Boston; the third to Messrs. Hartel & Neckelmann, of Leipzig; and the fourth and fifth to Herr Schweinfurth, of Boston, and Mr. H. A. Gribble, of London, respectively. We see that German members of the profession have taken the honours of the first, third, and fourth prizes.

Proposed Minister's House, Borough Synagogue, S.E.—A considerable number of drawings were received in this competition. The Committee called in a professional assessor to

assist them in coming to a decision. Acting on his advice the design submitted by Mr. Sidney G. Goss, A.R.I.B.A., of London, was adopted. Mr. Goss has been instructed to prepare the necessary working drawings and obtain tenders for the work as soon as possible.

Illustrations.

THE NEW LESSING THEATRE AT BERLIN.

THE new Lessing Theatre, the private property of Dr. O. Blumenthal, was completed in September, 1888, having taken barely a year to erect. Eleven hundred seats have been planned in the building, and standing-room for some sixty people has been arranged for. Of the 1,100 seats, 128 have been placed in the orchestra and side boxes of the parquet, and room has been found for 430 on the main floor of the house. The 542 seats remaining have been placed on two tiers, 214 on the first, and 328 on the second; and the standing-room has been partly allowed for in the pit, partly also in the second tier, the back places of which are priced the lowest.

The structure is almost entirely of a fireproof nature, wood having only been used for the stage flooring, the box partitions, and the lathing of the cupola. Most of the floors are vaulted in, the few exceptions being constructed in sheet iron. All the staircases are of freestone and have very easy ascents. On the proscenium side of the building four staircases have been planned, two for each tier, and each of these has not only the advantage of being in close connexion with the chief lobby, but at the same time the far greater one of leading directly into the open. The total width of the exit doors for the audience shows a figure of 14.50 metres, hence giving one metre exit width to eighty visitors. The main corridor running at the back of the boxes has a width of 4.30 metres, and, besides the very sufficient room for refreshment and cloak-room purposes, a foyer with a superficial area of nearly 150 square metres, and with its floor only 4.60 metres above street level, has been planned, thus making a crush in case of a panic nearly impossible.

The stage measures 20 metres by 18 metres, and is opening towards the audience has a width of 20 metres to a height of 7.50 metres. This opening can be closed, within seven seconds, by an iron curtain, working on a very simple system. The large fine over the stage has a superficial area of 16 square metres, or about $\frac{1}{2}$ of the stage floor. All scenic and technical apparatus is of the most modern date, and high-pressure hydrants command the whole of this part of the house.

The building, which has been designed by Messrs. v. der Hude and T. Hennicke (in conformity to the former building regulations), covers 2,300 square metres of the site, and has cost the proprietors 1,018,000 marks, or nearly 750,000l.

DESIGN FOR SPIRE.

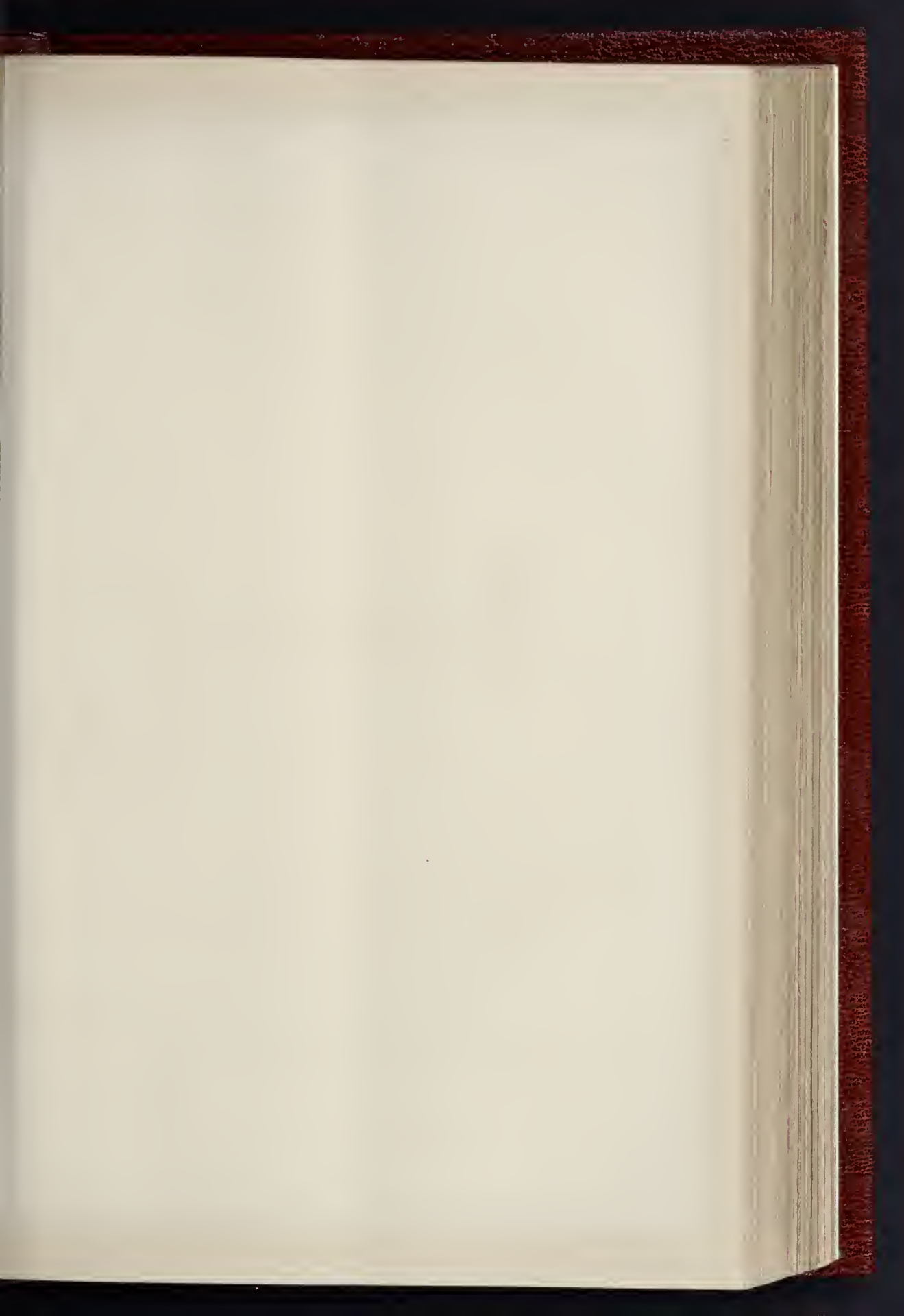
This design, by Mr. J. A. Pywell, was awarded a Medal of Merit in the Grissell Competition of the Royal Institute of British Architects, and is for a timber octagonal spire to be covered with lead and with angle-turrets at or near the base.

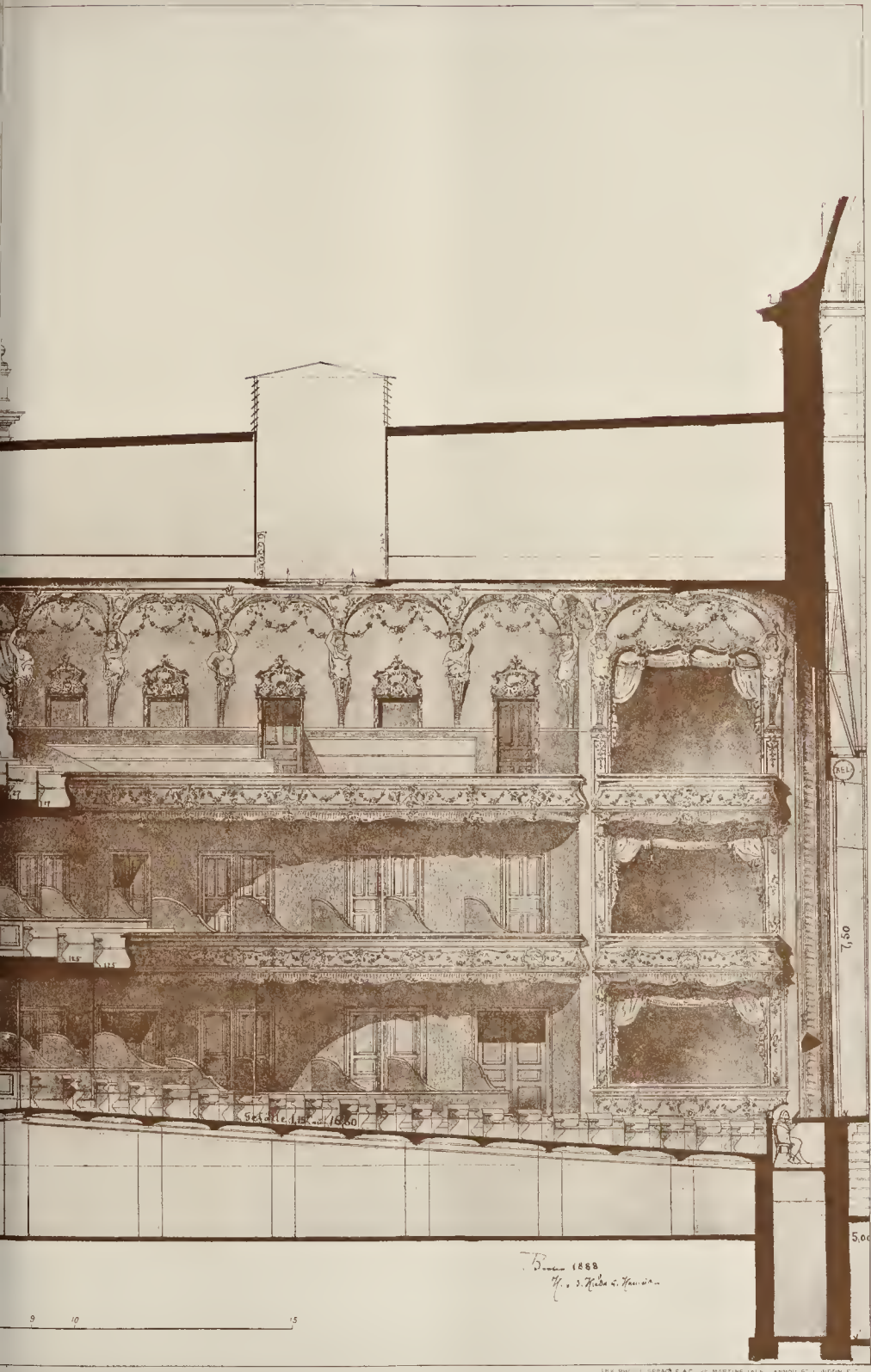
ENTRANCE GATE, MANOR HOUSE, COLD ASHTON.

This gateway forms the entrance to the Manor House at Cold Ashton, or Cold Easton, so called from its exposed situation, and is of the early part of the seventeenth century. The house contains good screenwork and panelling of wood, and a rich plaster ceiling. There is no trace of the iron gables now save the hooks in the reveal of the arch, and some stonework in the reveal of the arms, which, consisting of a lion's head and paws holding a shield with three guns on it, and surmounted by wings, were formerly those of the family of Gunning. The property now belongs to Mr. Gore-Langton. The illustration is from measured drawings by Mr. M. Aston Green.

"SCATWELL," WARGRAVE.

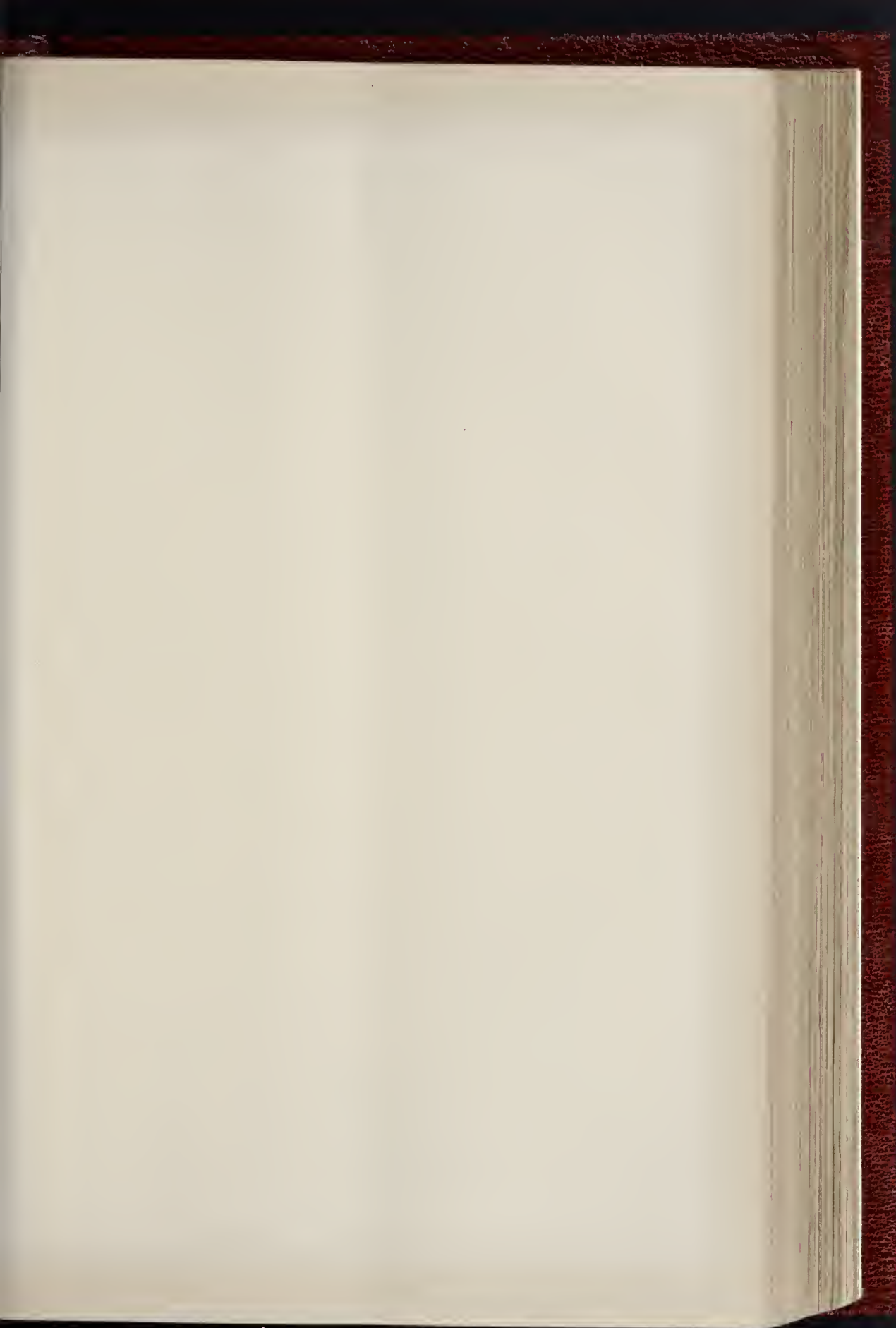
This is merely the rebuilding of a small property adjoining Sir Mossell Mackenzie's house. It is used during the summer in connexion with the house by the owner and his family as a





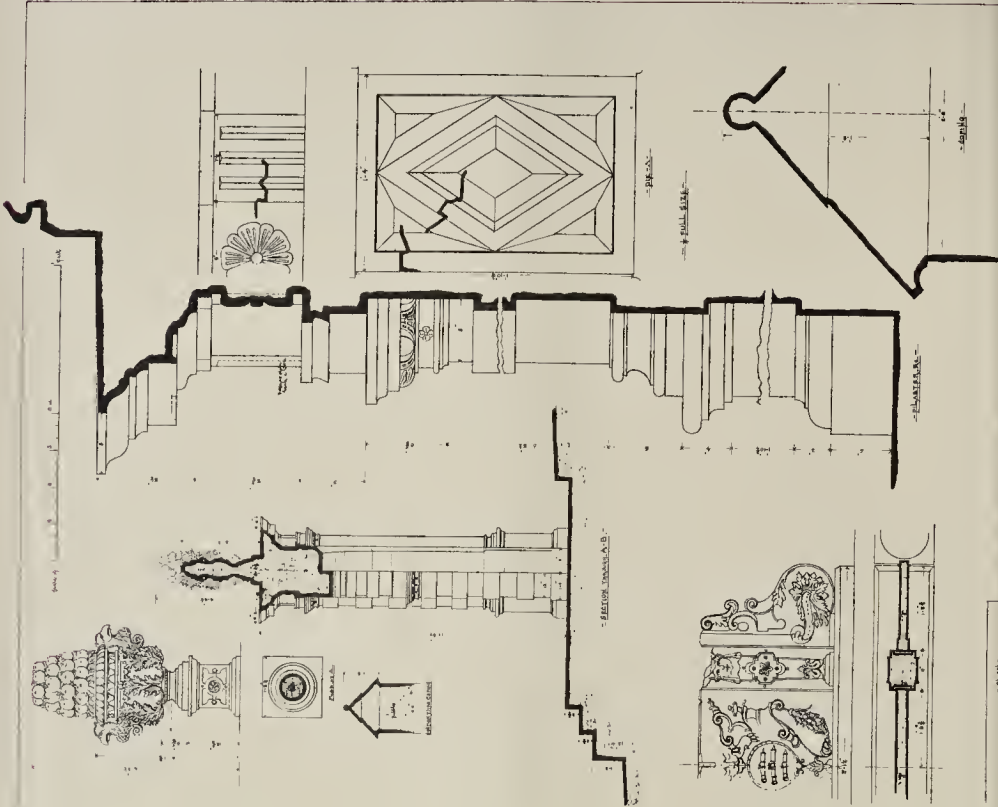
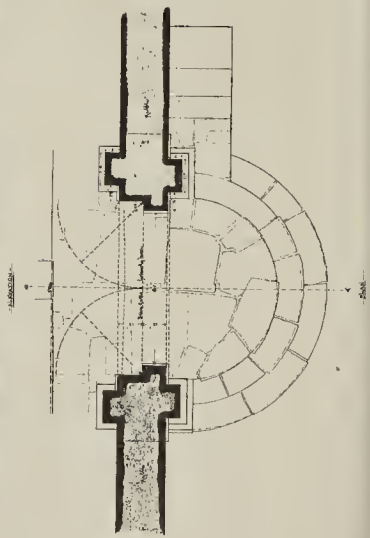
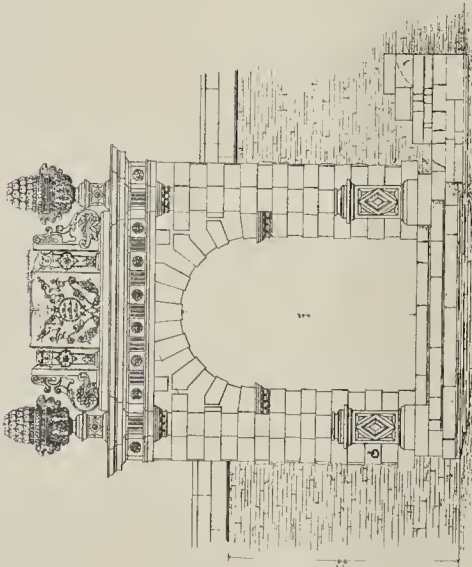
Bonn 1883
 H. v. Hildebrandt

THE PHOTOGRAPHED BY J. J. MARTIN (L.L.) ANNOU ST. L. (L. 1890)



THE BUILDER, MARCH 15, 1890.

ENTRANCE TO THE TOWER HOUSE.
- GEORGE J. STUBBS ARCHT.
- 1889.
- 1/4" = 1'.



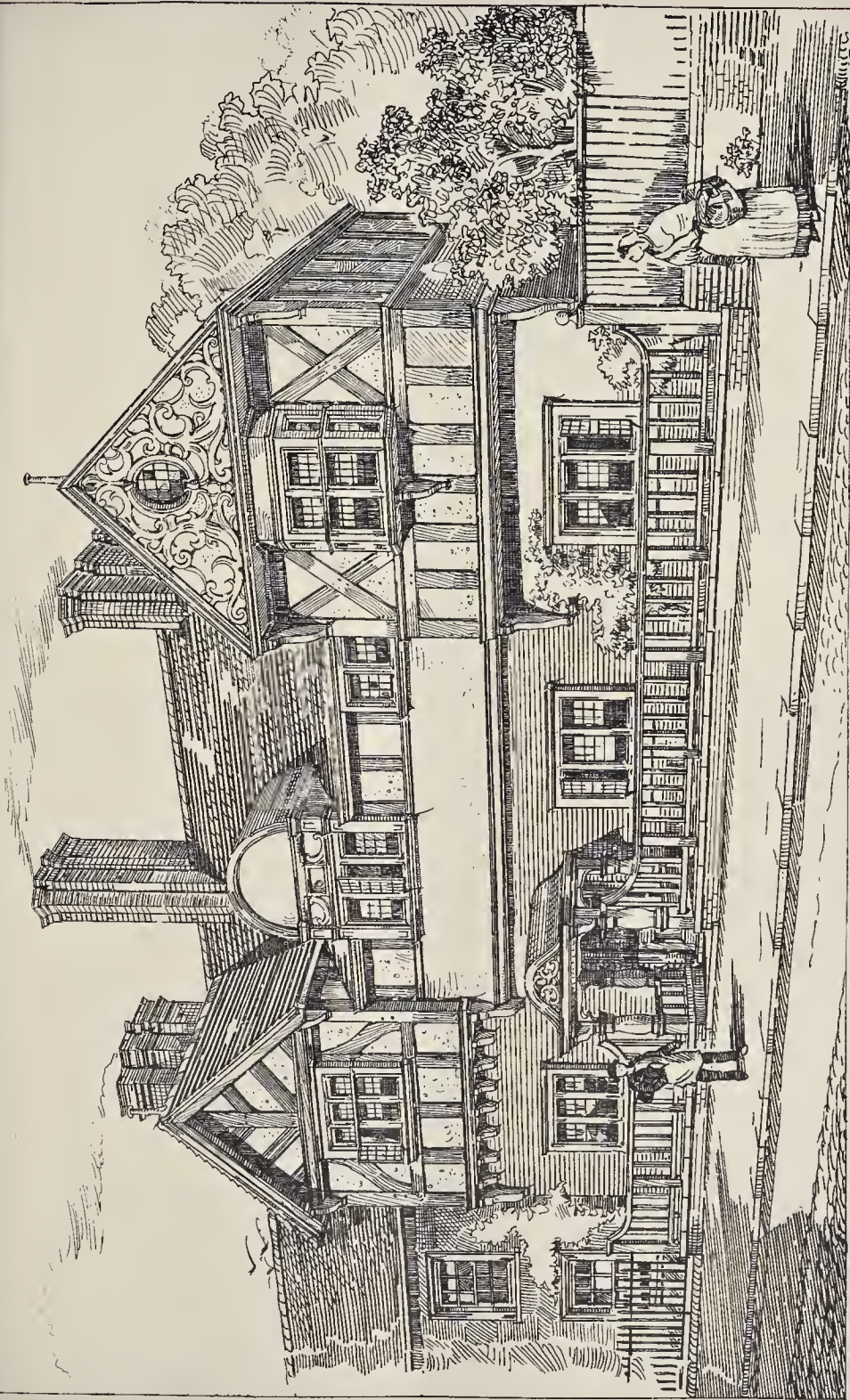
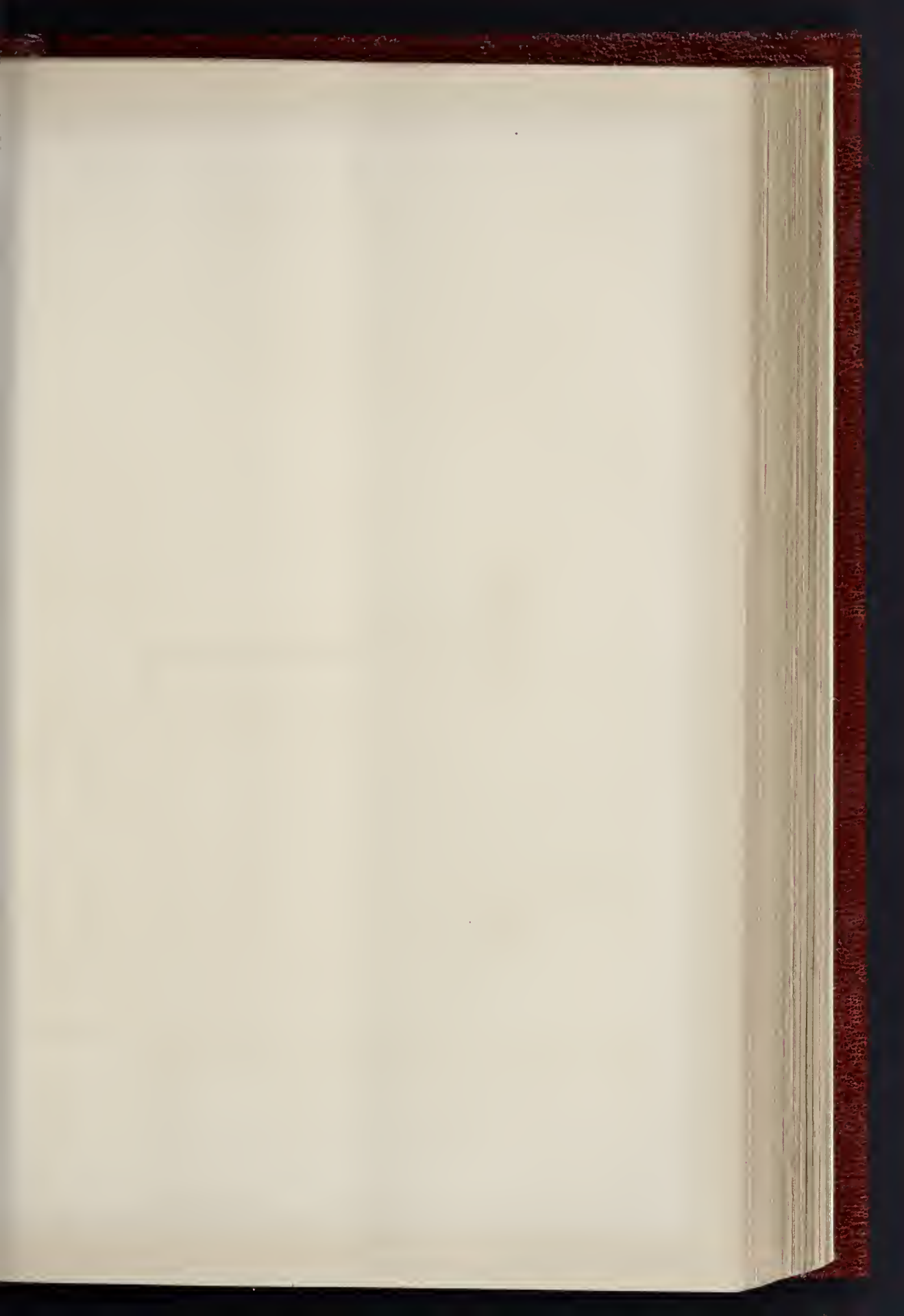


PHOTO-LITHO. SIMPSON & CO. 22 MARKING LANE, CANON ST. LONDON, E.C.

"SCATWELL," WARGRAVE.—MR. ARTHUR ARDRON, ARCHITECT.





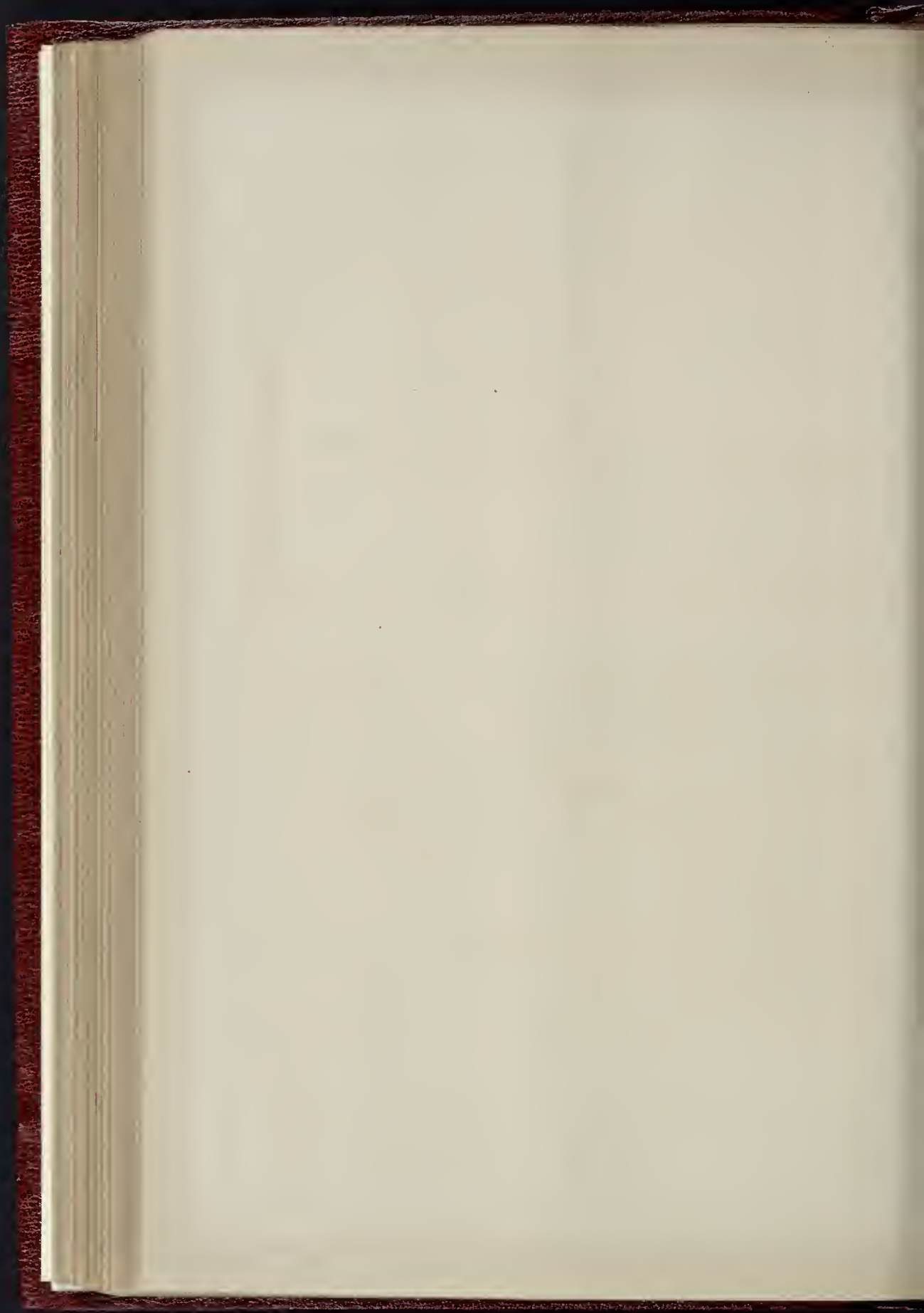


THE NEW "LESSING" THEATRE, BERL



Prague 1877

INK PHOTO - PRAGUE & ... MARTIN ...



erside retreat, in the village of Wargrave, or Henley-on-Thames.

The work throughout is of a very simple character. The inside joinery is stained walnut and varnished; the exterior fronts are in red brick and red-tile hangings and timber work. The gables to the garden front are in high east work of fine Thames shingle, the gable carved in cement.

The timbers are finished nearly black with pekholm tar, and the roofs are covered with slate.

Messrs. Silver & Sons, of Maidenhead, are the architects, and Mr. Arthur Ardron is the architect.

THE ARCHITECTURAL ASSOCIATION VISITS:

THE CHURCH OF THE HOLY TRINITY, CHELSEA.

The Church of the Holy Trinity, Sloane-street, which is being erected from the designs of Mr. J. D. Sedding, and will shortly be completed, was visited on Saturday afternoon by a large party of members of the Architectural Association.

The plan of this church covers a rectangle, the length of 150 ft., and comprises a nave 49 ft. 9 in. in width, with aisles 8 ft. 4 in. wide on each side. The north aisle is flanked by other and wider aisle, which will also serve as a Lady-chapel, and for this purpose is provided with a raised sanctuary adjoining the organ-chamber. A passage from the front of the building to the back is divided from the Lady-chapel by an arcade, over which light is admitted to the chapel by three windows in the aisle above. A deep gallery spans the west end, and is approached by circular stairs in the turret.

On each side of the chancel minstrel galleries overlook the altar, which are reached by spiral staircases. The altar will be set forward, and will screen a door communicating with an ambulatory behind, which extends across the chancel and is connected by doors with the side aisles and the vestries, occupying the north-east angle of the building.

Mr. Sedding, in the interesting description he gave of the building, called attention to the fact that the building was designed with a view to the decoration of a somewhat elaborate description.

A deep frieze above the nave arcade will, it is proposed, be filled with paintings from the hand of Mr. Burne Jones, whilst it is proposed to place statues of the Apostles by Mr. Thornycroft in the niches prepared for them on the vestries.

It is to be hoped that the addition of these decorations will tone down some of the baldness of the present appearance of some of the details, especially of those in the spandrels of the nave arcade.

It was stated that the east window is probably the largest in the United Kingdom, and that the main lines of the tracery of this and the other windows were drawn in with a free hand by the architect with a view to the later introduction of figures in stained glass. One of the side windows is perhaps one of the most satisfactory in its design. The clearstory windows contrast appear to be very small.

It is to be regretted that the nave has been covered with a vault of wood, springing from iron shafts, and appearing to imitate a vault of stone. A more suitable design for the material might have been conceived, if a wooden roof was unavoidable.

The front elevation has been executed in red brick and Douling stone dressings and bands, and spandrels to the entrance doors being coated in rubbed brickwork, in preparation for carving.

The turrets, which flank the west window and aisle-screens, with their gradually retreating sides, are certainly one of the most pleasing parts of the design.

The screens at first appear to terminate the side aisles, though in reality a much less projection would have been sufficient. The carrying of the battlemented parapet under the west window across the side screens, as an ornament, is open to criticism.

The building will be lighted by electricity, for the installation of which preparation is being made.

We may add that we have published the following illustrations of this church,—viz., a

double-page exterior view and an extra-large-size interior view on October 6, 1888; and a drawing of one bay of nave arcade on October 12, 1889.]

THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

At a general meeting of this Association held on the 1st inst. at Carpenters' Hall, Mr. H. Alexander presiding, a report was presented by the Council embodying its recommendations upon the question of the status of the Sanitary Inspector, which it had been instructed to consider. The Council came to the conclusion that in the various Acts of Parliament referring to the position and work of the Sanitary Inspector, there were five defects which it was desirable to remove in future legislation, and the report therefore recommended the Association to endeavour to secure the following amendments in sanitary law:—

1. That every candidate for the position of Sanitary Inspector shall have a general knowledge of the building trades, and, in addition, shall possess a certificate in Sanitary Science.

2. That Sanitary Inspectors shall have a permanent tenure of office, and shall only be dismissible for misconduct, or proved incompetence, with right of appeal to the Local Government Board.

3. That it shall be the duty of Sanitary Inspectors to periodically inspect the dwellings in the district to which they are appointed; and to receive complaints of nuisances and serve notices forthwith, requiring all necessary works to be done for the abatement of the nuisances. Such notices to be as valid, if confirmed by the Local Authority, as if served by the Authority's order.

4. That in all appointments requiring the officer's whole time to be given to the duties of his office, an adequate minimum salary shall be prescribed.

5. That the officers now variously named "Sanitary Inspectors" and "Inspectors of Nuisances" be designated "Sanitary Inspectors."

After a brief discussion, during which the Chairman announced that his Board (Shoreditch) had formally adopted proposition 3, the report was adopted unanimously.

Mr. Richards (Battersea) read a paper on "The Removal and Disposal of House Refuse in London." The practice of storing up refuse for weeks, instead of a very few days, before removal, was strongly condemned, and the manner of collecting and conveying it through the streets of London was described as "a disgrace to this centre of civilisation." The practice, formerly common, but, as the paper stated, "happily no longer permitted," of depositing it on proposed building-sites had been followed by the wasteful disposal of it either by deposits on the marsh-lands of the estuary of the Thames, or by "barging" it out to sea, and more recently, in some districts, by the still more wasteful process of "cremation." On the basis of the cost of machinery erected in Whitechapel for the latter method of wasting refuse, it was estimated that the enormous sum of 1,031,000. would have to be got from the taxpayers of London, without counting the annual cost of working, on purpose to destroy annually 2,295,000 cubic yards of fertilising matter, a quantity sufficient to cover 1,400 acres of land with a layer of manure a foot thick.

China, and recently Scotland, offered us examples of a more sensible disposal of refuse, and in at least one London parish (Newington) these excellent examples had been followed, with good results. The larger question of the disposal of all refuse must, the lecturer declared, "ultimately receive the serious attention of the future Ministers of Health and of Agriculture. What must be more fully realised by our sanitary reformers is that the gradual diminution of the area under cultivation, and the decrease of the producing power of the land, not only means total dependence upon foreigners for our food-supply, but by withdrawing from the land those who should be employed upon it constitutes the primary cause of excessive overcrowding in our towns."

Mr. Poulson (Chelsea), in proposing the usual vote of thanks, condemned the method of storing the refuse preparatory to removal as a serious nuisance in Newington, and Mr. Grant, who seconded, said he thought cremation the only cure, opinions for and against those of the paper being expressed by other members in the course of the discussion.

THE LONDON COUNTY COUNCIL.

The ordinary weekly meeting of this Council was held on Tuesday afternoon last, in the Council Chamber, Guildhall, Lord Rosebery in the chair.

Age of Retirement of Officers.—The Standing Committee presented the following report:—

"We are giving careful and anxious consideration to the important questions referred to us by the Council, relative to an insurance scheme for the servants of the Council, and also the establishment of a benevolent fund. These questions have been referred to a sub-committee, who have been making inquiries as to the course adopted by other of their inquiry institutions. In the course of their inquiry they have remarked upon the absence of any limit of age at which officials of the Council may be required to retire. The consequence of there being no provision for compulsory retirement may be that officers will remain in the service of the Council when they no longer have the vigour necessary for the efficient discharge of their duties. The Royal Commissioners on the Civil Service establishments have recently recommended that there should be compulsory retirement at the age of sixty-five years, and we are of opinion that it would be well for the Council to follow the same principle, and to fix sixty-five years as the age at which retirement should be compulsory.

Cases may arise in which it would be advantageous to retain the services of particular officials, but this we think should only be done by a special resolution of the Council in each case. We recommend that the following be a Standing Order of the Council:—

"That every officer and servant of the Council shall retire at the age of sixty-five, unless the Council shall pass a special resolution to the effect that his retirement will cause inconvenience to the public service, in which case he shall continue for another year, and so on at the termination of each successive year of his age."

This was agreed to, after some discussion.

The Proposed Central London Railway.—The Parliamentary Committee presented the following report:—"On February 11 the Council passed a resolution that, in order to preserve the *locus standi* of the Council, to oppose, if so advised hereafter, on merits, a petition should be prepared against the preamble of the Central London Railway Bill. The report on Parliamentary schemes, prepared in the Engineer's Department, which has been circulated to the members of the Council, points out the serious interference of the proposed line with the Council's sewers, and it is evident that, in any case, proper protective clauses must be obtained. But, apart from this, as we have already pointed out in our report on the 11th instant, the question of motive power is one of very great importance. In the case of the similar scheme which was before Parliament last year, Sir John Fowler stated as follows, in evidence before the Select Committee on the Bill:—

"Those motors are liable to derangement, like anything else, and especially anything connected with electrical machinery. Electricity, so far from escaping difficulties as regards derangement, I think, according to everybody's experience at the present time, is rather liable to it; that is certainly my own personal experience."

"I quite grant you, if you like, that, that it has gone so far beyond the experimental stage that you are perfectly justified in adopting it; but we have not got so far beyond the experimental stage to know how much liability there is to derangement of these motors."

The petition of the Council, which was sealed on the 18th instant, and which was framed so as to enable the Council to oppose the preamble of the Bill, if considered advisable, contains the following allegations:—

"Your petitioners deny that any such public necessity can be shown to exist for the construction of the said subways or railway as proposed by the Bill, or that any such public advantage will result therefrom as will justify the public injury and inconvenience which the exercise of the said powers would cause, and your petitioners believe that no experience has yet been gained to show that the working of so large an undertaking, as proposed by the Bill, by means of electricity is convenient or practicable.

Your petitioners also call attention to the special provisions of the Bill as to interference with property by enabling the Company to acquire easements or rights of constructing and using their railway under certain properties, and also to the powers sought of interfering with properties by underpinning, or otherwise strengthening the same, and your petitioners submit that such powers may cause injury and inconvenience. Your petitioners refer to the settlements and cracks in their sewers, caused by similar works, as showing that the risk of such injury and inconvenience is considerable."

Owners of the freehold soil below that portion of the street which is vested in local bodies are petitioning against the Bill, and are

claiming compensation for interference with their rights; while, on the other hand, the interests of the authorities in whom the streets are vested are also affected. In the appeal case of the Wandsworth District Board of Works v. the United Telephone Company (Law Reports, Queen's Bench Division, vol. xiii., page 913), it was held by the Master of the Rolls that the property in a street passes to a certain depth, which depth is what may be called the 'area of user,' that is to say, such a depth as will enable the urban authority to do what is done in every street, to raise the street and lay down sewers. Now, we have the authority of the Engineer's report for the interference of the scheme with the Council's sewers, and we are informed that for a distance of three-quarters of a mile the line, as shown on the plans, passes within 25 ft. of the surface, and for two miles within 35 ft., there being, of course, a limit of deviation in either case, which might bring it considerably nearer. The case consequently appears to be within the limits laid down by the Master of the Rolls in the judgment above referred to. As regards the question of compensation, we desire to express the opinion that the local authorities, in whom the streets are vested, should be compensated in the same way as the freeholders of property on either side of the street. We are proceeding to obtain evidence in support of the allegations of the Council's petition, but looking to the terms of the resolution passed on the 11th inst., we are placed in a position of uncertainty, and we are anxious to have definite instructions as to the nature and extent of the proposed opposition. We, therefore, submit this report, and recommend—

"That the opposition to the Central London Railway Bill be continued on the lines laid down in the Council's petition, and that the course taken by the Parliamentary Committee with regard to obtaining evidence be approved."

Mr. Beachcroft moved the following amendment:—"That as no resolution has been come to by the Council to oppose the Central London Railway Bill on its merits, and as the object of the Bill, if successfully attained, will effect a great metropolitan improvement without charge on the rates, the opposition of the Council to such Bill be confined to the taking of needful steps to secure the special clauses required to protect the sewers and other interests of the Council." Mr. Beachcroft urged that the Council ought not to stand in the way of an improvement of this kind, provided that their interests could be safeguarded, as he believed they could be. He contended that a new central London railway from east to west, following the line of Oxford-street and Holborn, was much needed for the convenience of the public, and he cited the City and Southwark Subway (now nearly completed) as a proof that such a work could be constructed without damage to property on the line of route. Mr. Collard, however, contradicted this statement, and said that there was scarcely a building in High-street, Borough, which had not suffered from the construction of the subway.

After a good deal of further discussion, the amendment was carried, and after transacting other business, the Council adjourned.

SALT IN CEMENT MORTARS.

SOME interesting particulars regarding the use of salt in the preparation of cement mortars which are to be subject to very low temperatures are given in the Transactions of the Institution of Civil Engineers (see vol. xcii., Abstracts of Papers, &c.). The information is taken from various sources, and is of considerable interest to those engaged in building operations. It is well-known that water contained in common salt in solution freezes at a lower temperature than fresh water, and it has been proposed to take advantage of this property in preparing mortars for use when the temperature is below freezing-point. It must not, however, be concluded that sea-water would answer the same purpose, as that contains other salts also.

From some experiments made in Russia, the following results were obtained:—Hydraulic lime and Portland cement were mixed with fresh water, and also with water containing 2 per cent. and 8 per cent. of salt in solution. Bricks cemented together with these mortars were allowed to set in the open air at temperatures ranging between 17-6 deg. F. to a little above freezing-point. Two cubes made from the different cements were subject to the same con-

ditions. The cubes made with fresh water cement fell to pieces under pressure of the hand; and the bricks cemented with the same material did not adhere. The specimens prepared with water containing 2 per cent. of salt gave somewhat better results; but the samples made with water containing 8 per cent. of salt could only be destroyed by the aid of the hammer, and the bricks could not be separated. The Portland cement mortar was, in all cases, stronger than that made from hydraulic lime. Some operations carried out in America (see "Transactions of American Society of Engineers," March, 1887, p. 79), confirm the latter fact. In the construction of some canal locks, the work built with Portland cement, when examined the following year, turned out to be perfectly sound, but the hydraulic lime mortar had been destroyed to a depth of 3 to 4 in. In the course of erecting these works some concrete was laid in which a good deal of salt was mixed. The mass was completely frozen, but proved perfectly sound in the end, being impervious under a head of 15 ft. of water.

In the construction of a bridge in the United States, four piers were built, when the temperature was ranging in the case of the first between 1-4 deg. Fahr. and 21-2 deg. Fahr. During the building of the second the temperature was about 20 deg. Fahr., and the remaining two were built when the thermometer stood above the freezing-point. For the facework, Portland cement mortar, mixed with sand in the proportion of 1 to 1½, was used, and for the interior work 1 to 2½. The sand was warmed, and large quantities of salt were added to the water, yet at 1-4 deg. Fahr. the mortar froze very quickly while it was being used. In the end no difference could be discovered between the quality of the masonry of all the piers. The superiority of Portland cement over native American hydraulic lime is also testified by Mr. G. S. Morrison, an American engineer. Test specimens of the two materials were frozen in water; those of Portland cement were uninjured, but the hydraulic lime samples fell to pieces. The Superintendent of Public Works for the State of New York, Mr. Shanahan, when building walls in cold weather, adds a strong solution of salt to the mortar.

ARCHITECTURAL SOCIETIES.

Manchester Architectural Association.—At the fortnightly meeting of this Association, held on the 4th inst., a paper was read by Mr. T. Chadwick, A.R.I.B.A., the subject being a few recent notes in Holland and Belgium. The paper was illustrated by sketches made by Messrs. Chadwick, Colley, and Woodhouse during a tour in September last. The route taken was from Harwich to Rotterdam, Delft, Dordrecht, Malines, Brussels, Ghent, and Antwerp. A cordial vote of thanks was accorded to Messrs. Chadwick, Colley, and Woodhouse.

Sunderland Architectural Students' Association.—At the first general meeting, February 7, a paper, on the "Study of Mechanic in their Relation to Architecture," was read by the President (Mr. Frank Caws), and, during the discussion which followed, it was arranged to have interim meetings for the study of the subject in detail, the President undertaking to conduct these interim classes on alternate Wednesdays, and give practical demonstrations on the black-board. At the general fortnightly meeting, February 21, a paper by Mr. H. Barnes, on the "Use of Wood and Iron in Building," and on March 7th a paper by Mr. F. J. Purvis, "On Stone as a Building Material," were read, and followed by interesting and instructive discussions, in which the younger students were encouraged to take part. In addition to the classes for the study of mechanics, another class, on alternate Wednesdays, meeting under the direction of Mr. William Milburn, is engaged in the study of Grecian architecture, illustrated by lime-light photographic views and diagrams. Mr. R. Eisey Smith has most kindly lent the Association a number of photographic slides, taken by himself, of Grecian buildings. The subject of Greek architecture was divided into the following details or branches:—History, Mr. H. Barnes; Plans, Mr. John Hall; Proportions, Mr. G. T. Brown; Shafts, Mr. J. Spain; Caps and Bases, Mr. A. B. Tiffin; Entablatures and Pediments, Mr. F. E. Coates; Ornament, Mr. E. S. Welles; and the various students above-named undertook each the branch set against his name. The committee intend to further pursue this method of inchoing

all the students in share and take an interest in the work of study and preparation necessary for the successful carrying-on of this class.

ARCHÆOLOGICAL SOCIETIES.

British Archaeological Association.—At the meeting of this Association on March 5, Mr. C. H. Compton in the chair, Mr. Earle Way exhibited some remarkable Gray-beard ja found in Southwark, ornamented with coat-of-arms and having Dutch inscriptions as well as the usual head and beard of Cardinal Bellarmine. Mr. Davis described a candlestick of stone, of small size, found among some rubbish removed from a Gloucestershire church. It is circular in form and about 3 in. in height. Mr. Davis also produced a rubbing of a brass in Newlands Church, Forest of Dean, where a miner is depicted holding his candlestick in his mouth, a stick and a boss of clay in the left hand. It occurs on the brass called that of Sir H. Baynham. A rubbing of a brass in Wandsworth Church was also shown dated 1420, on which a knight is represented with a mace at his girdle. Mr. Saunders described the key of Portsmouth Town, which was thrown into the Harbour by Colonel Goring on the surrender to the Parliamentary Army. It is now in his possession, having been recovered in 1811. Mr. Oliver exhibited one of the well-known forgeries of the celebrated traders of spurious antiques known as "Billy and Charles." He did so as a warning to antiquaries, as the occasional exhibition of these will do good deal to keep a record of their fabrication. A paper, illustrated by a large collection of rubbings of the objects referred to, which occupied one side of the Hall, was then read by Mr. Romilly Allen, F.S.A. (Scot.), on the Pre-Norman Sculptured Stones of the West Riding of Yorkshire. In the comparatively limited district under review twenty-six different localities occur in which sculptured stones have been found in churchyards, or in relation to churches, mostly in the valleys. The greatest number are found within a radius of twenty miles of Leeds. After dwelling upon the historical data, especially with regard to the introduction of Christianity in the seventh century, the lecturer referred to the style of ornamentation, which agrees in peculiarities of detail with what is found in other parts of the North of England, Lindisfarne being probably the centre of the art. The stones are covered with interlaced patterns, and consist of shafts and heads of crosses. Eleven inscribed stones have already been noted, one of which appears to relate to Osbert, killed in 867. Figure subjects occur not unfrequently, and at Bingley an inscribed font, a photograph of which was exhibited.

Royal Archaeological Institute.—The Right Hon. Earl Percy presided at a meeting of the Institute held on Thursday, the 6th inst., when Mr. Oliver read a paper on a brass to the memory of Roger Thornton which was originally placed on altar tomb in the Church of St. Saints, at Newcastle-upon-Tyne. The figure of Roger Thornton was dressed in a long gown reaching to the feet. His wife's figure shows a long sleeveless gown with high collar. Mr. Oliver said that this brass was the only one of Flemish workmanship of the fifteenth century in this country. (We gave an illustration of this brass in the *Builder* for November 16 last.) Mr. J. Park Harrison read a paper on "Anglo-Norman Ornament compared with designs in Anglo-Saxon manuscripts." The paper was illustrated by many designs and copies from Early Saxon MSS. From these Mr. Harrison deduced that Saxon architecture was of a superior description than what was generally supposed. Lord Percy exhibited a silver ornament, shaped like a crescent, which was found near Newham, Northumberland. It was probably of the fifteenth century.

The Surveyors' Institution.—The Council of this Institution have decided to give a portion of the value of 100, out of the interest arising from the Crawter bequest to the candidate doing the best work in the field on Monday the 24th inst., provided he obtains not less than 75 per cent. of the marks allotted to this branch of the Surveying and Levelling Examination.

Surveyorship, Burslem.—The Burslem Corporation have appointed Mr. Fred. Bettal as their Engineer and Surveyor, in place of Mr. P. J. Sheldon, who has obtained the Burslem Council appointment.

BYZANTINE REMAINS IN GREECE.

Sir,—You were good enough about a year ago to advocate the work which was then carried on by the British Archaeological School at Athens in obtaining full-sized drawings of the profiles of the mouldings used in Greek architecture, and the response in the form of subscriptions from various donors, which, if not a large sum, yet has been of very material use in arriving at a satisfactory result, which consists of a very complete collection of mouldings taken with upolous exactness by our architect student, R. W. Schultz. These will no doubt be published in some form or other.

Since the beginning of this year the opportunity of employing so competent an artist is not been lost sight of by the school, and R. Schultz has been re-engaged by the committee in concert with another architect, Mr. Mansley, in making drawings of the Byzantine churches in Greece, of which there are an extremely valuable specimens. But your work is likely to be very seriously curtailed for want of funds, as the money which is devoted to this purpose by the British Archaeological School falls much short of what is due to the subject. Up to the present time the plans of this period in Athens itself have been examined, and one other very interesting and important specimen,—namely, the monastery of St. Luke, near Mount Helicon; but the collection will be very imperfect if it remains at Mistra and some other parts of Peloponessus are not included; which, unfortunately, cannot be done with the funds presently available. In a letter received lately from Mr. Gardner, the Director of the school, he says, "I am very sorry that Schultz and Mansley are so short of money, and I fear they will be obliged to curtail their plan, and only finish off the churches they have begun without going further afield. I think this will be a great pity, as their work makes me as more excellent than ever, especially their drawings of St. Luke."

Under these circumstances, I write to ask you would allow me, through your columns, to invite subscriptions from the lovers of archaeology in general, and early Mediaeval art in particular, for the purpose of making an undertaking more complete.

Subscriptions may be sent to Walter Lennox, Old Change, the treasurer to the British Archaeological School; or should you think, as on the former occasion, that a special subscription fund would be desirable, I should be willing (should you so desire it) to receive subscriptions, and from time to time to announce them in the *Builder*, in which case you could ask the donors to distinguish any of their subscriptions from others intended for the Greek Mouldings Fund; to signify in some way or other that Byzantine architecture is their aim.

F. C. PENROSE.
8, St. Paul's-churchyard.

"We certainly desire it.—Ed.

THE GLASGOW MILL DISASTER.

Sir,—In reference to your interesting article on the fall of the Glasgow mill, it would be instructive to your readers if a plan and drawing were given, the direction of the wind at its pressure per square foot.

It is known that at most meteorological stations the apparatus is so imperfect that the wind effects are generally blown away in a storm, and it may be hoped that this was not the case at Glasgow.

GEORGE ARCHIBOLD.

A CLAIM ON A BILL OF EXTRAS.

Sir,—Our clients, Messrs. Kirk & Randall, have drawn your attention to the paragraph in your last issue headed "A Claim on a Bill of Extras," and desire to point out to you several inaccuracies at report.

It is stated that it was shown that the amount in dispute had been paid by the Baths Commissioners to Messrs. Kirk & Randall. As a matter of fact the Baths Commissioners, who was present at the meeting, and our client, both positively stated that the amount in which the item in dispute was

included was not before the Commissioners at the time of settlement, and the Judge found, as a fact, that the item was not present to the minds either of the Commissioners or our clients at the time of settlement, and that our clients had never, personally, any knowledge of the item at all.

The plaintiffs' own evidence was that although they had been repeatedly warned by Messrs. Kirk & Randall that no amounts would be paid for unless orders were received from them, they had not in fact received any such orders, and they had not communicated the fact of the work being done to Messrs. Kirk & Randall. Furthermore, the contention of the defendants was not that the architect had exceeded his authority, but that the amount had not been included in the sum paid to them, and that it had never been received by them, as they had no knowledge whatever of the plaintiffs' claim in settling their accounts, and were, therefore, under no liability to pay the amount.

We should be obliged if you would in fairness to our clients call attention to these facts in your next issue.

We defer saying more on the subject as the case is new under appeal.

MCKERRILL, MATON, & GODLEE,
21, Cannon-street, E.C., March 8.
[This letter arrived too late for insertion last week. Our reporter informs us that our report, although brief, was substantially in accordance with the evidence; that it was proved that the item in dispute was in the accounts which were before the Baths Commissioners at the time of settlement, and that an exception was taken to it; that these accounts had been prepared jointly by the quantity-surveyors representing the builders and the building-owners respectively; that although it is true that evidence was tendered as to the plaintiffs having been cautioned by the defendants against executing orders received otherwise than through the defendants, it was proved that the architect, Mr. Vorty, had ordered the goods in question (which he had ample power to do under the terms of the contract), that they had been duly supplied, and that the architect had authorised the amount in dispute to be included in the accounts. On one point only was our reporter slightly in error, and that was in describing the nature of the action. It was not, technically speaking, an action to recover money for goods supplied to defendants, but it was an action to recover money had and received by defendants on behalf of the plaintiffs.]

"HISTORY OF CROMER."

Sir,—Will you kindly allow me space to correct an error in your last edition in reference to the above. In referring to the church, you say, "The restoration of the nave was done by Mr. Newman." This is not quite correct, as the work was carried out by the late Mr. E. Summers and myself, Mr. Newman only having the sub-contract for the bricklayers' work.

W. CHAPMAN.
Haverorth, Norfolk, March 12, 1890.

* It is not our mistake; we merely teek the statement as given in the book.

Technical Institutions in Berlin.—Mr. Brunner, M.P., during a recent visit to Berlin, took special interest in the affairs relating to the organisation of the institutions for technical education in Germany, and those at Berlin especially. Thanks to the "Rector," Prof. Jacobsthal, Mr. Brunner had the opportunity of inspecting all the interior arrangements of the Royal Technical College, and besides viewing the aula, the library, and reading-rooms, the lecture-halls, class-rooms, studies, and minor details of the main building, he also went over the Architectural Museum (of which Professor Raschdorff is the director) and some of the educational collections (building construction, building materials, geological, civil engineering, technological, and ship building). A visit was paid to the building belonging to the Chemistry division, and here the laboratories of the inorganic department (Prof. Ruedorff) were specially gone through. The Royal Testing Laboratory and workshops were visited, and here the head of the institution, Prof. Martens, explained the different apparatus used, especially those used for testing iron and steel, and those used for the testing of paper as to wear, tear, and discolour.

The Association of Municipal Engineers notify that the ninth examination of candidates for the offices of Municipal Engineer and Local Board Surveyor will be held at the Institution of Civil Engineers on Friday and Saturday, April 18 and 19 next. The Association of Municipal Engineers was instituted in 1875, and now numbers some 420 members. It has done a great deal to raise the standard of qualification for the professional officers of municipalities and Local Boards.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—XI.

DYNAMO-ELECTRIC MACHINES.

WELL-ILLUSTRATED descriptions of the details of all the important forms of dynamo-machines that are made appear from time to time in the pages of engineering papers. To these articles is referred a student who wishes to see how the general principles of dynamo-electric machinery, dealt with in this and future articles, are applied in practice. We have already explained—article VII.—how and in what direction E.M.F. is set up in a conductor which is being cut by lines of force; fig. 26 represents lines of

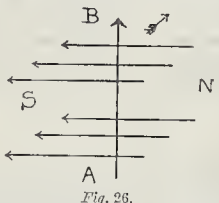


Fig. 26.

force between the N and S poles of the field magnet of a dynamo-machine. If the conductor A B move into the paper, the direction of the E.M.F. produced will be from A to B; some such diagram, showing the relative directions of lines of force, motion, and electro-motive force produced, should be committed to memory, though the following rule may prove useful if it is borne in mind that at the earth's surface lines of force go from south to north:—*If a man walks towards the east an E.M.F. is set up from his feet to his head.* In practice, however, the moving conductor is not a mere rod like A B, nor does the field consist of straight lines of force as in fig. 26. It is, therefore, necessary in many cases to consider parts only of the conductor at a time, and then to see in what direction acts the added electro-motive forces, set up in the different parts. It frequently happens that a conductor cuts lines of force, so that the E.M.F. set up in one part opposes that set up in another, in which case the difference between the two is all that is available for use. Before the quantity can be calculated the numerical value of the E.M.F. set up in a conductor moving in a magnetic field must be known.

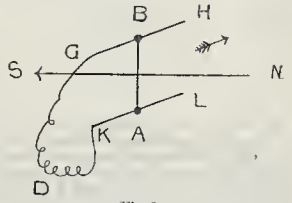


Fig. 27.

In Fig. 27, A B is a conductor which slides between two fixed rods G H and K L, metallic contact being made with them at A and B, so that any E. M. F. which may be set up in A B will produce a current in the closed circuit A B D A. Let the resistance of this circuit be R and the resistance of the rods G H and K L be so small that the varying length of rod introduced into the circuit, as A B moves, does not appreciably alter the total resistance. If a uniform field of force pass through the apparatus in the direction N S and the conductor move in the direction of the arrow, an E. M. F. is set up in the direction A B and a current C flows in the direction A B D. Let l = length of A B, v = speed with which it moves, f = strength of field, E = E. M. F. set up, and t = time taken by A B to move from G to H. Then $E = CR$, and the work in Joules done in the circuit is $E C t$, that is, $10^9 E C t$ ergs, as explained in article V. Again, in the same article it was shown that if a conductor of length l , carrying a current of C amperes, was bent into the form of a circle of unit radius,

it exerted a force of $\frac{Cl}{10}$ dynes on a unit magnetic pole placed at its centre, or a force of $\frac{Clm}{10}$ dynes on a pole of strength m ; but since action and reaction are, by Newton's third law, equal and opposite, the conductor itself experiences the same force, though in the opposite direction; as, therefore, the pole of strength m produces a field of strength m at one centimetre distance, in the neighbourhood of the conductor and at right angles to the direction of the current at every point, the force produced is $\frac{Clm}{10}$ multiplied into the strength of field into which it has been introduced. Applying this to the present case, the movement of AB is resisted by the force $\frac{Clf}{10}$, and since the total distance through which it moves is $v t$ the work which is to be done to move it from G to H is $\frac{Clfv t}{10}$ or $10^{-7} Clfv t$.

By the law of the conservation of energy, the mechanical work put into the apparatus is equal to the electrical work got out of it. Hence:—

$$10^7 E C t = 10^{-7} Clfv t$$

$$E = \frac{10^7 Clfv t}{10^7 C t} = 10^{-8} lfv \quad (1)$$

But lv is the area traced out by AB per second, and $lv \times f$ is the number of lines of force cut by AB per second; so that equation (1), which is of fundamental importance, may be stated in words as follows:—The electromotive force set up in a conductor is equal to the number of lines of force through which it cuts per second multiplied by 10^{-8} .

It appears, then, that to get one single volt, a conductor must cut, in the same direction, no less than one hundred million lines of force per second.

There is now working at Deptford a dynamo-machine which gives 10,000 volts electromotive force, so that 10^{12} or 1,000,000,000,000 cuttings of lines of force by conductor per second must take place. At first sight this figure seems very extraordinary, but it must be remembered firstly, that the actual number of lines of force in the field or set of fields in a dynamo amounts to many millions; secondly, that each conductor is not a simple rod as in fig. 27, but is wound into a bobbin of many turns, so that each line in the field is cut several times by the same conductor; and, thirdly, that the armature revolves many times per second. Each of these factors multiplies the E.M.F., so that it is not so astonishing after all that the number of cuttings reaches the enormous figure it does.

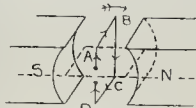


Fig. 28.

We will now investigate the E.M.F. produced by the skeleton dynamo-machine in fig. 28. $ABCD$ is a rectangular conductor placed between the poles of the field magnets NS . Suppose F to be the flux through $ABCD$ when it is in the vertical position, by the time it has turned into the horizontal position AB and CD have together cut every line, i.e., F lines, setting up an E.M.F. in the direction shown. In one complete revolution $4F$ cuttings take place, and if the rectangle is revolved n times per second, the number rises to $4nF$ per second, so that an average E.M.F. of $10^{-8} \times 4nF$ volts is produced.

To give an idea of what this E.M.F. may be likely to come to, suppose the area of the rectangle to be—say, 150 square centimetres, then 10^6 would not be an out-of-the-way value for F ; if the number of revolutions per minute is 600, $n = \frac{600}{60} = 10$. Let $E = \text{E.M.F. in rectangle}$, then $E = 10^{-8} \times 4 \times 10 \times 10^6 = 4 \times 10^{-1} = 0.4$ volt.

It must be noted that average electromotive force is spoken of, as by tracing the E.M.F. set up in the conductor as it revolves it will be seen that the direction reverses at the instant when the rectangle is vertical: hence in the vertical position $e=0$, if e is the actual E.M.F. at any instant; in the horizontal position e has its maximum value, and sinks again to zero

a second time at the vertical position. We shall not trouble ourselves about this while considering machines used for giving a continuous current, because a number of conductors are connected up so that when one is contributing its maximum effect another is contributing no E.M.F. at all, the other conductors being in intermediate positions. When, therefore, all the effects are added the result is an E.M.F. equal to the average E.M.F. given by one conductor multiplied by the number of them so connected; thus by proper connections and commutation a practically constant, though slightly fluctuating, E.M.F. is obtained for external use.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

3,600, Scavenger Carts. A. H. and J. E. Hayes.

The carts made under this specification are covered to prevent spilling the liquid slop or the dust being blown about by the wind, and side and end boards are fitted to increase the carrying capacity for light dust without interfering with the action and protection of the mechanical cover. These extra boards are provided with iron pintles, which fit into sockets at the back and sides of the cart, the front being built up solid of sufficient height to close up the crown of the covering. The extra boards are fitted to the covering-flaps being, is of sufficient height to permit the flaps to conveniently rest on the top of the additional side-boards, so as still to make a joint thereon for protecting the contents as efficaciously as when the heightening boards are removed without interfering with the action of the flaps. When the contents are to be discharged, the door, on tipping, is automatically opened so as not to cause any interference with the fixed cover.

4,432, Balanced Sashes. W. S. Ingle.

The sashes, which are the subject of this invention, are hung so that one half balances the other. A grooved pulley, working in a case bracket, is employed, and is fixed to the top of each internal side of the window-frame, the centre of the pulley being midway between the two side window-sash frames. Over these pulleys is passed a cord or chain, one end of which is fixed to each top sash-frame, and the other to the bottom sash-frame. When one is lowered the other is raised correspondingly.

4,645, Door and Window-fastenings. Ellis Parr.

This invention relates to the form of fastening in which, when it is applied (for example) to a door, the latter is held sufficiently firmly in a closed or desired position; but can be opened or removed when desired by simply pressing it in either direction. A plate has a rectangular aperture stamped out, the edges of which are left standing at right angles to the side, the bolt is passed through past the aperture, and through a spiral spring in the centre of the aperture. This forms the fastening.

4,853, Centre Bits and Boring Tools. R. J. Anderson.

According to this invention, a tool for drilling or boring, whereby the diameter of the holes to be bored may be adjusted, is made by employing an arm of suitable length pivoted to the bit or tool. The extremity of this arm has a cutting edge. The end of the tool is spread out to form wings having a flat surface forming a support for the arm, and giving space for a slot, into which is fitted a tightening screw. To adjust the tool to make a hole of a proper size, the arm is rotated on its pivot till the size is attained, it is then locked and fixed by a screw.

5,205, Terra Cotta Blocks. H. Doulton and another.

According to this invention blocks are made with a number of small cells or cavities similar to the holes in perforated bricks, except that in place of running completely through the block they are open at one face, stopping short of the opposite face. The blocks may be moulded at the closed end, and owing to the smallness of the cells can be employed for building purposes without any filling, and yet since the cells on them are open at one end the clay can dry thoroughly.

5,595, Chimney Pots. R. Roberts.

At a short distance below the cover of the pot, a dish-shaped ring is, according to this invention, fixed around it to serve as a preventive in case of the rebound of the wind—as, for instance, from a roof or wall on this ring the wind impinges and down draught is prevented.

NEW APPLICATIONS FOR PATENTS.

February 24.—2,912, H. Badams, Gas-brackets and Chandeliers.—2,911, G. Appiani, Continuous-acting Kilo.

February 25.—2,965, H. Brookfield, Flush Water-closets, Drains, &c.—2,966, G. Bayl, Fastenings for Window-sashes.—2,983, J. Coll, Combined Sash-fasteners and Lits.—3,021, O'Brien and J. Carew, Stone-cutting Chisels.—3,025, G. West, Flanging Material Compositions.

February 26.—3,075, G. Light, Interceptor traps for Drains, &c.

February 27.—3,162, J. Merryweather, Pavement.

February 28.—3,184, A. Rovedino, Wood Pavement Block or Brick.—3,197, J. Bell, Circular Saw.—3,205, F. Cook, Lightning Conductors.—3,215, Meredith, Fastening Door-knobs to Spindles.—3,217, C. Spurr, Cutting Veneers.—3,221, L. Hawkins, Flushing Apparatus for Water-closets.

March 1.—3,255, E. Marples and F. Lamb, Combination Tool Cabinets.—3,266, B. Town and J. Dixon, Horizontal Sawing-machines.

PROVISIONAL SPECIFICATIONS ACCEPTED.

791, R. Crowden and R. Pulton, Paperhang Roller.—1,054, J. Connell, Sash Fasteners & Window-sashes and Doors.—1,958, W. You, Securing Sash-lines to sashes.—1,418, A. Ramman, Metal Framing for Fire-proof Floors and Walling.—1,544, G. Newman, Bolts or Fasteners.—1,619, Shilton, Electric Bolts or Gongs.—1,689, W. N. Sealing Windows.—1,730, J. Merrill, Cisterns & Water-closets, &c.—1,769, J. Jones and S. Edgar, Automatically raising Water-closet Seats.—2,008, R. Evedred and N. Colman, Flushing Drain.—2,190, E. Jobson, Open Stoves or Fire-grates.—2,445, A. Osborne, Heads and Screws.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

3,376, J. Becker and W. Winslow, Cleansing Whitewashing, Staining, and Painting Ceiling.—5,175, W. Wintour, Ventilating.—5,913, W. Leach, H. Lyman, Refractory or Fire-resisting Cement Ladders, &c.—6,819, J. Jacquemin and E. Sogtan, Closing Orifices in Drain-pipes.—6,874, J. I. and J. Lyon, Mosaics for Floors, &c.—6,895, S. Barwell, Draught, Rain, and Dust Excluder for Doors.—7,197, A. Goslin, Flushing Cisterns.—W. Albany, Retaining Windows at any desired Height.—8,845, N. Frowler and others, Bricks.—20,947, R. Haddon, Water-closets.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

MARCH 3.—By VENTON, BULL, & COOPER. St. John's Wood—4, Lodge-rd., u.t. 34 yrs., g.r. £40

By J. C. PLATT. Acton Green—30 and 32, Abchurch-rd., r. £72, 10s. p.a. Westbourne-pk.—4, Lancaster-mews, u.t. 73 yrs., g.r. £4, 10s., r. £30 ss. ...

9, Westmoreland-mews, u.t. 69 yrs., g.r. £5, r. £30

By G. A. BICKERTON. Clapham—73, The Chase, u.t. 79 yrs., g.r. £7, 10s., r. £40

Finsbury-pk.—37, Digby-rd., u.t. 86 yrs., g.r. £7, r. £40

By C. FULLER & SON. Stepney—1 and 3, White Horse-lane, u.t. 74 yrs., g.r. £10

Buckhurst Hill, Palmerston-rd.—"The Hollies," u.t. £75

By PHILLIPS, LEE, & DAVIES. Holborn—The Lease of 8, Smart's-buildings, u.t. 36 yrs., r. £280 p.a.

MARCH 4.—By G. ROBINS. Caledonian-road—75 and 77, Pembroke-st., u.t. 59 yrs., g.r. £2, r. £58, 15s. ...

New Southgate—6 to 11, Edward's-ter., and 1, Osborne Villas, u.t. 88 yrs., g.r. £30, r. £109, 4s. ...

Camberwell—F.g.r. of £35, with reversion in 73 yrs.

By RUTLEY, SON, & VINE. Kentish Town—37, Dickenson-st., u.t. 77 yrs., g.r. £30

Holloway—22, 24, and 24a, Vokey-rd., u.t. 69 yrs., g.r. £14

Brunswick-sq.—39, Compton-st., u.t. 15 yrs., g.r. £8, r. £30 p.a.

By CHESTERTON & SONS. Kensington—35, Holland-rd. Villas, u.t. 61 yrs., g.r. £25

By W. HALL. Hampstead—Cleveland, "Woodcote," and plot of land, f. ...

New Barnet—East Barnet-rd., a plot of f. land & Hackney—41, Casterton-st., u.t. 88 yrs., g.r. £6, r. £33, 16s. ...

Kilburn—1, Falconer Mews, u.t. 73 yrs., g.r. £5

Notting Hill—27, Wheatstone-rd., u.t. 85 yrs., g.r. £7, 10s.

MARCH 5.—By M. HUBBARD.
 (ah Town—25, Cavendish-rd., n.t. 68 yrs.,
 f. 58. 4,600
 By NORTON, TRIST, and GILBERT.
 ham—15, Bellenden-rd., f. 670
 Stanbury-rd., n.t. 53 yrs., g.f. 424. 106, f.
 229. 188. 185
 Clapton—"The Cazenoves" and 34 acres,
 and 1 1/2 acres l. 5,300
 Stanlrl.—Nos. 57 to 61 (old), f. area 39,100
 8,600
 By PROTHERO & MORRIS.
 h Kensington, Clarendon-grove—"Clarendon
 Edge," n.t. 33 yrs., g.f. 426. 1,300

MARCH 6.—By W. W. JENKINSON.
 road—8, The Avenue, n.t. 47 yrs., g.f. 62. 1a. 1,070
 By Messrs. CHOMIN.
 don—34, Northcote-road, f. 296

By W. J. NEWELL.
 ford—104, St. John's-rd., n.t. 99 yrs., g.f.
 22. 7a. 6d., r. 230 255
 Kent-rd.—25, 57, and 59, Aylm-rd., n.t. 18
 yrs., g.f. 418, f. 479 240
 3, and 5, Gervase-rd., n.t. 13 yrs., g.f. 425. 10a,
 271. 10s. 230
 201—60, Sussex-rd., n.t. 32 yrs., g.f. 43. 28a.,
 f. 420 325
 By FOSTER & GRANFIELD.
 road-st.—12, Union-st., f., area 420 ft., r.
 135. 3,075

By H. GRIFFIN.
 erson—Acorn Wharf, f., area 7,000 ft., r. 495 1,580
 By NEWB & HARDING.
 gate, Cromwell-avenue—The residence called
 "Caerleon," f. 1,100
 bury—93, Highbury Quadrant, n.t. 59 yrs.,
 g.f. 424. 15s. 700
 bury Pl.—216, Green Lanes, n.t. 29 yrs., g.f.
 27. 10s. 650
 onville—1 and 2, Vernon-sq., n.t. 29 yrs., g.f.
 700 455
 Vernon-st., n.t. 29 yrs., g.f. 45. r. 425
 e Newington—17, 19, 21, and 23, Woodland-
 rd., n.t. 73 yrs., g.f. 420 910

By C. G. COLES & Co.
 ing-hill—60 and 62, Portobello-rd., n.t. 52 yrs.,
 r.f. 49. 430
 and 70, Portobello-rd., n.t. 52 yrs., g.f. 49. r.
 279 515
 and 32, Portobello-rd., f., r. 400 p.a. 910
 MARCH 7.—By C. D. FIELD & SONS.
 igh—7, Maze-rd., f. 430
 Ladd's-court, f., r. 416. 18s. 115
 Noah's Ark-alley, f., r. 419. 10s. 130
 19—16, Guy-st., n.t. 23 yrs., g.f. 44, r.
 123. 14s. 135
 rfrs.—106 and 108, Broadwell, c. 300

Contractions used in these lists.—F.g.f. for freehold
 and rent; l.g.f. for leasehold ground-rent; l.g.f. for
 owned ground-rent; g.f. for ground-rent; r. for rent;
 f. for freehold; c. for copyhold; l. for leasehold; e.f.
 for estimated rental; n.t. for unexpired term; p.a. for
 annum; y. for years; st. for street; rd. for road;
 or square; pl. for place; ter. for terrace; yd. for
 &c.

MEETINGS.

FRIDAY, MARCH 15.
 Royal Institution.—The Right Hon. Lord Rayleigh,
 F.R.S., on "Electricity and Magnetism." 7.30 p.m.

MONDAY, MARCH 17.
 Royal Institute of British Architects.—(1) Mr. Alfred
 Boswell, on "Drawings of Brick Buildings in North
 America, erected from the designs of Professor Otzen-
 berg." (2) Mr. William White on "The Gallies of
 St. Paul's Cathedral." 8 p.m.
 Society of Arts (Contar Lectures).—Professor A. H.
 Church, M.A., on "Some Considerations Concerning
 Colouring." 1. 8 p.m.
 Imperial Architectural Society.—Miscellaneous Con-
 sultations. 7 p.m.
 Leeds and Yorkshire Architectural Society.—Mr.
 Waterhouse, M.A., on "The Work and Writings
 of Alfred Rick." 7.30 p.m.

TUESDAY, MARCH 18.
 Institution of Civil Engineers.—Mr. J. Price, Jun.,
 on "Lough Erne Drainage." 8 p.m.
 Royal Institute (Lectures for Sanitary Inspectors).
 J. F. J. Sykes, B.Sc., on "General Powers and
 of Inspectors of Nuisances.—Method of Inspec-
 tion." 8 p.m.
 Society of Arts (Foreign and Colonial Section).—Mr.
 Ellis on "Brazil." 5 p.m.

WEDNESDAY, MARCH 19.
 Lectures to Artisans and others on Matters Con-
 cerning Building.—Professor W. C. Unwin, F.R.S.,
 "The Construction of Walls." Carpenters' Hall,
 11, New-wall. 8 p.m.
 Institution of Civil Engineers.—Students' visit to the
 Grand Main Drainage Works. Meet at King
 Cross Railway Station at 1.30 p.m.
 London Mechanical Engineers' Society.—Mr. H. C.
 Clarke on "Gold Mining in Merionethshire." 7 p.m.
 Society of Arts.—Mr. J. S. Kettle on "Commercial
 Geography." 8 p.m.
 Architectural Association.—Mr. W. Money,
 on "The Seal of the Dean of Newbury, 1492."

THURSDAY, MARCH 20.
 Edinburgh Architectural Association.—Principal F.
 Galvrie on "Electric Lighting of Interiors."

FRIDAY, MARCH 21.

Sanitary Institute (Lectures for Sanitary Inspectors).
 Mr. J. F. J. Sykes, B.Sc., on "The Nature of Nuisances,
 including Nuisances the Abatement of which is
 difficult." 8 p.m.
 Institution of Civil Engineers (Students' Meeting).—
 Mr. L. A. Leveque on "Economy Trials of a Compound
 Mill-engine and Lancashire Boilers." 7.50 p.m.
 Royal Institution.—Professor G. F. Fitzgerald, M.A.,
 F.R.S., on "Electromagnetic Radiation." 9 p.m.
 Sunderland Architectural Students' Association.—Mr.
 F. Purvis on "Stone as a Building Material." 7.30 p.m.

SATURDAY, MARCH 22.

Architectural Association.—Visit to the new Central
 Offices for the Metropolitan Police on the Victoria
 Embankment, Mr. R. Norman Shaw, R.A., architect.
 Royal Institution.—The Right Hon. Lord Rayleigh,
 M.A., F.R.S., on "Electricity and Magnetism." VI.
 8 p.m.

Miscellanea.

Sales of Building Property at the Mart.
 —Two well-favoured properties at Hampstead
 will be put up to auction within three or four
 weeks hence, and in all likelihood will be de-
 voted to general building purposes. These are
 the Priory Lodge and Frogmal Hall estates,
 situated between St. John's parish church and
 the top of West End-lane, and covering about
 six acres in all, with 1,000 ft. frontage to
 Frogmal and Church-row. Priory Lodge is
 close to the site of the Priory built by
 "Memory Corner" Thompson, an auctioneer
 and valuer, over the ruins, as he claimed,
 of an ancient priory, formerly occupied by
 Cardinal Wolsey, as a rural retreat. But it is
 to be remembered that the real priory,
 Godwin's hermitage, temp. Henry I, converted
 into a nunnery of St. Benedict, lay at Canehour,
 or Kilburn. At Frogmal, in the older maps, are
 marked one or two ponds, feeders of the West
 Bourne, or Ay Bourne, whereof a branch ran
 towards Kilburn. The old manor-house of
 Hampstead originally stood upon the opposite
 (or northern) side of West End-lane. It
 was rebuilt by the name of Hall Oak
 Farm. Parkin, in his "Topography and
 Natural History of Hampstead" (1818),
 conjectures that this manor's primitive name was
 Frog-mall. He also says that in Sir Samuel
 Bentham's day there stood in the garden a
 handsome old pollard, being the particular oak-
 tree which Bentham had always understood
 gave its name to the manor farm. Thompson's
 Priory, which he filled with a strange collection
 of curiosities and pseudo-rarities, is now
 demolished. Lord Alvanley, Lord Chief Justice
 of the Common Pleas, occupied, teste Walford's
 "Old and New London," Frogmal Hall; he died
 there on March 13, 1804. Isaac Ware, the
 architect, and editor of Palladio's works, lived,
 for a while, in Frogmal Hall. Hard by, in
 West End-lane, being, as Park tells us, "the
 last house in Frogmal (southward)," and stand-
 ing in his day, was the house which Dr. Johnson
 rented for his wife, and to which he himself
 occasionally resorted. There, as we read in
 Boswell, he composed (1748) the greater part,
 if not the whole, of "The Vanity of Human
 Wishes, being the Tenth Satire of Juvenal
 Imitated."

The Tansa Water Scheme.—That this is
 the greatest scheme of a gravitating water-
 supply for a city in India is well known. The
 first survey was made by Major Hector Tulloch,
 now Senior Inspector of the Local Government
 Board in England, in 1870. It was first brought
 before the Corporation as a project to be
 executed on July 27, 1883, when it was ably
 supported by Dr. Weir, and was accepted. The
 area of the water-spread, when the dam is com-
 pleted up to the height which it is now intended
 to be carried, will be about seven square miles,
 while the catchment area is fifty-two square
 miles. The water from the reservoir will be led
 into Bombay by five miles of tunnels, twenty-
 five miles of ducts, and nineteen miles of 48-in.
 mains. These will carry the water to Ghat
 Kooper. From Ghat Kooper into Bombay there
 will be twelve additional miles of mains. The
 final surveys and necessary modifications which
 were found to be required were made by Mr.
 Clarke, the talented engineer of the works,
 under whose immediate superintendence they
 are being executed.—*Indian Engineering.*

New English Art Club.—This Club has
 secured the Galleries in Humphreys' Mansions,
 Knightsbridge, for its next Exhibition. The
 private view is fixed for March 29.

The English Iron Trade.—The English
 iron market is quieter, if anything, and its ten-
 dency is still downwards. Very little is being
 done in pig-iron, makers holding on pretty
 firmly to their quotations, while buyers generally
 purchase of merchants. Scotch warrants are
 again lower on the week, the result being that
 makers in Scotland have reduced their prices
 from 6d. to 2s. a ton, according to brand.
 Middlesbrough pig has lost 1s. 3d. a ton. In
 other districts prices are easier. Although makers
 of hematite pig are putting into practice their
 agreement of blowing out furnaces, to counteract
 the effects of operations in warrants, they have
 lowered their prices 3s. a ton. Manufactured
 iron is unsettled, and very little business is put
 through. The market is easier on the whole,
 merchants offering under makers' prices, and in
 the north of England ship-plates and angles
 have fallen. The tone of the steel market is
 anything but steady, and in the north-west
 wire rods have lost 5s. a ton, while rails and
 blooms have dropped 12s. 6d. and billets and
 slabs 15s. a ton. Ship-building material is also
 generally cheaper. There are no fresh orders for
 ships, and engineers are getting quieter.—*Iron.*

A New Source of Portland Cement.—A
 new source of supply of Portland Cement has
 been opened up by the recent discovery of the
 immense deposit of carbonate of lime and
 cement clay underlying the former in the county
 of Grey, Ontario. The deposit is only two
 miles from the Grand Trunk Railway of Canada,
 and only nine miles from Owen Sound of the
 Georgian Bay. The carbonate of lime is stated
 to be purer than the European chalk, and the
 clay much the same as the well-known Medway
 clay, and contains 62 per cent. of soluble silica.
 Canada imports about 100,000 barrels of Port-
 land cement annually, and the United States
 procure from Europe over 1,000,000 barrels.
 Not a barrel of Portland cement of commerce
 has, so far, been made in America, although an
 inferior kind of cement or water lime is manu-
 factured. The reason is obvious, no carbonate
 of lime having heretofore been found on the
 American continent pure enough to make
 superior Portland cement. It is believed that
 a cement superior to any imported can be pro-
 duced as cheaply as European manufacturers
 are able to place the raw material on the
 ground.

Free Lectures at Carpenters' Hall.—
 The fifth of the present series of free lectures
 to artisans and others on matters connected
 with building, under the auspices of the
 Worshipful Company of Carpenters, was
 delivered on Wednesday, the 5th inst., by
 Professor A. B. W. Kennedy, F.R.S., his
 subject being "The Forth Bridge." Mr. Alfred
 Preston presided, and there was a crowded
 attendance. The lecture was illustrated by a
 large number of photographic slides shown by
 means of a lantern.—The sixth lecture was
 delivered on Wednesday evening last by Pro-
 fessor Marshall Ward, M.A., on "The Tree,
 from the Sapling to the Bench." This lecture
 also was illustrated by lantern views. Mr.
 Wyatt Papworth, F.R.I.B.A., Master of the
 Clothworkers' Company, presided, and there
 was again a large attendance.

Lock-out of Kentish Brickmakers.—We
 regret to see that, owing to the strike of Kentish
 bargemen, there has been a lock-out of brick-
 makers. A special meeting of the Committee of
 the Brickmakers' Association was held in Lon-
 don last week, to receive a deputation from
 the Bargemen's Society, but a letter was read
 from the latter postponing the conference. On
 Saturday the edict of the Kentish brickmasters
 to close their works and to lock-out their hands
 came into force. This had the effect of turning
 some 5,000 people out of employment in the
 Sittingbourne district alone. The men have
 been told that they are locked-out pending the
 settlement of the dispute with the bargemen.

Berlin.—The exhibition of "Stone Road-
 making Materials," which had been organised
 by the Amalgamated Association of Pavors,
 and was held here recently, cannot, although
 very interesting and fairly well managed on
 the whole, be termed a success, partly owing
 to the inexact and very incomplete cataloguing,
 and partly on account of the non-marking of
 the prices on the exhibits. The idea of having
 such an exhibition was certainly good; for,
 however much asphalt and wood-paving may
 come in use, stone-paving, especially that of a
 superior sort, will never die out. The Associa-
 tion intends repeating the exhibition on a
 larger scale and with greater care.

Mr. P. H. Rathbone and the St. George's Hall Panels.—Mr. P. H. Rathbone has addressed a letter to the Town Clerk of Liverpool acknowledging the letter accepting his offer of the remaining panels for St. George's Hall, and adding that he hopes this "may be one step in restoring to British architecture that human interest which was alike the glory of Grecian and Gothic architecture, including our own cathedrals, and which alone spoke to the heart of the people until it was crushed by Henry VIII. and the great Protector of Edward VI.'s reign, but which makes every principal street in Florence a page of Florentine history, which he who runs may read."

PRICES CURRENT OF MATERIALS.

TIMBER.		£.	s.	d.	£.	s.	d.
Greenheart, B.G.	ton	7	0	0	7	15	0
Teak, E.I.	load	12	0	0	14	0	0
Sequoia, U.S.	foot cube	0	2	3	0	3	0
Asi, Canada	load	3	0	0	4	5	0
Birch	load	3	0	0	4	15	0
Elm	load	3	10	0	4	15	0
Fr. Dantsic, &c.	load	2	0	0	3	10	0
Oak	load	3	0	0	4	10	0
Canada	load	5	10	0	7	0	0
Pine, Canada red	load	2	10	0	3	10	0
Lath, Bantse, yellow	load	3	0	0	5	5	0
St. Petersburg	load	5	0	0	6	10	0
Walasot, Higa, &c.	log	0	0	0	0	0	0
Deals, Finland, 2nd and 1st, std. 100	load	8	10	0	11	0	0
" 4th and 3rd	load	7	0	0	8	0	0
Deals—Riga	load	7	0	0	9	0	0
St. Petersburg, 1st yellow	load	11	0	0	14	0	0
" 2nd	load	9	0	0	10	10	0
" white	load	6	10	0	10	0	0
Sweden	load	7	10	0	15	0	0
White Sen	load	9	0	0	17	0	0
Canada, Pine, 1st	load	10	0	0	25	0	0
" 2nd	load	11	0	0	17	10	0
" 3rd, &c.	load	8	0	0	10	10	0
Spruce, 1st	load	9	0	0	11	0	0
" 3rd and 2nd	load	7	0	0	9	0	0
New Brunswick, &c.	load	6	0	0	8	10	0
Baltens, all kinds	load	6	0	0	17	0	0
Flooring Boards, sq. ft. 1 in.	load	0	11	0	0	14	0
pared, First	load	0	8	0	0	10	6
Second	load	0	5	0	0	7	0
Other qualities	load	0	4	0	0	5	0
Cedar, Cuba	foot	0	0	4	0	0	5
Honduras, &c.	load	0	0	4	0	0	4 1/2
Malogany, Cuba	load	0	5	0	0	6 1/2	0
St. Domingo, cargo average	load	0	5	0	0	6 1/2	0
Mexican, cargo average	load	0	4 1/2	0	0	5 1/2	0
Tobacco	load	0	0	5 1/2	0	0	6 1/2
Hopburs	load	4	0	0	5 1/2	0	6 1/2
Box, Turkey	load	4	0	0	12	0	0
Rose, Rio	load	15	0	0	20	0	0
Bahia	load	14	0	0	18	0	0
Satin, St. Domingo	load	9	0	0	1	3	0
Porto Rico	load	0	0	10	0	1	0
Walnut, Italian	load	0	0	4 1/2	0	0	6 1/2
IRON—METALS.							
Bar, Welsh, in London	load	8	2	6	8	10	0
" at works in Wales	load	7	15	0	8	0	0
" Staffordshire, in London	load	8	10	0	9	10	0
COPPER—British, cake and ingot	load	62	10	0	63	10	0
Best selected	load	64	0	0	65	0	0
Sheets, strong	load	62	0	0	0	0	0
Chili, bars	load	47	0	0	0	0	0
YELLOW METAL—lb.	load	0	0	5 1/2	0	0	0
LEAD—Pig, Spanish	ton	12	10	0	0	0	0
English, com, brands	load	12	10	0	12	12	0
Sheet, English	load	14	15	0	0	0	0
Pipe	load	15	0	0	0	0	0
TIN—Straits	load	21	0	0	0	0	0
Australian	load	21	5	0	0	0	0
English Ingots	load	25	0	0	0	0	0
OLDS.							
Linseed	ton	22	10	0	22	15	0
Cocanut, Cochin	load	22	10	0	0	0	0
Cocanut, Ceylon	load	24	10	0	0	0	0
Palm, Lagos	load	24	10	0	0	0	0
Rapeseed, English, pale	load	33	10	0	0	0	0
" brown	load	32	0	0	0	0	0
Cottonseed, refined	load	22	7	0	22	10	0
Tallow and Oleine	load	21	0	0	40	0	0
Lubricating, C.S.	load	5	10	0	6	10	0
" refined	load	7	0	0	12	0	0
TAB—Stockholm	barrel	1	6	0	0	0	0
Archeing	load	0	17	6	0	0	0

TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

BIRMINGHAM.—For the erection of new business premises, Union-street, for Messrs. Chamberlain, King, & Jones. Messrs. Tittley & Jones, architects, Bennett's-hill, Birmingham:—

Thos. Smith	£3,500 0 0
John Bowen	3,556 0 0
W. J. Webb	3,405 0 0
John Sampson & Sons	3,428 0 0
Wm. Sparcott & Sons	3,385 0 0

Accepted provisionally.

BIRMINGHAM.—For the erection of a glass-cutting factory, St. George's-square, for Messrs. J. Grinwell & Sons, Birmingham & London. Messrs. Tittley & Jones, architects, Bennett's-hill, Birmingham:—

Archer	£909 0 0
West	825 0 0
W. J. Whittall (accepted)	700 0 0

COMPETITIONS, CONTRACTS & PUBLIC APPOINTMENT

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.
Works at New Cemetery	Willesden Burial Bd.	50l. and 25l.	April 30th
New Offices	Oldham School Board	50l., 50l., and 200l.	do.
College Buildings, Kingston-upon-Hull	The Governors	50 ps. and 25 ps.	May 1st

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Sewerage Works, Kentish Town	London County Council	Official	Mar. 17th
Roadmaking Works	Finsbury Local Board	do.	do.
Stone Paving	Com. of Sewers	do.	Mar. 18th
Roadmaking Works	Lewisham Bd. of Works	do.	do.
Roadmaking Works	Southend Local Board	P. Dodd	do.
Additional Arches and Facing Brickwork of Sea Wall	Brighton Town Council	F. J. C. May	do.
Works and Materials	Whitbread Local Board	Official	do.
Supply of Materials	Carlisle Corporation	W. H. Smith	Mar. 15th
Paving Works	Clerkenwell Vestry	Official	Mar. 20th
Iron Staircases	Bromley Union	Jno. Ladds	do.
Tailors Shop at Cottage Home, Banstead	Kennington, &c., School District Managers	A. & C. Harston	do.
Wrought-iron Bridge, near Reading	Berkshire County Council	J. Morris	Mar. 21st
Supply of Timber	Norwich Corporation	P. E. Marshall	Mar. 22nd
Gravel Footpaths, Clissold Parks	London County Council	Official	Mar. 24th
Gravel Footpaths, Well-tract Common and London Fields	do.	do.	do.
Works and Materials	Southgate Local Board	C. G. Lawson	do.
Roadmaking Works	Hendon U. R. S. A.	Thos. Henry	do.
Supply of Steam Coal	Colchester U. S. A.	Official	do.
Enlargement of the Norwich Post-office	Com. of H.M. Works	do.	Mar. 25th
Works and Materials	Wood Green Local Bd.	C. J. Gunyon	do.
Retaining Wall at Public Baths	Southampton Corpn.	W. B. G. Bennett	do.
Wood Paving	West Ham Council	Lewis Angell	do.
Convalescent Home, Broadstairs	N. Surrey School Dist. Managers	J. R. Vining	Mar. 26th
Sewerage Works	Richmond U. S. A.	Walter Brooke	Mar. 31st
Drainage of the New Gardens District	Hanwell Local Board	E. J. W. Herbert	April 1st
Roadmaking and Sewer Works	Governors of Blundell's School	D. Young	do.
Erection of Sanatorium, Tverton	Bromley U. R. S. A.	Official	April 2nd
Roadmaking Works	Com. of H. M. Works	do.	do.
Superstructure of New P.O., St. Martin's	Gloucestershire C. C.	J. Medlan	April 3rd
Police Station and Petty Sessions Court	County of Hertford	Urban A. Smith	April 7th
Lock-up, &c., Bishop Stortford	Gainsborough L. B.	D. G. Macdonald	April 8th
Well Sinking	Lawson & Donkin	do.	Not stated
New Church, Bourne-mouth	County of Northampton	E. Law	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
General Road Foreman	St. George-the-Martyr (Southwark) Vestry	3l. weekly	Mar. 13th
Assistant Road Surveyor	Birkenhead Corporat.	150l.	Mar. 13th
Inspector of Nuisances	Newcastle-on-Tyne Cor.	200l., &c.	Mar. 24th
Clerk of Works	Salford Corporation	4l. per week	Mar. 25th
Sanitary Inspector	St. Matthew, Bethnal Green, Vestry	120l.	Mar. 26th
Borough Surveyor and Engineer	Luton Corporation	200l., &c.	Mar. 28th
City Surveyor	Bucks County Council	Not stated	Not stated

EALING.—For iron roofs and castings, for the Ealing Local Board. Mr. Charles Jones, Surveyor:—

Iron Roofs. Iron Castings.

King, Masterman & Terry	£500 0 0	£152 10 0
R. C. Batham & Co.	473 10 0	108 18 7
Rubery & Co.	415 10 0	178 10 0
E. C. & J. Keny	383 10 0	170 10 6
Cragos & Co., Limited	360 0 0	—
Fredk. Brady & Co.	349 1 3	147 10 8
Alex. Math	342 10 0	108 10 0
Wm. Glover & Sons	332 10 0	133 16 0
Brownlie & Murray	315 0 0	138 13 0
Walter Jones	313 0 0	124 5 0
F. Morton & Co., Limited	313 10 0	107 0 0
Fredk. Bird & Co.	311 15 0	113 5 0
W. Whitford & Co.	310 0 0	128 0 0
Hill & Smith	285 0 0	112 8 0
Walter Macfarlane & Co.	—	135 1 0
Allday & Onion's Pneumatic Engineering Co., Ltd.	—	147 7 6
E. Humphries, Limited	—	156 12 0
A. Handyside & Co., Ltd.	—	133 15 10
J. Bagshaw & Son	—	113 10 0
Dutton & Co., Limited	—	101 0 0
Goldard, Massey, & Warner (accepted)	253 0 0	100 10 0

[Surveyor's Estimates, £327. 10s. and £132. 10s.]

FARNHAM.—For additions to the "Lion" Brewery Farnham for the Farnham United Breweries, Limited. Messrs. Inskip & Mackenzie, architects, 5, Bedford-row, W.C. Quantities by Messrs. R. L. Curtis & Co. 119, London Wall, E.C.:

Martin, Wells & Co., Aldershot	£3,448 0 0
Diamond & Sons, Farnham	3,350 0 0
Pompett & Kingham, Farnham	3,203 0 0
Patman & Fotheringham, London	3,130 0 0
Brown, Son, & Blomfield, London	2,960 0 0
Kirk & Randall, Woolwich	2,922 0 0

Accepted.

HEATON NORRIS.—For new works for Messrs. Faulder & Co., Limited, Heaton Norris. Mr. J. Harker, architect, 78, King-street, Manchester:—

Accepted Tenders for Ironwork, &c.

Messrs. De Bierge & Co., Limited (foundry ironwork, &c.)	£2,500 0 0
Messrs. Brown, Long & Co. (steel joists, &c.)	800 0 0
Messrs. Milburn & Co. (columns, &c.)	500 0 0

[All above tenders are on Schedule.]

LONDON.—For the reconstruction of the Olney Theatre, Welch-street, Drury-lane, W.C., for Mr. Wilmot. Messrs. Crew & Sprague, Fitzalan House, Arundel-street, Strand, and Mr. L. W. Goodwyn, Gravel Chambers, Granville-place, W., architects. Quotes by Mr. William Ailport, 35, Southampton-street, W.C.:

J. W. Hobbs & Co.	£23,720 0 0
Charteris	23,240 0 0
Collis & Sons	22,024 0 0
D. Laing & Son	22,740 0 0
J. Morter	22,590 0 0
J. & H. Bywaters	22,440 0 0
Holloway Bros.	22,228 0 0
Holliday & Greenwood (accepted)	21,577 0 0
F. & W. Pattinson	21,355 0 0
Kirk & Randall	21,150 0 0
J. Godfrey & Son	20,930 0 0

Peunterer's Work.

Sanders & Sons (accepted)	37 0 0
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LONDON.—For the erection of the Bishopsgate School, Chapel, and Curate's Residence, in Spital-square, E., including fences, heating, &c. Mr. T. Child Clarke, architect, 63, Bishopsgate-street in-
 Charles Cox £18,735 0 0
 J. B. G. 18,287 0 0
 Ashby & Horner 18,093 0 0
 Rollope & Sons 18,081 0 0
 Love Bros. 18,080 0 0
 Jack, Pettit & Co. 17,878 0 0
 Advance & Sons 17,831 0 0
 Holland & Hauman 17,695 0 0
 Lightdale 17,432 0 0
 Ellis & Sons 17,340 0 0
 Briggs & Hill 17,194 0 0
 Woodward & Co. 17,173 0 0

LONDON.—For the erection of the superstructure and erection of Nos. 54 and 55, London Wall, and Bourne-st., Copthall-avenue, E.C. Messrs. N. S. Joseph & Co., architects, 45, Finsbury-pavement. Quantities by Messrs. Franklin and Andrews:—
 J. Shepherd £10,973 0 0
 F. Schreiber & Co. 10,888 0 0
 J. G. 10,780 0 0
 Row, Son, & Blomfield 10,750 0 0
 Clark Gentry 10,636 0 0
 Ashby & Horner 10,523 0 0
 J. B. G. 10,338 0 0
 T. Chappell 10,293 0 0
 Atman & Fotheringham 10,223 0 0
 Lawrence & Sons (accepted) .. 10,155 0 0

LONDON.—For alterations and additions to No. 77, Whitechapel-road, in order to adapt the same for the uses of a model lodging-house for the Building Act. Mr. W. Gilbee Scott, A.R.I.B.A., architect, Bedford-row, W.C. Quantities by the architect:—
 Earle & Son £7,350 0 0
 J. Hanson 7,150 0 0
 J. B. G. 6,987 0 0
 Morter 6,905 0 0
 Boyce 6,775 0 0
 J. B. G. 6,773 0 0
 A. & F. J. Wood 6,730 0 0
 Godfrey & Son 6,678 0 0
 Earle & Co. (accepted) 6,493 0 0

LONDON.—For rebuilding No. 52, Coleman-street, near Mr. Chas. Morrison. Messrs. Gordon & Co., architects, 35, Finsbury-circus, E.C. Quantities by the architect:—
 Atman & Fotheringham £8,750 0 0
 Johnson & Son 8,572 0 0
 J. B. G. 8,245 0 0
 Jarvis & Sons 8,200 0 0
 J. B. G. 8,053 0 0
 Godfrey & Son 7,330 0 0
 J. B. G. (accepted) 7,330 0 0

LONDON.—For alterations and additions at High-street, for Mr. Roper. Mr. W. T. Farthing, architect:—
 J. B. G. £4,297 0 0
 J. B. G. 4,177 0 0
 Holloway 3,900 0 0
 J. B. G. 3,975 0 0
 Atman Bros. 3,890 0 0
 J. B. G. 3,863 0 0
 J. B. G. 3,814 0 0
 J. B. G. 3,798 0 0
 J. B. G. 3,777 0 0
 J. B. G. 3,767 0 0
 J. B. G. 3,694 0 0
 J. B. G. 3,684 0 0

LONDON.—For the construction of dock and foot-bridge at the western end of the Putney Embankment, Wandsworth District Board of Works. Mr. J. C. Clark & M.L.C.E., surveyors. Quantities by Mr. Clark & M.L.C.E., architects, 3, Bucklersbury, E.C.:—
 J. B. G. £4,418 0 0
 J. B. G. 4,080 0 0
 J. B. G. 3,938 0 0
 J. B. G. 3,847 0 0
 J. B. G. 3,810 0 0
 J. B. G. 3,785 0 0
 J. B. G. 3,660 0 0
 J. B. G. 3,630 0 0
 J. B. G. (accepted). Surveyor's estimate, £2,700.

LONDON.—For the erection of Mission Church, near St. Pancras. Mr. John Hamilton, architect:—
 J. B. G. £1,950 0 0
 J. B. G. 1,833 0 0
 J. B. G. 1,827 0 0
 J. B. G. 1,804 0 0
 J. B. G. 1,784 0 0
 J. B. G. 1,773 0 0
 J. B. G. 1,462 0 0
 J. B. G. 1,382 0 0

LONDON.—For rebuilding No. 324, Holloway-road, near Mr. Reuben Loomes. Mr. Whitehead, architect:—
 J. B. G. £2,173 0 0
 J. B. G. 2,026 0 0
 J. B. G. 1,897 0 0
 J. B. G. 1,863 0 0
 J. B. G. 1,764 0 0
 J. B. G. 1,743 0 0
 J. B. G. 1,651 0 0
 J. B. G. 1,545 0 0

LONDON.—For constructing brick and pipe sewers on the site of the late, Highbury New Park, near J. Edmondson & Son, under the Vestry of St. Pancras. Messrs. J. P. Barber, C.E., Surveyor:—
 Messrs. Barbers, Finsbury Park, (accepted) £1,563 0 0

LONDON.—For pulling down No. 4, Little Putey-street, Soho, and rebuilding same for Mr. Walter Justice. Mr. W. Gilbee Scott, architect, 25, Bedford-row, W.C. Quantities by the architect:—
 W. Rows £2,450 0 0
 D. Lang & Son 2,450 0 0
 W. Downs 2,438 0 0
 T. Boyce 2,380 0 0
 W. Harris & Co. 2,379 0 0
 W. Scrivenner 2,266 0 0
 Harris & Wardrop 2,257 0 0
 Bywaters 2,250 0 0
 G. Godfrey & Son 2,137 0 0
 W. Johnson (accepted) 2,100 0 0

LONDON.—For pulling down and rebuilding No. 56, Great Titchfield-street, W., for Messrs. W. H. & C. Chalton. Mr. Walter Miller, architect, 182, Oxford-street, W. Quantities by the architect:—
 Watson £2,589 0 0
 Whetherill, Lee, & Martin 2,498 0 0
 Williams & Son 2,479 0 0
 Adams 2,331 0 0
 W. Harris & Co. 2,350 0 0
 J. Godfrey & Son 2,044 0 0
 Stevens 2,030 0 0

LONDON.—For erecting warehouse at Hackney, for the Dublin Bottling Company. Mr. J. Hamilton, architect:—
 Prater £2,104 0 0
 G. W. Beale 1,970 0 0
 F. H. Wilson 1,933 0 0
 Wm. Shurman 1,890 0 0
 Godfrey & Son 1,887 0 0

LONDON.—For pulling down and rebuilding the "Eagle Tavern," Chatham-road, Wandsworth Common, for Messrs. Matthews & Canning. Messrs. Karalack & Foranor, architects and surveyors, 5, Great Queen-street, Westminster:—
 Potterton £1,800 0 0
 Buchanan 1,658 0 0
 MacLachlan & Son 1,625 0 0
 W. F. Picken, Chelsea 1,589 0 0
 McCormack & Sons 1,545 0 0
 Holloway Bros. 1,522 0 0

LONDON.—For erecting new warehouse, Fulwood's-terrace, Holborn, W.C., for Messrs. Watson & Sons. Mr. Henry L. Florence, architect, 3, Verulam-buildings, Gray's Inn, W.C. Quantities by Mr. J. P. Bull, 30, Bedford-row, W.C.:—
 B. Wire £2,210 0 0
 Worley 1,907 0 0
 A. Heron & Latta 1,935 0 0
 Harris & Wardrop 1,918 0 0
 J. Jarvis & Sons 1,870 0 0
 J. Godfrey & Son (accepted) 1,844 0 0

LONDON.—For alterations and additions to No. 9, Bantock-street, W., for Miss Snadelle. Mr. C. H. Worley, architect. Quantities by Mr. E. C. Cleed:—
 Amended tender.
 G. H. & A. Bywaters (accepted) £1,578 0 0

LONDON.—For alterations and additions to No. 5, Bentinck-street, W., for Mr. Saul, Lithgow. Mr. C. H. Worley, architect. Quantities by Mr. E. C. Cleed:—
 Amended tender.
 G. H. & A. Bywaters (accepted) £1,650 0 0

LONDON.—For painting, cleaning, &c. the interior of the South-Eastern Hospital, New Cross, S.E., for the Metropolitan Asylums Board. Messrs. H. Jarvis & Son, architects, 29, Trinity-square, S.E.:—
 W. H. Castle, Southwark £2,293 0 0
 W. F. W. Small, Green-lanes, N. 2,279 18 10
 J. Vaughan, Primrose 1,888 10 0
 J. J. Richards, St. David's-street, Bury 1,848 0 0
 C. G. Wright, Crickwood 1,785 0 0
 Godson & Sons, Kilburn 1,650 0 0
 W. Reason, St. John-street, Clerkenwell 1,635 0 0
 W. G. Lily, Whitcombe-street, W.C. 1,457 0 0
 M. Batchelor, Maidstone 1,354 0 0
 W. S. Hadzor, Dover 1,260 0 0
 R. H. Bax, Highbury 975 0 0
 L. Wallace, Sutton (accepted) 355 10 0
 Foris, Soutwark 355 10 0

LONDON.—For sanitary and decorative works to No. 53a, Sussex-square, W., for Mr. E. Bacon. Mr. Walter Graves, architect, Winchester House, E.C.:—
 White & Co. £270 0 0
 Shaw 598 0 0
 Slegmann 522 0 0
 Nightingale (accepted) 514 0 0

LONDON.—For redecorating and repairs at the "Duke of Argyll," Great Windmill-street, W., for Mr. A. C. Mills. Mr. J. H. Wesley, architect, Forest-gate:—
 Bishop & Webb £165 10 0
 Clayton 152 10 0
 A. & W. Garay, Peckham 114 0 0
 "Accepted."

LONDON.—For building an additional story to No. 21, Whitton-road, Finsley, S.W., for Mr. Rice Taylor. Messrs. Saville & Martin, architects, 86 and 87, Strand, W.C.:—
 R. H. Harris £210 0 0
 T. Couillard 199 0 0
 C. H. Bates 159 0 0
 B. Bowles (accepted) 128 0 0

LONDON.—For making up and paving roads in the Parish of Fulham. Mr. W. Sykes, New Streets Surveyor:—
 Gilstead-road.

Bowles, Battersea £910 0 0
 Nowell & Robson, Kensington 613 0 0
 Tomes & Wimpey, Hammersmith 603 0 0
 Mears, Kensington 506 0 0
 Serff, Holle, & Co., Chiswick 572 0 0
 Neave & Son, Paddington 527 0 0
 Coat, Hammersmith 491 0 0
 Whittinghall-road.
 Bowles, Battersea 420 0 0
 Nowell & Robson, Kensington 337 0 0
 Serff, Holle, & Co., Chiswick 315 0 0
 Tomes & Wimpey, Hammersmith 304 0 0
 Neave & Son, Paddington 293 0 0
 Coat, Hammersmith 368 0 0

LONDON.—For pulling down and rebuilding back addition and sundry repairs at 1, 2, 10, and 12, Market-place, Underhill-road, East Dulwich. Mr. Alfred Wright, architect, 61, Kennington-road:—
 Nixon £275 0 0
 Hollingsworth 230 0 0
 Ford & Son 228 0 0
 Batley 224 0 0
 G. Godson & Sons, Kilburn 208 19 0
 Greuville 175 0 0

LONDON.—For the supply of granite kerbs, pitching, channelling, macadam for roads, Yorksire stone flags, Patent Indurated stone flags, cartage of materials, and the masons' and paviors' work for one, two, or three years, from March 25, 1890, for the District Boards of Bow, Poplar, Bromley-by-Bow, and the Isle of Dogs.
 Lewis Griffiths, Millwall, E., schedule of prices (accepted).

LONDON.—For the erection of artisans' dwellings, Richard's-place, Old-street, E.C. Messrs. Elmsston & Gabriel, architects, 42, Old Broad-street. Mr. G. R. Tasker, surveyor, 38, John-street, Bedford-row:—
 J. B. G. £286 0 0
 J. B. G. 270 0 0
 Shenherd 274 0 0
 Patman & Fotheringham 239 0 0
 Taylor 209 0 0
 Scott 198 0 0
 Smith & Son 198 0 0
 Young & Lonsdale 176 0 0

LONDON.—For the construction of a new road and sewer on the Old Park-avenue Estate, Nightingale-lane, S.W. Messrs. N. S. Joseph & Smith, architects, 45, Finsbury-pavement, E.C.:—
 L. Bottoms, Wandsworth-common £72 0 0
 R. Mayo & Co., Brixton 60 0 0

LONDON.—For erecting a new proscenium to the stage of concert-hall, and for re-decorating, gilding, and other works to hall, supper, and dressing-rooms, also concert-hall, at the Queen's Gate Hall, Harrington-road, South Kensington. Messrs. Rogers, Chapman, & Thomas, surveyors, 59, Belgrave-road, South Belgravia, S.W.:—
 Adin Bros. & Davies £253 0 0
 W. K. Manders 223 0 0
 J. Douglas 213 0 0
 H. Smith & Son 212 0 0
 E. D. Hook (accepted) 250 0 0

NEWCASTLE-ON-TYNE.—For building St. Jude's Church, Newcastle-on-Tyne. Mr. A. B. Plummer, architect, Newcastle. Quantities by Mr. Geo. Connell, Grainger-street, Newcastle:—
 E. Weatherley, Newcastle £4,003 0 0
 E. B. Road, Newcastle 3,833 5 7
 J. H. Elliot, North Shields 3,618 0 0
 Tyrie & Graham, Newcastle 3,763 0 0
 S. B. Burton, Newcastle 3,754 13 6
 Middleton Bros., Newcastle 3,620 10 0
 Haswell & Waugh, Newcastle 3,618 0 0
 J. & W. Lowry, Newcastle 3,488 10 0
 J. T. Simpson, Newcastle 3,452 11 6
 R. E. E. Reed, Newcastle 3,411 0 5
 G. Scott & Son, Newcastle 3,382 19 3
 J. Shepherd, Durham 3,303 3 0
 W. Baston, New Bridge-street, Newcastle (accepted) 3,260 1 0

NEWCASTLE-ON-TYNE.—For new workshops, &c., at the corner of FORTH and South streets, Newcastle-on-Tyne, for the Gas Company. Mr. A. B. Plummer, architect 48, Cloth Market, Newcastle. Quantities by Mr. Geo. Connell, Grainger-street, Newcastle:—
 J. & W. Lowry (lowest) (accepted) £2,159 5 0

NEWCASTLE-ON-TYNE.—For alterations to premises, Clayton-street, Newcastle. Mr. Arthur B. Plummer, architect, 40, Cloth Market, Newcastle:—
 J. M. Wilson (lowest) £175 10 0

RICHMOND.—For the completion of No. 2 Contract of the drainage works. Mr. Meils, C.E., engineer:—
 S. E. Bentley £49,674 12 6
 H. Hill 48,990 0 0
 A. Kellert 40,193 3 3
 A. Mears 39,717 0 0
 T. Adams 37,576 12 11
 W. J. Jotterill & Co. 35,937 0 0
 H. Dickson 35,966 0 0
 Nowell & Robson (accepted) 34,983 0 0
 Holme & King 33,779 15 4

RUDGWICK (Sussex).—For two pairs of cottages at Arun Bank. Mr. Benj. Tabberer, architect, 13, Basinghall-street, E.C. Quantities by Messrs. Franklin & Andrews, 25, Ludgate-hill, E.C.:—
 Waddington & Co., Spisham £1,057 0 0
 King Bros, Rudgwick 983 17 5
 Peters, Horsham 900 0 0

SALFORD.—For erecting the Ladywell Sanatorium, Salford. Messrs. Maxwell & Tuke, and E. & F. Hewitt, joint architects, 29, Princess-street, Manchester:—

Sanatorium Buildings. G. Parkinson 235,047 0 0 ... 2,307 19 0 S. & W. Pattinson 31,982 0 0 ... 802 0 0 A. Bleakley & Sons 39,548 0 0 ... 4833 0 0

Terra Cotta. Monk & Newell 2883 19 1 J. C. Edwards (accepted) 971 12 7

Concreting. Dunbar Kelly 22,905 3 2 H. H. Morton 1,932 0 0

Bell Hanging and Lightning Conductor. Rudale 171 0 0 Baker 148 0 0

SIDMOUTH.—For building new farm-house, Upper Chelson, Sidbury Manor, Sidmouth. Mr. Walter F. Cave, architect, 8, George-street, Portman-square, W.:

Turner & Skinner, Honiton 4710 0 0 Holmes & Tozer, Exeter 690 0 0

SOUTHALL (Middlesex).—For new school for 300 boys at Featherstone-road, Southall, Middlesex, for the Norwood Middlesex School Board. Mr. Thos. Newell, architect. Quantities by Messrs. Young & Brown:—

School Walls, Latrines, Building, and Play-ground. J. W. Falkner 23,732 41,647 25,370

SOUTHALL (Middlesex).—For three shops and dwelling-houses in High-street, Southall, Middlesex. Mr. Thos. Newell, architect. Quantities by Messrs. Young & Brown:—

T. Nye, Edling 23,140 0 0 H. & A. J. Jones, Edling 3,047 0 0

Reduction Estimates. Dorey 2,600 0 0 Gibson 2,476 0 0

THIRSK.—For additions, &c., to mansion, Thirskley Park, near Thirsk, for Lady Payne-Frankland, Messrs. William Lewis & Son, architects, 40, Stonegate, York. Quantities by the architects:—

James Thackeray, Ripon 22,288 0 0 John Keswick, Micklegate, York 1,936 0 0

SUDEBURY (Middlesex).—For sundry decorative works to "The Hale," for Mr. A. Hicks. Mr. Walter Graves, architect, Winchester House, E.C.:—

Oldrey & Co. 1135 0 0 Tompkins 97 5 0

WOLVERHAMPTON.—For erecting the "Vine" Inn, Stafford-street, for Messrs. Wm. Butler & Co. Mr. Arch. Paul Brevitt, architect:—

Henry Willcock, Wolverhampton 43,985 0 0 Henry Lovatt, Wolverhampton 3,960 0 0

WORCESTER.—For new tin-room, cooperage, boiler-house, and stables, for Messrs. Lewis, Clarke, & Co.'s Brewery, Worcester. Messrs. Sannell & Colyer, architects, 15, Great George-street, Westminster, S.W. Quantities by Messrs. R. L. Curtis & Sons, London-wal:—

No. 1.—Building. J. Wood & Sons, Worcester 43,729 0 0 No. 2.—Fronteroe. J. Wood & Sons, Worcester 727 0

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The Builder.

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FRIDAY, MARCH 22, 1890.

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Christ Church, Eimsbüttel, near Hamburg.—Professor J. Otzen, Architect	Double-Page Ink-Photo.
Pavement, Jubilee Chapel, Berlin.—Professor J. Otzen, Architect	Double-Page Ink-Photo.
Altar and Keredos, Mountain Church, Wiesbaden.—Professor J. Otzen, Architect	Single-Page Photo-Litho.
St. Nicholas Church, Flensburg, showing modern spire.—Professor J. Otzen, Architect	Single-Page Ink-Photo.
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The Railways of America.



WHETHER it is a perception of an increased public interest in railway working that has called forth popular publications on the subject recently, or whether the publication of these works has itself been the means of awakening public interest on the subject, it would be difficult to decide. At all events it seems to be recognised now that railways and railway working are subjects open to treatment in popular literature. Mr. Acworth's extensive and effectively written treatise on the Railways of England has been pretty speedily followed by a similar type of book on the Railways of America;* which however is not the work of one writer, but a collection, into one volume of a series of chapters by various writers, each treating separately his own subject, but the whole being written as a series and in relation to one another.

Though it might be expected that this divided authorship, and the relegation of special subjects to special writers, should conduce to a more thorough and practical character in a book on so large and complicated a subject, we cannot say that the American book in the main compares favourably with its English forerunner in practical character, except in regard to the two first chapters, written by engineers, on "The Building of a Railway" and on "Feats of Railway Engineering." Even these are written in rather a sensational style, though they really give information supplemented by a number of illustrations; and much of the book is apparently written with the special desire to say startling and effective things rather than to give information on a practical subject in a practical manner.

It is just possible that in this desire to be effective the writers have done the railway system of their country some injustice, though their endeavours to give graphic accounts of hairbreadth escapes from dangers which ought not to have existed, and of tragic

* "The Railways of America: their construction, management, development and appliances." By various writers. With an introduction by Thomas M. Cooley, Chairman of the Interstate Commerce Commission. With more than 200 Illustrations. London: John Murray, 1890.

accidents which ought never to have happened. It is only charitable to suggest this possible allowance for the effects of literary impulsiveness. If we are to take this book *au pied de lettre*, we can only say that it gives the idea in many parts of what might be termed an organised recklessness in the making and management of railways such as would fill people with indignation in this country, and which, if it represents the plain truth, certainly serves to account for the number of bad railway accidents which we hear of from the United States.

Nothing could more decisively mark the wide distinction between the whole spirit of railway policy in England and America than the naive admission made by Mr. Curtis Clarke in the first chapter, "There is one thing more which distinguishes the American railway from its English parent, and that is the almost uniform practice of getting the road open for traffic *in the cheapest manner and in the least possible time*, and then completing it and enlarging its capacity out of its surplus earnings, and from the credit which these earnings give it." The italics are ours. The writer makes this characteristic admission without comment, and apparently without any perception of its damaging imputation. This system has been followed everywhere, it seems, except on a few branch lines, "and on one monumental example of failure," the West Shore Railway of New York, in which an attempt was made to build a railway up to the standard of one that had been forty years in reaching its standard of excellence. "Their money gave out, and they came to grief." The most elaborate essay could hardly emphasise more the distinction between the English and American spirit of responsibility in railway-making; a distinction of which we may well be proud. It has at all events been always recognised in England that the construction of a railway is a matter of grave responsibility in regard to public safety, and that it is not a kind of construction to be turned out anyhow, in a hurry, in order to realise dividends at the expense of risk to the lives of all travelling upon it. We allow jerry-building, unhappily, to far too great an extent; but we have not yet gone so far in the evil path as to sanction jerry railroad-making. That the Americans regard this as a perfectly natural and commendable system, as one which it is even a folly to depart from, is a charge which we should hardly have ventured to have made against them; but here we have it on the

authority of one of their own engineers; and the admission throws a significant light on some of the accounts of railway accidents in the States, as well as on incidents mentioned in other portions of this book. This is the bad side of a spirit in railway engineering which has also its good or at all events its interesting side. The history of the American railroad affords, it must be admitted, evidence of what may be called the adaptability of the spirit of the nation. They were not content to adopt the system as England invented it, but began early to consider railroad-making in reference to the special conditions of the country. In making railroads over immense areas of often hilly country, where there was no choice of a flatter route within the range of district to be served, it was resolved that the railway must be adapted to the country and not the country to the railway. Hence the invention of the swivelling truck or "bogies" system, by which the whole length of train was rendered as flexible as possible, so as to go round curves of short radius. Hence also the method, of which the Americans first set the example, of working railways up slopes by a series of returns and doubles, the road coiling up the hill like a snake in a long series of curves, crossing and recrossing itself at higher levels, so that one American engineer is reported to have said, "where a mule can go, I can make a locomotive go." This eccentricity of railway planning, as it appears to those who are not used to it, is in some sites, no doubt, the most practical and direct way of meeting a difficulty. But in regard to the system of a flexible train and short curves, and the boast of the American engineer that thus a costly tunnel may be avoided by doubling round a promontory for instance, on the edge of a valley, which an English train could not go round, it must be remembered that this saving is effected at the expense both of speed and safety. A comparatively straight track, with no short radius curves, means high speed with safety, besides a more direct route. It costs more to make at first, and we can easily imagine that it would not suit a country where railways seem to be regarded mainly in the light of acute financing operations, intended to bring the quickest return possible; but with a solid financial basis it means speed, safety, saving of time, and ultimate money value in proportion. So with questions of vertical irregularity of road; as Mr. Acworth very justly pointed out in his book, the adoption of a heavy

gradient by way of shortening the route, in one instance, had proved a permanent cause of delay and of cost in haulage which more than compensated for the initial saving in the adoption of the route. And our conclusion in comparing the American system of sharp curves and steep gradients, as described here, with the English system of often heavy initial expenditure in securing comparatively straight and level roads, is that the latter has in the long run the advantage in every particular.

The change in the type of locomotive engine from that first derived from England is another example of the independent line taken in America, and with better reason. The type of locomotive which originated in England has been adopted with little variation by most of the European countries, where the conditions of railway work did not differ very materially from those of this country. The swivelling truck or bogie, first used in American engines, as observed, for the sake of flexibility on short curves, has been to a great extent adopted in English locomotives since, though the sharp curves have not been introduced, and indeed hardly could be until the whole of the rolling stock should be mounted on swivelled wheels. But other conditions combined to change the form of the locomotive in America; the use of wood fuel, which appears to require a different type of chimney (a detail, by the way, not commented on or explained in the volume); the necessity of frequent progress through snow, which produced the snow-plough in front of the engine; the running of long portions of the earlier railways through desert prairies, which no doubt established the "cow-catcher" framework in front of the engine as a kind of recognised equipment; and the frequent traversing of long routes in hilly country and with very steep "grades," which has further developed in the States the coupling of wheels to gain all the frictional grip that is possible with the weight of the engine. Thus we have the "consolidation" locomotive, with its four pairs of small driving-wheels, all connected by coupling-rods, with only one pair of small leading wheels at the extreme front of the bearing; and the "Decapod," with five pairs of small connected driving-wheels, looking as if it ran on castors; and a machine contrived for climbing steep gradients. Another peculiarity of the American engine is a recent development of the body of the engine in front of the chimney and boiler, as if the boiler were extended further. This is an elongation of the smoke-box in front of the base of the chimney, to give more space for catching and detaining hands and cinders, which collect here and can be removed by taking off the front plate. We presume the fuel used has made this desirable, as no necessity for it has been found in England, as far as we are aware. All these various *differentia* combine to render the American locomotive, to European eyes, a somewhat uncanny-looking object; it is impressive in its mass and its rather uncut outline, but has a heavy and cumbersome appearance, and has not the expression of being formed for speed which the English locomotive conveys; it has other special merits of suitability to its circumstances, but we cannot help thinking that the English model is more a work of Art, of the two.

There are it appears, one hundred and fifty thousand miles of railway laid down in the United States; and various details in the chapters on Railway Construction, as well as this rather impressive statement of mileage, impress the reader with the fact that we are in a country where things are done on a very large scale, and where no obstacles are allowed to count. But although one cannot help admiring the ingenuity with which a railway is carried in all kinds of ways through all kinds of country, we do not know that a perusal of the book is exactly calculated to give one a wish to travel much on American railways. Especially considering that ominous sentence before quoted, as to the practice of making railways as speedily and as cheaply as possible in the first instance, one cannot but feel, while looking at some of the illus-

trations of sections of line carried on "trestles," that is, running on the top of a series of tripods, that while it is magnificent as long as all is right, the slightest accident must have fearful results, and that if one travelled on railways carried on these kind of viaducts one would like at all events to know that they had been built with the very best materials and with the greatest care; and such knowledge as we can get seems to point rather to a considerable lightness of heart in these matters; at all events to a feeling that economy and rapidity of construction are the main ends in view. The long "trestle" on the Colorado Midland Railway, for instance, shown in one of the plates, is described as "an expedient often of the greatest service in railway construction. These trestles are built of wood, simply but strongly framed together, and are entirely effective for the transport of traffic for a number of years." That is to say, they do wonderfully well considering their temporary nature. "They must then be renewed, or what is better, be replaced by embankment, which can be gradually made by depositing the material from cars on the trestle itself." From other remarks elsewhere, it almost seems as if piling earth on the outside of a timber structure were considered sufficient to constitute it an embankment, or what appears in America to be called a "culvert." What about the centre when the timber finally decays? It seems hardly possible that this can be the meaning, yet we do not know how else to understand the remark on page 26, in connexion with temporary wooden structures, that "a structure covered with earth is much safer than an open bridge."

In the more modern American railways the art of building lofty viaducts on very light steel piers seems to have been carried to great perfection, though from the point of view of the picturesque one is almost tempted to regret the change on comparing the view of the grand timber viaduct at Portage, on the Erie Railway, with the thin spider-like construction that has taken its place. In regard to the method of finishing the light steel viaducts for the roadway Mr. Clarke says

"Build strong iron or steel bridges and viaducts with as short spans as possible and having no trusses above the track where it can possibly be helped. Cover these and all new bridges with a solid deck of rolled steel corrugated plates, coated with asphalt to prevent rusting. Place on this broken stone ballast, and bed the ties in it as in the ordinary form of road-bed."

By this means the usual shock felt in passing from the elastic embankment to the comparatively solid bridge will be done away. Has a crack formed in a wheel or axle, this shock generally develops it into a break, the car or engine is derailed, and if it strikes the truss the bridge is wrecked. The cost of this safety floor is insignificant, compared with the security resulting from it."

Security to the bridge, no doubt, but as to security to the passengers or the train no one who looks at the drawings of the type of bridge of which this remark is made would feel much reassured. The only "security" would be that the train, unless going at a very slow speed, would go over the edge, or a great part of it at all events. The tone in which cracked and broken axles are spoken of as if they were incidents to be looked for at any day is noticeable.

The deep snows to which parts of the American railway system are subjected in winter exercise a considerable influence on the construction of roads in certain positions, most remarkably illustrated in the great covered snow-sheds built over the track on the sides of declivities, to protect the train from avalanches. The train has to be run, for a long distance in places, under covered penthouse galleries of very solid construction, the roof of which continues the slope of the ground above so that the snow slides over it. In a section given of one of these we observe that there is a double track, that outside the shed being marked "summer track" and the inside "winter track." Why people who pride themselves so much on economy in railway work should go to this expense of a double track, and

why the covered track will not serve the purpose at all times of the year, it is not very easy to see. Another special feature rendered necessary by the snow is the snow-plough, a great erection like the prow of a small vessel, which is shown as pushed by sheer force through the snow, with four engines in line behind it. A more scientific means of attaining the same end appears to be exhibited in the representation of a "rotary steam shovel" at work, pushed by three engines, and sending off the snow in thick flying showers on either hand of the front engine: the illustration, a sensational one enough in appearance, is reproduced from an instantaneous photograph. There is, however, no technical description or illustration of its method of working, which it would have been of some interest to have.

The system of signalling and managing the succession of trains is described in the chapter on "Railway Management." We observe that the block system is not referred to as if it were in general use; and in regard to the interlocking system of points it is said "sometimes, by a very expensive and complicated apparatus, it is made mechanically impossible to open a track for the movement of a train without the previously locking all openings by which another train might interfere," so that this is invaluable and, as we now consider it in England, absolutely necessary system at all complicated junctions, appears still to be regarded in America rather in the light of a costly luxury. The following passage also suggests a comparison to our advantage:—

"Any train making a stop not on its schedule must immediately send out flagmen with red flags, lights, and torpedoes to protect it. This rule is a very difficult one to enforce without rigid discipline, and its neglect is the cause of the large percentage of the accidents 'that will happen.' The flagman who must go to the rear, often half a mile, at night, across trestles and in storms, must frequently be left behind, to take his chances of getting home by being picked up by a following train. There is no one to watch him, and he will often take chances, and not go back as far or as fast as he should; and if all goes well no one is ever the wiser."

We do not think that kind of charge could be brought against even the humbler members of the staff of any good English railway. Another detail in which the Americans seem behind the age is in the exceedingly primitive provision for the brakemen of "freight trains," who appear simply to stand on the roofs of the carriages, in any weather (there is a sensational picture of one of them at work in a snowstorm), and screw down at the proper time break-wheels working on vertical axles projecting two or three feet above the carriage roof. It is possible that the idea of a glazed look-out window projecting above or at the side of the carriage, that the brakeman may see where he is, has never occurred to the American railway mind?

Another passage in regard to the difficulties of fast running (the engine-driver, by the way, in America is called the "runner") seems to argue that a good many things are as yet far from being as they should be on American railways:—

"Fast time on a railroad depends as much on having a good signal system to assure the locomotive-runners that the line is clear, as it does on the locomotives. If he is always liable to encounter, and must be on the look-out for, obstructions at frequent grade-crossings of common roads, or if he is not certain whether the train in front of him is out of his way or not, the locomotive-runner will be nervous and be almost sure to lose time. If the speed is to be increased on American railroads, the first steps should be to carry all streets and common roads either over or under the lines, have the lines well fenced, provide abundant side-tracks for trains, and adopt efficient systems of signals so that locomotive-runners can know whether the line is clear or not."

This seems unsatisfactory enough, but it is a trifle to what we read in the chapter on the railway mail service, apropos of the duty of compensating the families of employes who are injured or killed in travelling on the railway mail carriages:—

"The danger to those within the postal cars is recognised by the railway people, and . . . all that American ingenuity suggests in the way of con-

struction, both inside and outside of the cars, is provided. The body of the car is most substantially built, the platforms and couplings are of the most approved patterns, the trucks are similar to those used under the best passenger coaches" [how considerable] "and the airbrakes and other safety apparatus are all brought into requisition. Within the cars are saws, axes, hammers, and crowbars conveniently placed in case of wreck, and safety-bars extend the length of the cars over head to which the clerks may cling when the cars leave the track and roll down the embankments, as they often do." In the year ending June 1888 there were 243 accidents to trains on which postal clerks were employed. In these wrecks four clerks were killed; sixty-three were seriously, several of the number permanently, and forty-five slightly injured."

This statement is from a chapter written by Mr. Thomas L. James, Ex-Postmaster-General. We can only say that it forms a most discreditable accusation against the American railway system. English post-office clerks would laugh if they were told that in being placed on travelling mail carriages they were engaged on a service of special danger.

There is far more of interest and information in the book than we have been able to allude to; and it is perhaps not entirely unsatisfactory to the English reader to find, on the authority of the Americans themselves, that with all their energy and inventiveness, we are obviously still ahead of them in the art of rendering railway travelling at once speedy and safe, and in general principles and details of management. American engineers are behind no others of this epoch in talent and resource, but American railway working seems not yet to have surmounted the drawbacks arising from an inherently loose system of construction and working, fixed upon it at the outset by the desire for economy and by the lack of that feeling of responsibility for public safety which seems much more developed in the English character in connexion with public works of this kind. England has the credit of having invented the railway system, with all its vast consequences to the world, and we may be allowed as a nation to feel some pardonable pride in the assurance that in its working and management we are still in front of all other nations.

BERLIN "MANSIONS."

It is a well-known fact that by far the greater number of the inhabitants of Berlin live on flats, in spite of the numerous evils and the great inconveniences pertaining thereto.

As most of the building-sites in the German capital have but narrow frontages in comparison to their great depth, the typical Berlin block-plan of an ordinary house shows the letter L, or in the case of a double house the letter U, the wings containing the bedrooms, the kitchen, and the back staircase. (Fig. 1.)

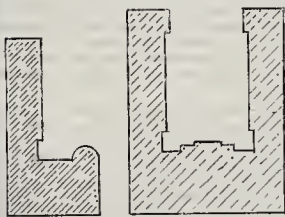


Fig. 1.

Very strict police regulations are in force referring to the area of the court-yard, the height of the front and court-yard elevations, the depth of the basement floor beneath the street level, &c., &c., and hence the architect is tied hand and foot when working out his designs.

These restrictions, combined with the unfavourable lines of the block plan, account for the bad disposition of rooms mostly found in a Berlin flat; yet the greatest faults are occasioned by the average Prussian architect not considering it necessary that every room

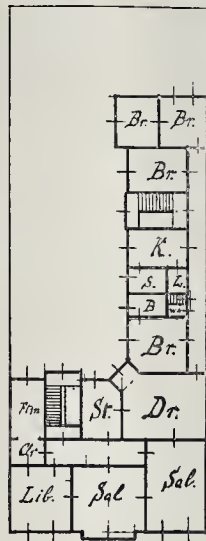


Fig. 2.



Fig. 4.

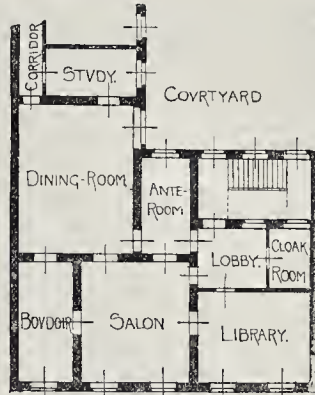


Fig. 3.

Types of Berlin "Mansion" Plans.

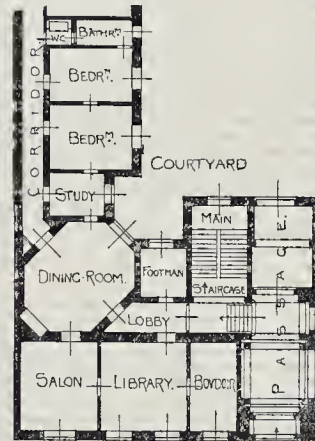


Fig. 5.

should be in direct connexion with a corridor. Hence one often finds that one bedroom has to be passed to reach the second one, or discovers that the gentleman's study is only accessible by steering between the numerous small tables of the drawing-room.

The most typical feature of Berlin planning is the so-called "Berliner-Zimmer," that room which is situated near the inside corner of the block plan, and which is mostly used as dining-room,—forming at the same time, however, the only connecting link between the front and back part of the flat. (See figs. 2, 3, and 5.) Many attempts have been made to avoid this double function of dining-room and passage, but these have generally failed, on account of the difficulty of obtaining light and air for the desired connexion.

The corridor and lobby are, as a rule, badly lighted and ventilated, both as a rule only receiving their light indirectly through glass panels in the doors, or at the best from some narrow area. Even the water-closets, up till a few years ago, rarely had any ventilation (see fig. 4), but now the police have prohibited the planning of such insanitary cupboards, and have gone to what is considered the extreme measure of requiring light and air direct from the courtyard, or, under special circumstances, from an area measuring at least 9 ft. by 6 ft. at its base.

It is wonderful with what little kitchen accommodation the average German housewife is satisfied; sculleries are never to be found, even in first-class flats; a pantry is a rarity, and such a thing as a well-ventilated larder is seldom thought of; brooms, dustpans, &c., are kept in some old wardrobe, but are also often used as a decoration for the kitchen walls. Each tenement, however, receives a good area of cellarage, and also plenty of attic room—the former being used for the storage of coals, potatoes, and wine cases; and the latter taking the place of the English box and lumber room.

Bedroom accommodation is very small in comparison with the number of living and reception rooms, so that families can very rarely have a "spare bedroom" at their disposal. The servants' rooms have, till very lately, been a disgrace to a civilised country; but a short time ago the ever-vigilant police have also made some regulations which prohibit the servants' rooms in newly-built houses being placed, for instance, above the larder or bath-room, with a height of only 6 ft. (a state of affairs that has been common up till now). Bath-rooms are only to be found in flats of a higher class, or in those of very modern date; and even then they are looked upon as only a secondary consideration.

* The Italics are ours.

The most laudable features of a Berlin flat are, firstly, the good connexion of all the rooms with one another by means of folding or sliding doors; and, secondly, the fact that the height of the "étages" is not stinted, 13 ft. being the usual height for the ground-floor, 15 ft. for the first, and 14 ft. and 13 ft. for the second and third floors,—seldom less, in better-class flats often more. Air and light are abundant in the reception and living-rooms (barring the dining-room) and bedrooms, and, as a rule, in both front and back-staircases. The staircases are mostly well planned, seldom lack width, and have easy step-height. The front-staircase and the outer-hall are generally richly decorated, especially the latter, which has, however, of late assumed the form of a carriage passage; a law having been passed compelling all householders to have a free thoroughfare through which the city fire-engines can be driven without the men having to dismount.

The courtyards, which as a rule contain a pump, are well paved and drained, and always have a corner especially assigned to the dust-hins of the various tenants.

The elevations of the courtyard are kept as plain as possible, stucco with stone dressings, or brick with stucco dressings, being mostly used. The front elevations are for the greater part finished in cement with stone dressings, and always show some attempt at decoration. It will strike any stranger that a decoration of the elevations is to be found in all the Berlin streets, no matter what class of people live there; in fact, there seems to be throughout the town a leaning towards over-decoration. In the last ten years, when Prussia has not only been politically but also financially prospering, a better class of material is taking the place of plaster and cement; marble, freestone, terra-cotta, and glazed bricks are gradually finding their way into the street-fronts, so that the Berlin thoroughfares will, in course of time, not only show decorated, but solidly decorative, architecture.

NOTES.

THE second reading of the London County Council Bill was passed on Tuesday in the House of Commons, subject to Mr. Ritchie's amendment to omit clauses 55, 56, 57, 58, and 75. These are all clauses referring to questions of administration and general powers. All the clauses referring to reforms in regard to details of building regulations, such as heights of buildings, lines of streets &c., are included in the Bill and will have to be dealt with in Committee. A greater blunder in the path towards the amendment of building regulations could hardly be made. A Committee of the House of Commons is one of the most unfit bodies to deal with such questions in detail, and the result will probably be most unsatisfactory. The County Council should have avoided all details and asked for a general clause conferring power to deal with questions of the construction and laying out of buildings and streets, &c., and to make by-laws on the subject as might seem best for the public benefit. By thrusting details of this kind into an omnibus bill, they run the chance of either not getting what they want, or getting it in such a manner as to tie their own hands.

THE great strike of coal-miners is one of those events which force themselves upon the attention of a vast number of industries besides the one most directly affected. At this time last week strong hopes were entertained that it might be averted, but the determined attitude of the men failed to induce the owners to concede the advance demanded; and, consequently, work is suspended at a large proportion of the collieries. The immediate effect was that all available coal was advanced to prices which many manufacturers cannot afford to pay—preferring rather to close their works. Thus, an immense number of operatives and others are thrown

out of employment, in addition to the miners. All attempts to arrive at an understanding have hitherto proved abortive, the only alternative to the original demand for an immediate advance of ten per cent. being an offer on the part of the men to accept five per cent. now and five per cent. in July,—to which the masters have so far declined to accede. It is probable, however, that at the meeting between the representatives of the Coalowners' Federation and the Miners' Federation, which was being held as we went to press, a basis of settlement may be arrived at. The trade of the country, however, has already been considerably interfered with, and much loss inflicted upon both employers and employed in other industries. If the men resume work on Monday they will have lost a week's wages, and, while they have been standing idle, the masters will have had the satisfaction of clearing off from the pit-heads, at good prices, hundreds of tons of stuff hitherto considered almost valueless.

ON adjoining the Railway Rates Inquiry,—as far as England and Wales is concerned,—until after Easter, Lord Balfour of Burleigh drew attention to the fact that if the Court should be precluded from presenting their report to Parliament this Session, legislation could not take place until the Session of 1892. It is therefore of the greatest importance that no delay should be caused by the time of the Court being taken up with unnecessary evidence. As eighty witnesses have already been heard, it is probable that there are not very many more to follow; and Lord Balfour seemed to intimate that he should rest the responsibility upon them should the Inquiry be so delayed that insufficient time is left for the preparation of the Report this Session. In the course of the evidence at the concluding sitting last week, a large sender of "smalls,"—i.e., consignments of less than 500 lbs.,—paid a high compliment to the Parcels Post. He showed that 80 per cent. of the traffic sent by his firm was in the shape of "smalls," and mentioned that whenever they came within the Parcels Post weight and dimensions they preferred to use that mode of conveyance. He declared that the traders delighted in having this alternative, and proceeded to remark that if the railway companies had kept more in touch with the public there would have been no necessity for the institution of the Parcels Post at all. "That shows how well the Government Departments do their work," interposed Mr. Courtenay Boyle,—a remark which certainly holds good in the case in question, but which one would hesitate to make of general application.

THE "betterment" question came before the House of Commons on Tuesday, in relation to the Strand Improvement Bill, promoted by the London County Council. The question, however, was not really discussed, and if the clause remains after the Bill has gone through Committee, it will probably give rise to a debate on the third reading. The matter, therefore, still remains before Parliament, and we shall take an opportunity in the course of the session to refer to it again, and at due length.

AREACTION seems to be setting in regarding the proposed underground railway for Edinburgh. At a meeting of the Edinburgh Trades' Council, held last week, the report of the committee upon the subject was read, from which it appeared that the committee were of opinion that the proposed railway from West Princes-street to Leith would be of great benefit to the citizens, and would afford a ready means of transit between the three great shipping ports of Scotland,—Leith, Glasgow, and Greenock. It was recommended that the Trades' Council should petition the Town Council to withdraw their opposition to the preamble of the Bill and confine their action to preserve the amenity of the city. The report was adopted by 23 votes against 4. The solicitor for the Cale-

donian Railway have written to the Town Clerk a letter to be submitted to the Town Council of Edinburgh submitting a number of concessions which the directors of the railway company propose to make with a view to disarming the opposition of the Council to the underground railway scheme.

PROFESSOR RASCHDORFF'S latest design for the proposed (Renaissance) "Dom" for Berlin is now under consideration at the "Cultus Ministerium;" and, as far as rumour goes, it is believed that the present scheme has found friends there, and has been recommended to the Emperor for approval. Even if the rumour proves to be correct, it will take at least a couple of years before the foundation-stone can be laid; not only on account of the time needed for working out the design, but also on account of the time required for the pulling down of the old "Dom," the erection of a provisional church for the "Dom" community, and many other preparatory works. We are not permitted to give any description of the present design until the sheets have passed through the different stages of bureaucratic criticism; but it may be as well to mention that Professor Raschdorff has given up his former idea of connecting the old "Schloss" with the proposed "Dom" by means of a communication-gallery over the thoroughfare which runs between the two sites.

IN looking through the annual report of the municipal authorities of Berlin, we find that they have come to the conclusion that wood pavement is not advisable for the Berlin thoroughfares, and that further new work of this material has been prohibited. In the same division of the report we find figures referring to the total area of paved roadways in the town, and the ratios of the different sorts of pavement used; according to these statistics we find that 574,000 sq. metres of asphalt have so far been laid, and that this material is recommended very highly. It is of some interest to notice this experience and opinion in Berlin, just when such a cry is being raised against asphalt in London.

A FORMER English architect who is now an Australian (Sydney) architect, Mr. J. Sulman, whose name will be familiar to many of our readers, has been reading a paper to the Melbourne Architectural Association on "The Laying-out of Towns," which appears to have attracted a great deal of attention, and has been made the subject of leaders in various Australian journals, professional and non-professional. The paper dealt with the subject both from a sanitary and artistic point of view. In the latter respect Mr. Sulman's preaching was generally against the rigid system of laying-out a city in squares and right-angles like a grid-iron, and in favour of making the most of picturesque incidents in a site, and of providing for central points of architectural effect in planning a city. The kind of advice which Mr. Sulman thought it requisite to give on sanitary questions of site may be judged from the following quotation:—

"Much may no doubt be done by the skill of engineers to improve an unhealthy site, but in a new country, where the land is practically unlimited, it is little short of a crime to permit any town to be formed which, from its location, will encourage disease. The most potent evils to guard against are swampy or flooded land and an impervious sub-soil. Of the former there are by far too many examples. I will describe one. In a rich agricultural district of the parent colony, a Government township was laid out many years ago on rising ground near the banks of a river. The upset price was low, but just on the other side of the stream a large area of land was possessed by a drunken old settler. It was, however, flooded in wet seasons. So far as position was concerned, either bank would serve, as the river was bridged. Cheapness, however, won the day, and the flooded land was purchased in blocks at the price of a bottle of ruin by ignorant new chums, and on it the town was built. Every few years the river comes down a banker, covers the town several feet deep in mud and water, and leaves behind a legacy of who can say how much suffering and

death? Now the inhabitants are petitioning for extensive works of embankment, and in course of time will, no doubt, obtain a large grant of public money for the purpose. If surface unsuitability is thus ignored, what may we expect when the subsoil is in question? Its importance as bearing on the health of a town can scarcely be exaggerated, but it rarely receives a thought."

The opinions expressed by Mr. Sulman in the paper are such as would be generally accepted as wise and sound by the profession in the old country, and perhaps he may induce those in the new country to give attention to considerations which they have hitherto overlooked. Australia is a continent in which there may still be new cities to plan, and where it is not too late to learn to plan them in the best way from the commencement.

ELECTRICITY as a means of locomotion has not made much progress in the United Kingdom; Bessbrook, Blackpool, Brighton, and Portrush being our chief existing examples. We shall shortly possess a far more important installation in the City and Southwark Subway, which may now be looked upon as an assured fact. Its extreme length, however, is under four miles, even if completed, and there are some difficult problems for the engineers yet to solve. In the United States this same slow progress is not observed, if we may judge by a paper lately read by Mr. F. J. Sprague, of New York, before the National Electric Light Association of America. Two years ago, the paper tells us, the electric railway business was in an experimental stage, and it was difficult to get a dollar for investment, but to-day it demands the best energies of two great corporations and a number of smaller ones. The business done this year, it is said, will probably amount to 6,000,000 dols. There are about 130 towns in the United States with one or more electric railways in operation, construction, or under contract. These comprise 1,500 miles of track, and 1,700 motor cars requiring 3,000 motors of an aggregate capacity of 45,000 horse-power, and a daily mileage of about 100,000. Gradients of 12 per cent., and more recently 14 per cent., have been ascended with loaded cars. Gradients three miles long, varying from 4 to 8 per cent., have also been ascended, the work done being beyond that possible with horses. In crowded cities speeds have been doubled 50 per cent., and the electric car has shown that it can be run faster on both up and down gradients, and can be stopped or started faster, than can a horse-car. On the whole, it would seem that the Americans are outstripping us as much in electric traction as they have done in electric lighting. It is doubtful, however, whether we shall lose much, on the whole, by our steadier and more cautious policy.

THE British Museum has recently become possessed of a valuable and very curious vase, formerly in the collection of the Earl of Carlisle at Castle Howard. The existence of this vase has long been well known, and it is catalogued in Dr. Klein's "Meister-signaturen," p. 210. Probably, however, few archaeologists have had the opportunity of inspecting the original. It is a krater signed by the late artist Python, and represents a curious scene,—the interrupted burning of Alkmene on the pyre. Alkmene is seated on a kind of altar at the back of the pyre, which is being kindled by Amphitryon and Antenor. Death seems imminent, but the Hyades, the rain nymphs, mercifully intervene; they pour down water from the arch of the sky above Alkmene, while Zeus looks on, as a naturally interested spectator. Up to the last few weeks the only publication of this curious vase was in the French section of the Roman *Annali e Monumenti*—a section missing from many, if not most, archaeological libraries,—from all, we believe, in England. However, a few weeks back Roscher's "Mythological Lexicon" reached *Hy*; and he gives a woodcut both of the Carlisle vase and another of analogous type. His double articles on the *Hyades* should be consulted by those who wish to appreciate the new acquisition.

THE Swedish Government, through its Geological Survey, has recently issued two further instalments of the researches of one of its officers in regard to the stone industry of Great Britain. The first of these deals with the methods of working sandstones and limestones, and of shaping slates, in which the various machines now in use are brought under review; and the second,—a more important work,—is divided into three sections:—(1) Gives a general account of the building stones of England and Scotland, in which the articles that have appeared from time to time in the *Builder* on the subject are freely made use of and acknowledged; (2) contains notes on building construction with suitable illustrations, showing certain methods of placing stones in rubble walls, rustic work, ashlar, &c.; and (3) in summing up the two first sections, indicates that it is possible for Swedish architects, by constructing random-coursed and similar walls in the usual English style, to make use of many sandstones, limestones, &c., that occur in Sweden, which have hitherto been considered too expensive for building purposes in that country. In addition to the diagrams referred to, the work is illustrated by two photo-lithographs of buildings in Aberdeen, which clearly explain the author's meaning; and the practical suggestions throughout the treatise cannot fail to be of great service to the Swedish building trade.

THE progress made in framing a new charter for the Royal Scottish Academy is anything but rapid. It is supposed to be at present in the Privy Council office, and it appears that there are points of disagreement between the Academy and the Board of Manufactures in reference to the teaching of students, which may account for the delay. No arrangements have as yet been made for the hearing of parties, and it will not probably be for several months to come that the charter will be in shape. The Academy Exhibition this year is well patronised, and the sales of pictures are considerably larger than last year, although the number of works exhibited is much fewer.

THE Twyford Abbey Estate, in Middlesex, covering about 520 acres, lying between Ealing and Sudbury, and two large dairy farms adjoining, have been placed in the market. The modern nineteenth-century Gothic mansion, designed by Atkinson, and recently occupied by the late Dowager Baroness Gerard, is traditionally stated to occupy the site of an old religious house. The former residence, moated, was rebuilt by Mr. Willan, who had purchased it from the Cholmondeley family. The name of the parish is said to be derived from the two fords across the river Brent. Twyford and the adjacent Perivale, or Greenford Parva, parishes are the smallest and least-populated of any at their distances from London, and retain much of their rural aspect. In 1831 the populations were 43 and 32 respectively; they are now 75 and 34. Not many years ago the "Abbey" was the only house in Twyford parish. In the little church, standing within the grounds, was erected a monument to Henry Bold, the poet, who died 1683. Perivale Church, by the riverside, was restored about fifteen years ago; it has a curious wooden tower. To the north stands a quaint half-timbered house, one of the seven or eight in the parish.

THE Morgans automatic signalling system, shown during the past week at the Westminster Palace Hotel, is an American invention of very ingenious conception, well thought out in its details. The system consists of a central police-station and, say, one hundred street signal-posts, in each of which there is a locked box containing two discs, one for transmitting, the other for receiving, certain specified messages, and a telephone, by

which conversation, if needful, may be carried on between the officer at the street-box and the central station. As it is impossible for every police constable to be a telegraph operator, a number of short messages, such as "send officer," "send waggon and four men," "crowd threatens," &c., are printed on a dial. All the policeman has to do is to unlock the "office door," put a pointer to the message he desires to send, and close a hasp. As soon as the message has been received the pointer returns to its ordinary position automatically, while the number of the post or constable from which the message has come is duly recorded at the station. Each signal-post has also a red light fitted in its lantern. This light is ordinarily out of use, and is put on when needed to call attention by the central station or by the officer on the beat. The means by which the signals are worked are electricity, magnetism, and clockwork. The electric-wires are run out radially from the central station, one wire to each street-post, so that if any wire be broken or damaged the others are not interfered with. The electric current energizes the magnets, which then draw back the detents of the clockwork, and, as each street-wire is connected with its own representative portions of the central apparatus, each street signal acts automatically with the central station. If the officer on a beat sees a red light he reads the signal in its box. If he wants help he can ask it by his signals without leaving his place, without shouting or whistling, or messengers, without attracting attention. Keys may be furnished to residents or caretakers by which they can set up the red light of the nearest street-post, and so call the police. As this key is inscribed with the number of the residence, the policeman on coming to the box knows where his assistance is required. Special boxes can be fitted in private houses in direct communication with the nearest central station.

THE most important as well as the largest work at Mr. Wallis's Gallery, the thirty-seventh annual exhibition of which opened this week, is Professor von Uhde's life-size painting of "The Last Supper" (61). This is one of the most remarkable examples we have seen of the modern realistic spirit in the treatment of scenes from the New Testament. The apostles are frankly represented as labouring men in working garb, but with faces of great interest and variety of character. The head of Christ is very beautiful and pathetic in expression, without partaking of that too sentimental character with which it has too often been invested by artists. "Suffer Little Children to Come Unto Me" (62) by the same painter, has also great merit in the character and expression of the children, but to liken them to Dutch children of the modern period is carrying realism a little too far, or rather it is not true realism at all. Nevertheless Professor Uhde is an artist worth knowing. Another new name at the Gallery is that of Professor Liebermann, a painter of peasant life. His largest work, "Women Mending Nets, Katwyck, Holland" (60) shows in the foreground a remarkable figure of a coarsely-clad peasant girl standing and hauling at a net with that kind of unstudied energy which at times gives a kind of sublimity to the simplest personality. His picture of "Flax Spinners, Holland" (59) has a pathos in its representation of homely toil which reminds one of Millet. We are indebted to Mr. Wallis for introducing the works of these two remarkable painters to London. Among other works to be looked at are Seiler's exceedingly clever scene in a "Buffet at a Railway Station" in the Tyrol (29); the same painter's two finely-studied figures in "The Argument" (41); Walter Firlie's "First Communion" (33); Mukacsy's "The Two Families" (34) a previous edition of the brilliant painting exhibited at the Royal Academy a few years ago, but hardly equal to it; and Heilbuth's "On the Seine near Bougival" (37) a characteristic example of this painter, with a group of French ladies going boating in elaborate

* On bearbetning af Sandsten, Kalksten och Takskiffer i Stockholm. Af Hjalmar Lundbohm. Stockholm.
 † Engelska bygnadsmaterial och byggnadsätt samt de senare tillämpning i Sverige. Af Hjalmar Lundbohm. Stockholm.

costumes, as if they were on their way to an "At Home."

THE collection of sketches of London by Mr. Herbert Marshall, on view at the Fine Art Society's Gallery, includes a great many charming studies of London architecture and street scenery, but there are two queries we should propound in regard to it. First, are the effects of light and colour shown in many of these sketches really London effects, or are they not rather effects which the artist would like us to see or to think we see? "Battersea Church" (9) is a river-scene looking more like Venice than the Thames, in light and colour; other views of well-known London streets, though most effective in themselves, impress us as unfamiliar and unlike the place as we know it. Did any one ever see Westminster Abbey from Dean's-yard (58) show so white and bright as Mr. Marshall makes it? Another query is, whether the artist has done himself justice in the drawing and general treatment of the architecture. "St. Paul's from Cannon-street" (3) is badly drawn; so is St. Mary-le-Bow (32), rising from a street also which does not in the least suggest Cheapside. In the view of the Horse Guards (17) the clock turret is absolutely on the wrong side of the centre of the pediment, considering it in relation to the perspective of other portions of the building. The portico of the church in Covent-garden Market (34), which forms a foreground object, is also very inadequately treated. This would be expected at the hands of a landscape-painter merely, but Mr. Marshall professes to be a painter of scenes in which buildings play a principal part, and artists who take that position should be careful of the drawing of their buildings as well as of the effects. Among the best sketches in the collection are "St. Martin's-lane" (67), "Back of Kensington Palace" (68), "Autumn Afternoon, Chelsea" (81), "St. Mary-le-Strand" (83), and "Barges at Low Water" (89) near Lambeth Bridge. We may add one other query to our two former ones—why are the catalogues at these sort of exhibitions to be prefaced by shallow small-talk on the subject by people whose opinions on art are of no recognised value whatever, and whose names are merely used as a bait to catch the more ignorant section of society?

THE NORTH DOORWAY OF THE ERECHTHEION.

THE large doorway in the north portico of the Erechtheion—"H ὄψαία πύλη."—"The Beautiful Door" as it is called by the Greeks, has generally been accepted as contemporary with the rest of the building.

Mr. R. W. Schultz, during his investigations at Athens last session, while engaged on the work of collecting the mouldings of the buildings on the Acropolis, observed certain peculiarities in connexion with this door, which led him to doubt this general assumption, and last week he explained his views at a meeting of the British School there.

He contended that none of the door now *in situ* is part of the original work; that the present jambs belong to a period not far removed from the time of the building, although not contemporary; and that the lintel, cornice, and brackets are a still later addition. In connexion with the first point, he referred to a curious related stone on the west side of the present lintel, which he thought belonged to the original lintel which had been damaged and cut out, leaving the ends in, and he explained the various reasons which had led him to come to this conclusion. He next went on to argue that the unfixed "ὄψαία" of the British Museum inscription (the word having already been assumed to mean, in this instance, the linings and not the leaves of a door) which had generally been appropriated for the east door, could not have belonged to it on account of their dimensions not working in; and he showed how they exactly fitted this north door if they were made in two pieces in the height, which, as they were not constructional parts, but mere linings, was highly probable. He drew attention to the existing fragments of another door, one of which is now in the British Museum (Inwood, plate 20), which prob-

ably belong to the east door, and mentioned how certain indications on those had made him think the doors had originally had bronze linings inside the stone ones. He concluded that the first north door consisted of a lintel built in with the walls, and having mouldings worked on it, and of thin jamb linings having a projection of about 2½ in. from the wall face, and with bronze linings inside.

The lintel having been damaged it was cut out, leaving the ends in, and heavier jambs were inserted to take the whole weight of the new lintel. The return face of these jambs was dressed right through, and the inner bronze linings done away with. This second lintel was not, however, he thought, the one now in position; the nature of the ornament, which, although a continuation of that on the jambs, differs greatly from it in character, being much less refined and bearing on its face clear indications that it must be a late copy, faithful in general form but lacking the spirit and refinement of the original. Amongst other points in this connexion he showed how, in the rosettes of the jambs, the centres have been bored out for the insertion of a wood plug, in which was fixed a central gilt bronze disc, while in those of the lintel this has been worked solid on the stone in a convex form and was probably merely gilded over. From the general character of the work this lintel might, in his opinion, have been inserted about the second century B.C. The brackets on each side of the lintel he put down to the same time; he did not think the north door had originally any brackets at all, but merely a plain cornice. The position of these brackets appeared to him both constructively and decoratively false, set back half hid behind the projecting architrave, so that their inner face was almost lost, and in reality of no value as supports to the cornice over. He suggested that they might have been copies from the original brackets of the east door, mentioned in the inscription, which were probably of similar detail, but more suitably placed in relation to the other parts of the composition, and he showed how the one bracket which no longer existed on west side, did not fall through the wall, but had been merely doweled on to the face.

He drew attention to the nature of the ornament on the cornice of the door, which varies very much from that on the wall-band over, to which it bears a certain resemblance, and accounted for this variety of type by suggesting that it had been done by a workman who, limited by the nature of his work on the lintel and brackets to an exact reproduction of his original as he was capable of, had here given free play to his own ideas of what the ornament ought to be like.

He was influenced in his conclusion that this was of later Greek time and not Roman by observing in it several characteristics similar to the work on the later Ionic examples of Asia Minor, and by the fact that had it been the latter it would have been a close replica of that on the band over, and he instanced the work on the remains of the Temple of Rome and Augustus lying to the east of the Parthenon as an example of the Roman rendering of Greek detail. As further evidence of the later insertion of this lintel and cornice he instanced the holes cut on the underside of the stones over for the purpose of needling up the wall temporarily during the alteration, and the way in which the stones have been wedged up afterwards. He also alluded generally to the other various evidences of fixing the cramping to jambs and lintel.

The thin inner jambs and linings now round the door, he said, were put in, perhaps, in quite late Christian times, partly as a support and partly to hide the broken underside of the present lintel, which had been seriously cracked and chipped off on the under-edge.

It is, of course, impossible in a short summary to go into all the arguments adduced in support of these theories, which Mr. Schultz threw out, rather as points for consideration, than as definite fixed opinions; but we trust that it will be possible to examine them in detail when the school papers of the present session are published later on in the "Journal of Hellenic Studies."

Edinburgh.—After an expenditure of 6,000*l.* in alterations upon the Palace Hotel, Prince's-street, which was acquired by the Scottish Liberal Club, it is now in possession of the members, and it may be considered one of the finest club-houses in the country.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE ninth ordinary general meeting of the present session of this Institute took place on Monday evening last, Mr. Arthur Cates (Vice-President) in the chair.

Proposed Extension of Premises.

The Chairman announced that a special general meeting of members only will be held on the 31st inst., at 7.30 p.m., to receive and consider a recommendation of the Council that the Royal Institute of British Architects do enter into arrangements for obtaining a lease of the shop premises now vacant at 9, Conduit-street, and to authorise the Council so to act.*

Examinations for Architects.

The Chairman also read the following requisition addressed to the Council:—

"Gentlemen,—We, the undersigned, being of opinion that it would be of advantage to the profession and the public alike, if all heretofore seeking to practice as architects were compelled by statute to pass a similar examination or examinations to those recently established by the Institute with such signal success, desire to test at as early a date as possible the opinion of the whole body of professional members of the Institute.

We therefore send this requisition, under By-law 69, for a special meeting to be held to consider the subject, and to propose the following resolutions:—

1. That at as early a date as possible statutory powers should be sought to establish, as in other professions, a system of compulsory examinations to be held by the Institute, and to be extended to all architects heretofore entering the profession, whether as members of the Institute or not.

2. That when such compulsory examination comes into force the position of all existing architects shall be completely respected."

Whether these be carried or not, we desire, under By-law 69, or if that be not applicable, then by resolution, to propose

"That a poll be taken by voting papers, in order that, under any circumstances, the opinion of the entire body of professional members may be ascertained."

He added that, in accordance with that requisition, the Council had appointed a special general meeting on the 31st inst., at 8 p.m., to consider it.

Drawings of Brick Buildings in North Germany.

Mr. Alfred Strong, Fellow, then read the following short paper:—

Towards the end of last year I had a letter from Professor Otzen, an architect in somewhat extensive practice at Berlin, in the course of which he said that, during a recent visit to England, he had noticed the very limited use made of moulded and glazed bricks in this country; and having largely used them himself, he asked whether our Institute would care to see some of his works so executed. I referred the suggestion to our Literature Committee, with the result which you see on the screens to-night. There are altogether ninety-nine drawings and eleven photographs, representing twenty buildings, of which fifteen are executed, and the rest either in contemplation or in course of execution, and I hope you will agree that the exhibition is an interesting one. The subject of moulded and glazed bricks as used in the North of Germany—I purposely exclude their use in Spain and Italy—is not a new one within these walls. Forty years ago, on February 18, 1850,* my old friend Charles Fowler—he was Charles Fowler junior then—read a paper on "Mediæval Brick Buildings in the North-east of Germany," which was reprinted by order of Council in 1874, probably *à propos* of another paper, read on November 17, 1873,† by Mr. J. Tavenor Perry, on the "Mediæval Brickwork of Pomerania." Mr. Fowler described the churches, town-halls, and gates of Stralsund, Brandenburg, Stenthal, Stargard, and Lübeck; he showed that stone was used for tracery in early examples, but that from the end of the fourteenth century brick only was employed, "and we find even such parts as crockets and finials executed in brick." Again:—

"There is one feature in particular which deserves attention—namely, the introduction of a white-glazed ground to relieve the forms of tracery." The use of dark brown and black glazed bricks was also common.

In the discussion which followed, Mr. Smirke said:—

"He had seen churches of brick at Hanover and Hamburg, with delicately moulded jambs and slender nullions of brick, and he thought we in England are scarcely aware of the great capabilities of terracotta."

* See *Builder* for March 9, 1850.

† For a report of the discussion which followed this paper see the *Builder* for November 23, 1873.

Professor Donaldson also remarked that,—
 "In this country brickwork as applied to Gothic detail had never been carried out to the same extent as in the Low Countries."

I have unearthed a few examples of such work out of my sketch-books, and enlarged copies,—about half-full-size,—are on the screen. They illustrate the mode in which effect was obtained by rendering the ground between the moulded bricks, and how patterns were obtained by the repeated use of a few simple moulds. Professor Otzen's adoption of this construction occurs frequently on these drawings. Stone is, and always was, a luxury in the North of Germany, and the architecture of the districts far away from the quarries of Saxon Switzerland and the Hartz Mountains naturally developed out of the material readiest to hand. In his paper, nearly fourteen years later, Mr. Perry says:—

"When stone was used, which was but rarely the case, it had to be shipped from Sweden, which in those days was a costly thing; but the skill with which ornamental features were moulded in clay caused less desire for carved stone than might otherwise have been felt."

Mr. Perry also mentions Stralsund, New Brandenburg, and Stargard, as also Stettin, Bergen, and Sagadahogien, and other examples. Describing the tower of St. James (1370) at Stralsund, he says:—

"The whole of the tracery and arcing is filled in with rich brick coping, which, with the ornamented bands and the mouldings of the entrance, is very highly glazed." At St. Nicholas, Stettin, he notices "a richly moulded band of vine-leaves in blocks about 12 in. square, carried along under a black string," and at Prenzlau, "a little turret, octagonal on plan, two stages high, built entirely of glazed bricks in various colours, chiefly green."

That, in the late Gothic straining after effect, the limits of sound construction were often passed cannot be denied,—as, for instance, at St. Mary's, Lübeck, where brick mullions about 12 in. wide are carried up to 60 ft. or more, apparently only kept in their place by the saddle-bars, to which the lead lights are attached. Still, in spite of these drawbacks, there are many examples of good work scattered up and down the North of Germany, and the student may with advantage examine both the ecclesiastical and the secular buildings from Hanover to well up the Baltic, and from its shores southward and westward. In connection with this subject, Mr. Street's pamphlet on Lübeck and Essenwein's examples—both in the Library—will be found interesting; the latter, perhaps, less from the point of view of English Gothic than as giving valuable hints in the use of the material under discussion. Having quoted and said this much, in the hope of starting a useful discussion on the *pros and cons* of the more extensive use of moulded, and especially, of coloured and glazed bricks, in this country, I now turn to Professor Otzen's works, which show that he has carefully and exhaustively studied the works of his ancestors, as also the manner in which he has followed in their steps. So far as I know, Mr. Otzen was the first German architect to revive the free use of ornamented bricks in church architecture, and I can remember the sensation which his first church in this style (St. John's, Altona, near Hamburg, erected in 1868-73) made at the time, and being struck with the rich effect, not dark and gloomy, but rich and warm, which the use of well-blended colours and judicious glaze here and there produced. I visited the brickyards where the materials had been prepared; some specimens are on the table.

Unfortunately, this church near Hamburg is the only one of Professor Otzen's works which I have had an opportunity of seeing, and therefore I can only refer you to the meagre information furnished by the slips in your hands. The example thus set has since found a certain amount of approval, chiefly in the old Hanse Towns, where a limited use of moulded and coloured and glazed bricks has been made in warehouses and private buildings, adding life and interest to what otherwise appear somewhat prosaic compositions. I am sure that a careful examination of the beautifully-prepared drawings which surround us will repay the lover of colour in buildings, and I cannot do better than close these few remarks as Mr. Perry closed his paper:—"I trust," he says, "you will see that there are many points of excellence to be noted in these buildings, erected as they are of materials so similar to those at our own command, and that English architects may learn something from the mediæval brickwork of the North of Germany."

Mr. Charles Fowler, in proposing a vote of

thanks to Mr. Strong, said that Professor Otzen appeared to have studied the old examples, and, though it could not always be said that he had improved upon them, he seemed to have imbued himself to a considerable extent with the characteristics of the style. From his (the speaker's) own observation, the ornamental work in the old brickwork,—he did not refer to such as was formed by moulding, but to such things as crockets and finials,—was carved out of the brick before it was burnt, by means of wire. The workmen apparently learned to use this very skillfully, and though the results were not very minute in detail, they were effective and characteristic. He happened to be engaged in studying under the late M. de Chateaufort in Hamburg when that gentleman was restoring St. Peter's Church in that city, and he visited the brickyards which had supplied the bricks for the churches built in the fourteenth century. These brickyards had never been entirely closed, and they had supplied the bricks for the restoration of the church in 1844-5-6. These bricks were large, and quite different from those made for ordinary construction in that part of the country, the dimensions being 12 in. by 6 in. by 3 in., of a fine rich purple colour, very hard and well-burnt. The mortar seemed to have been made of the best lime he ever came across. It was beautifully crystallised, and so extremely hard that after 500 years the joints had the polish of the trowel as left by the original bricklayer. The joints were thick, sometimes measuring quite an inch, showing that the work must have been carried up slowly, and that the mortar got hard before it had time to bulge out. There were a great many interesting examples of this stamp of work in that part of Germany, but his information in regard to them had all been in print for the last forty years in the paper he read.

Mr. William Woodward remarked that a fine specimen of the skillful and artistic disposition of brickwork, in cornices and mouldings, was to be seen in a church off Great College-street, Camden Town.

Mr. Hugh McLachlan said that when holding the Godwin Bursary; he had the pleasure of seeing the Church of St. Johannes at Altona, a splendid specimen of Gothic architecture. These coloured bricks, tiles, and glazed terracotta had been brought into use with great aptitude. This church contrasted with Sir Gilbert Scott's great church in Hamburg, which was built altogether of stone. It might be said that some of Herr Otzen's work was too glaring in colour, and the way in which green was introduced was a case in point. It seemed that in this country we could not produce the splendid materials Herr Otzen was able to use. These came from the east of Germany and Silesia, and they appeared to be superior to anything in this country. He was sorry that the specimens he brought home and presented to the Institute had been hidden away in some closet.

Mr. J. M. Brydon seconded the vote of thanks to Mr. Strong. When he saw some of the churches in Altona, he was not struck either with their architecture or their colour, which was somewhat crude. It was the shadow, but not the spirit, of Gothic. To use moulded bricks was to go the wrong way to work, an effect being obtained which entirely destroyed the spirit which should be introduced into such buildings. The only way to get effect was to fall back upon the old principle of cutting the bricks after they had been burnt. The green colour was certainly very crude and strong, and in the matter of mixing the colours, in glazed or unglazed bricks, makers in England were far ahead of any on the Continent. Mr. Butterfield had shown the way many years ago in the case of All Saints, Margaret-street.

Colonel Prendergast proposed a vote of thanks to Prof. Otzen for so kindly sending his splendid collection of drawings for them to see. It could not fail to be beneficial to the members of the Institute if they got those who were exercising their professional duties in other countries to assist them in their researches here.

Mr. William White seconded the vote of thanks to Prof. Otzen. He considered that the question of the use of stone or brick was very much dependent upon the matter of cost. The same amount of precision could not be got in brick by moulding as by cutting. A brick which was made 4 in. or 5 in. in thickness would not shrink in the same way as a brick made only 2½ in. or 3 in. thick. The question would always be between the cost of brickwork

and the cost of stonework, and at the present moment he was hesitating, in the midst of an essentially stone country, whether or not he should have to put up a large building in brick simply on account of the cost.

Mr. Aston Webb said he could not help feeling that this question of the treatment of brickwork which had been brought before them that evening was essentially English, and not alone German. The English Tudor brickwork was as fine as any he had seen abroad. The architecture of the Elizabethan period brought out some magnificent brickwork, and, again, in the reign of Queen Anne, there was brickwork equally fine, while a great deal of our modern brickwork would stand comparison with that of any other country. Mr. Strong had given the date of one of Prof. Otzen's churches as 1868, but many fine brick churches had been built in England before that. Mr. Street's church of St. James-the-Less must have been erected about that date, and was one of the most charming examples of modern brickwork. Mr. Butterfield, in his house for the Society for the Propagation of the Gospel, produced another example that claimed the admiration of all who saw it; and although Keble College might have been thought too bright at first, anyone who saw it now would notice that it had wonderfully toned down, and was a most picturesque and essentially English building. The brick buildings of Chester, inaugurated, he believed, by Mr. Douglas, were also essentially English, and he did not think anything in Europe could be found to beat them. Mr. Waterhouse and many others had worked in brickwork, and, he need hardly say, with the greatest possible success. The great difficulty in regard to coloured brickwork in London was that in a short time the colour disappeared. He remembered Mr. Edward Barry describing his Endell-street schools, and being quite frightened at their brightness of effect, but in a few years the pattern of the brickwork quite disappeared. With regard to glazed materials, the glaze generally given seemed to destroy all lines, and if some of the manufacturers would try to introduce a glaze which would protect the surface of the brick, and at the same time not give the great reflection which the brilliant glaze gave, a material might be found which would enable architects to carry out brick-building in towns which would be satisfactory and enduring.

Mr. Thomas Blashill remarked that nothing had been said that evening about brick bond. He had been looking at the drawings and photos exhibited to see if he could learn anything about the bond which was used in Germany, but he had not been able to do so, except in some where he found the whole face of the brickwork was in headers. What he wanted to look for was as to what was usually called "English bond," which was in principle the ordinary bond used over the greater part of the North of Europe. Flemish bond was often used here, although the construction was not so good, because of the better appearance it was supposed to give to a brick wall. But if gentlemen who travelled abroad would look at the brickwork used generally in the North of Europe, they would find there was an essential difference between the English bond used here and the bond of a somewhat similar character as used on the Continent. The difference was this: English bond was generally produced by making alternate courses of stretchers and headers. That did not make very good fine work, but in France, Belgium, Holland, and those parts of the North of Europe with which he was most familiar, they also used alternative courses of stretchers and headers, and in every course of stretchers they made the brick next the end brick, in alternate courses, the header. If gentlemen would look at the *Builder* for June 23, 1883, they would see a short paper, with illustrations which he gave, showing the difference. The effect was that the brickwork looked as well as the best Flemish work, and was very much better in construction.

Mr. Charles Fowler remarked that the old work was all Flemish bond.

Mr. E. C. Robins drew attention to the beautiful brickwork to be seen in Berlin, and to the very fine *façades* of some of the public buildings there.

The Chairman asked if the drawings could remain for some little time in the Institute rooms?

Mr. Strong said they could remain on view for a week.

The Chairman said that Prof. Otzen had sent

no fewer than 113 drawings, representing twenty-one public works, produced at a total cost of 180,000. In England great advances had been made in producing beautiful brick-work, but we had to advance still further, so that our brick architecture should be enduring under the circumstances of climate and smoke. It was to be regretted that an entire evening had not been devoted to the subject, which was one of vital interest to English architects. It would lead, however, at a later period of the session, or next session, to some one introducing a paper which would go exhaustively into the matter, and say how the carving should be done.

The votes of thanks to Mr. Strong and Prof. Otzen were then carried by acclamation.

The Galilee of Durham Cathedral.

Mr. William White then read a paper on this subject. In the introduction Mr. White stated that Durham Cathedral was celebrated for its magnificent situation, its unusual type of architecture, and also for its Galilee, which was a perfectly unique structure. The name of the Galilee was as well known as the Cathedral, but not so its true meaning, or the purposes for which it was originally erected and used. The several and diverse traditions respecting it were not only at variance with each other, but no one of them accounted for certain architectural features found in it, or for its name. In many instances it had been called the Galilee Porch, the Galilee Chapel, or the Lady Chapel. The prevailing idea was that it had been built for a chapel; but the author considered that view untenable. Having given quotations from Canon Greenwell's history of the Cathedral, and Davies's history, referring considerably to Hugo Pusey's connexion with the Cathedral, the late Joseph Gwilt's opinion was alluded to, as was also a paper by Longstaffe in the "Transactions" of the Archaeological Society of Durham. The two first mentioned and the last wrote of the Galilee as a Lady Chapel; but Gwilt differed, saying it was for the "collection of monks returning from processions, and it was used for the dead bodies previous to burial." The separation of the Galilee from the church for the first 200 years—supposing it had been separated, as some authorities considered,—certainly militated against the idea of its being recognised as a Lady Chapel. In an account of Durham Cathedral published by Ross in 1733, the Galilee was not said to have been built as a Lady Chapel; and from a MS. published by the Surtees Society one learnt that Cardinal Langley placed a font there for the baptism of children whose parents were under excommunication. After giving quotations of opinions and statements respecting the Galilee, including one that in the north side was an altar, called the Lady of Pity altar, dedicated by Cardinal Langley, reference was made to the origin and meaning of the word Galilee, which signified "circuit." It had been originally applied to the circuit of the country around Kadesh Naphtali, occupied chiefly by strangers. Mr. White considered that the Galilee at Durham took its rise from that association of ideas and circumstances, it being the court for causes extra-ecclasiastical. He believed that Pusey built the Galilee as a court external to the Cathedral, though in contiguity to it, to serve not only as his Palatine Court, but also for his regal court of justice,—both as Prince-Bishop and Chief Justiciary under Richard I. Richard I. had, however, before leaving England for the Crusades, divided the country between two Regents, still appointing Pusey Chief Justiciary for north of the Trent, and Longchamp, Bishop of Ely, for the south. Although there existed in England several so-called Galilee porches, there was but one besides Durham, that at Ely; and Ely had also been the see of a Prince-Bishop who was also a Chief Justiciary. The author then referred to Miller's, Bentham's, and Stewart's account of the Galilee at Ely, and stated that he had been told he was utterly mistaken in thinking a court would ever have been held in any part of a cathedral. But in ancient documents the Galilee at Ely was spoken of as "*Curia vocata le Galilee*," which, had it never been used as a recess between the great central portal of the Galilee at Durham was the prominent feature, architecturally, which first led the author to the opinion that the Galilee was erected as a court. The arch was of Pusey's date, and its

treatment such as was consistent, at that time, with forming a recess for a tribunal. The central division of the recesses was left with its rough plaster uncoloured, to receive a dorsal hanging or canopied seat, which was not the treatment of an altar recesses at that period. Reference to similar treatment in the old Church of St. James at Dover was made by the author, who regretted that while twelve or fourteen years ago he had seen traces of the original work, on a subsequent visit they had been covered with compo and completely obliterated. The term "Galilee" had been applied in several instances to a building attached on the west of a cathedral, as at Lincoln and Peterborough, and at the new chapel, Windsor, and St. Stephen's, Westminster. But whether in the first instance Galilees were built and used as courts or not, it was certain, he believed, that at Durham the Consistory Court had been held in the Galilee from the time of Cardinal Langley down to the end of the eighteenth century; while how early it might have been so used was unknown. In several village churches in England there was at the west end a porch or small chamber external to the church which had by some been called a Galilee. These he considered might likewise have been built for the purposes of a court,—although the actual purpose had never been definitely determined,—as the manorial courts, to which submission was made and fees paid by the tenants, must have required some recognised public place. As examples were mentioned Melton Mowbray Church; Snettisham, Norfolk; Wigginton, Bucks; and Croxland Abbey. Besides those external chambers, in many churches there was a small chamber over the north or south porch called a parvise, the origin of which was equally uncertain, but which might have been intended to serve the same purpose. Or was it a narthex reserved for the penitents? At Cluny and Vézelay the author thought it was very probable that the thirteenth-century tribune was for some such purpose as he had indicated at Durham. In conclusion, he considered that, whatever their opinion as to the origin and uses of the Galilee, all would agree that there was yet enough interest about it, both archaeologically and architecturally, to justify a record of its history.

In the discussion which followed,

Mr. Nicol said that in the Cathedral of Tann, where there was a large choir, it was used as a court.

The Chairman: As a *curia*.

Mr. Thomas Binshill said he believed that at the east end of Durham Cathedral, as was the case with similar large buildings, there was originally a small chapel dedicated to the Virgin, and used only for the members of the community; and when in the latter part of the twelfth century the services offered with special reference to the Virgin became very popular, the people, and especially the women, desired to have the same privileges in a chapel to which they could be admitted. It was impossible that they could go through the portions of the church reserved for the community to the chapel which was built for them, and probably it became a question as to where the chapel should be built. Worksp Abbey showed, on that side of Durham, and having the large size and proportions characteristic of the thirteenth and fourteenth century Lady Chapels. The Durham Galilee was probably the next in date to that of Worksp, and he had no doubt it was originally built for no other purpose than that of a Lady Chapel. Another building, he believed, built for the same purpose, was that called the Chapel of St. Joseph of Arimathea at Glastonbury. These were built so that people might get at them, because they could not get at the chapels which existed at the east end of the cathedrals. At Hereford, Worcester, and other cathedrals, arrangements were made by which the people could go along the north aisle, and so get at the great Lady Chapels made in the thirteenth century to project end of Durham. The great chapel at the east end of Durham Cathedral was the Lady Chapel, so that the building referred to by Mr. White would be no longer used as such, but might become the Consistory Court, or the Galilee, whatever that might mean. He was fairly familiar with the Church of St. James at Dover. That was made the court of the Lord Warden, but he believed it was not originally built as such, as there were all the marks of a purely ecclesiastical building upon the struc-

ture. In fact, it was only in comparatively late times that it became the Court of the Lord Warden. On the whole, then, he believed that the Galilee at Durham was built originally as a Lady Chapel, but when the eastern chapel was constructed it was no longer considered the Lady Chapel, and became the Galilee, although he confessed he could not tell the meaning of the name. He concluded by proposing a vote of thanks to Mr. White.

Mr. Wilson seconded the vote of thanks, and said that whatever the place was built for it had been all those things which had been described to them, and more; it had been a chapel, a court of justice, and a place of access for the female sex. The Consistory Courts had to move about, and they did not require more than a small amount of room. The courts, however, were held in some chapel or convenient place, where there was good access; but he had no doubt that this building was always the Chapel of Our Lady to the end.

The vote of thanks was then put and carried. Mr. White, in his reply, said he had no doubt that such buildings were used for many purposes, and that the Consistory Court was moved to various parts of the Cathedral was a point as to which they need not raise any question. A civil court, on the other hand, would not be held in the Cathedral. Bishop Pusey doubtless desired a place where he could hold his secular court, and it was not likely he would go elsewhere when he had the opportunity of making a court immediately contiguous to the Cathedral, but external to it. There was a precedent for that at the Cathedral of Aix-la-Chapelle, which contained a sort of Galilee where Charlemagne held his judicial courts, which were necessarily secular and civil. That monarch's chair was still preserved, he thought in one of the *triforia* in the centre of such a tribune as that which Viollet-le-Duc mentioned as existing at Vézelay.

The proceedings then terminated.

THE LONDON COUNTY COUNCIL.

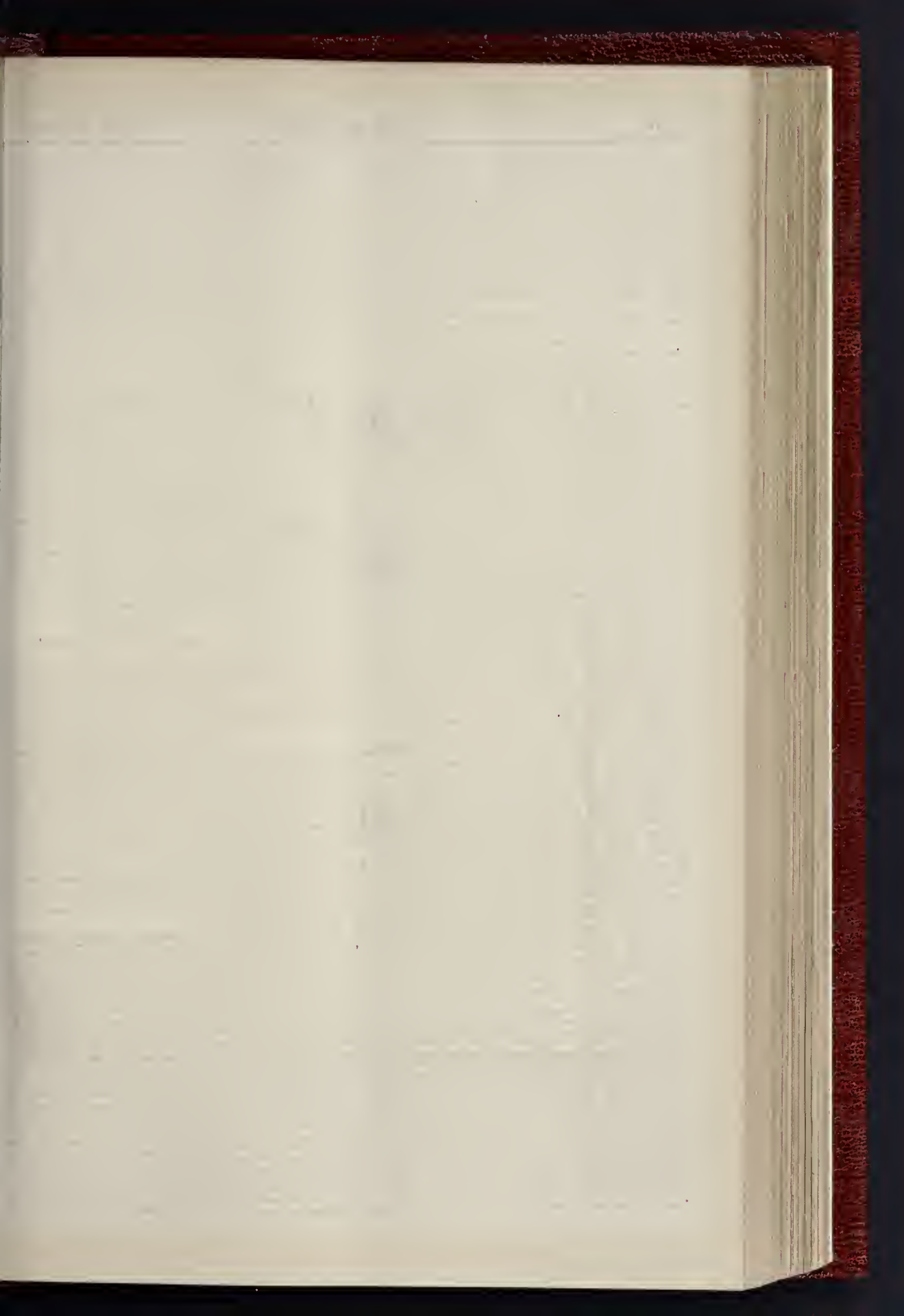
The Blackwall Tunnel.—At the supplementary meeting of the Council held on the 14th inst., the question of the Blackwall Tunnel was further discussed, but no definite conclusion was arrived at, except that Mr. Arthur Arnold's amendment (the terms of which we have already given) was defeated by nine votes, the numbers being 56 against to 47 for. A further amendment, suggesting that the work should be postponed until the Council had obtained power to apply the principle of "betterment" to the land on Bogsby's Marshes which would be improved by the construction of the tunnel, was lost by 11 votes,—49 votes against to 38 for. The Chairman (Lord Rosebery) suggested as a compromise that a trial shaft and a small length of tunnel should be undertaken experimentally, and the further consideration of the question was adjourned until next Tuesday.

The usual weekly meeting of the London County Council was held on Tuesday afternoon last, Lord Rosebery in the chair.

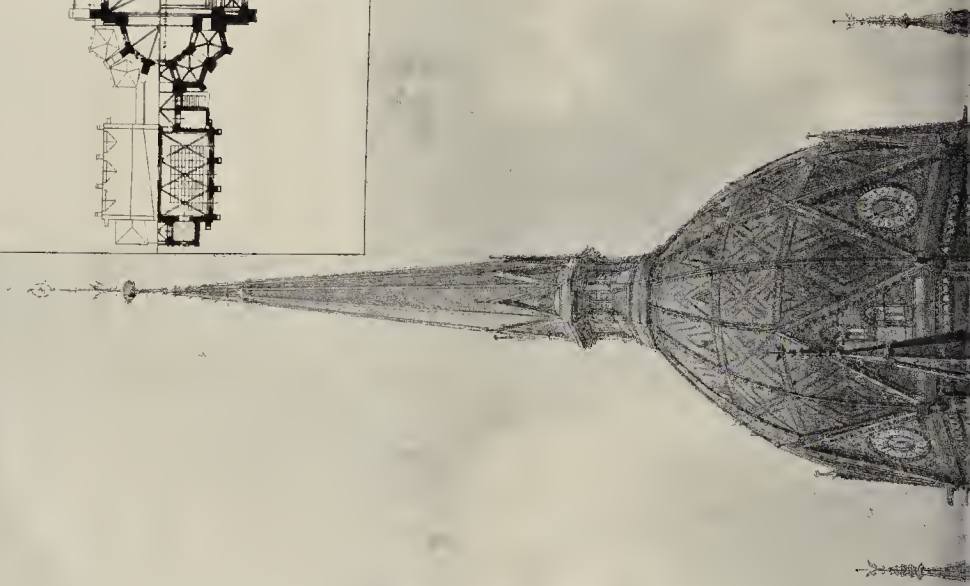
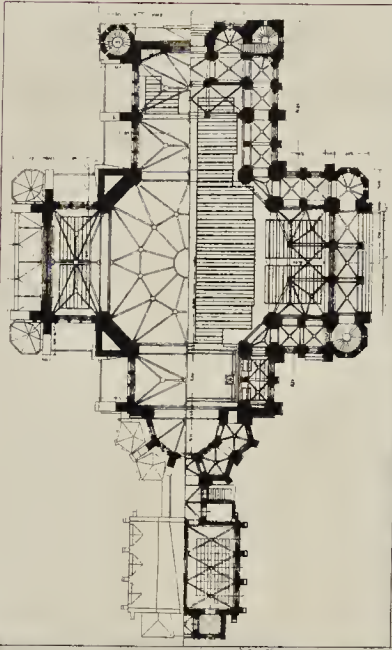
Main Roads.—The Highways Committee's report contained the following important paragraphs:—

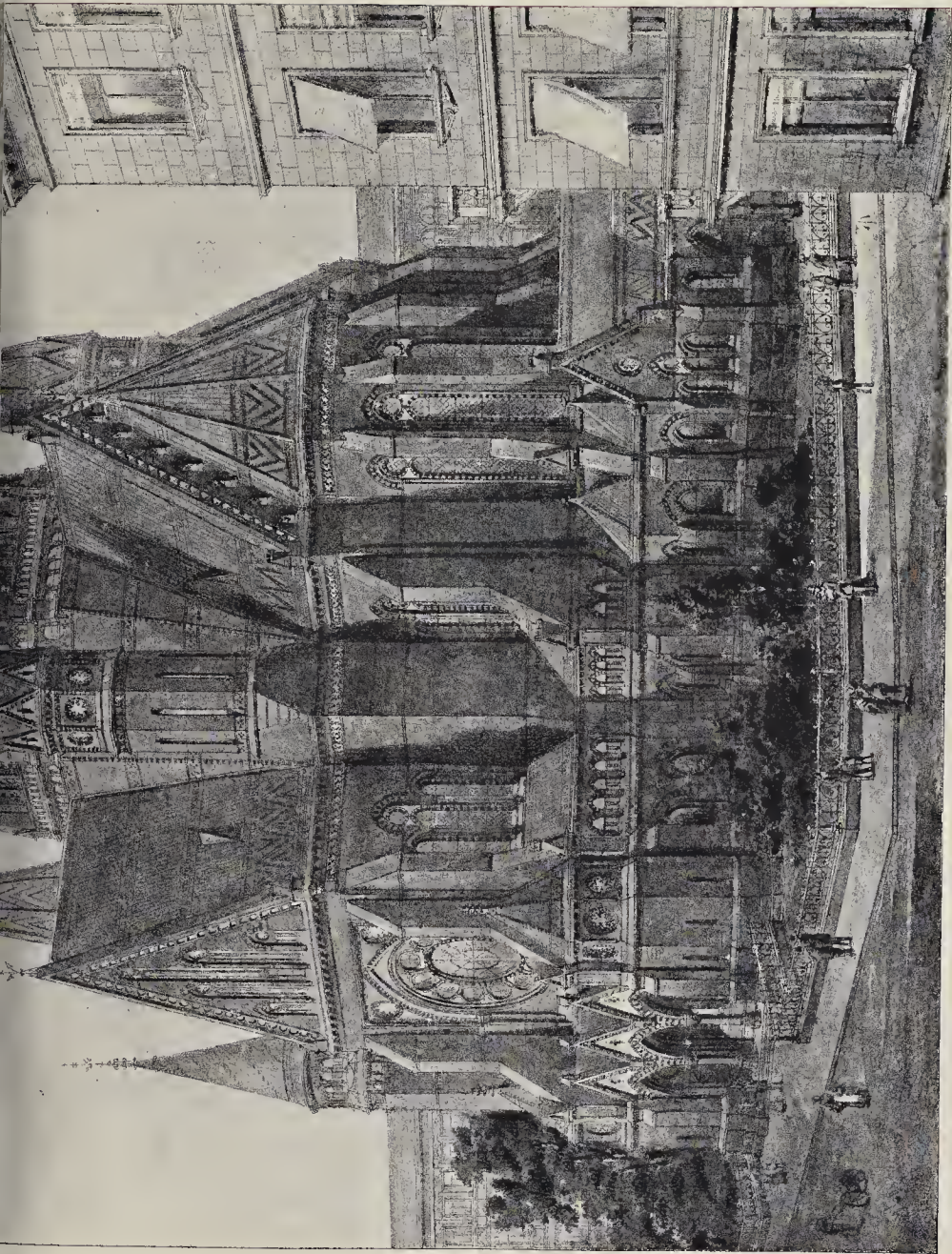
"Your Committee have considered the applications which have been made by the several Vestries and District Boards for thoroughfares in their respective districts to be declared by the Council to be 'main roads,' under the provisions of sections 11 and 41 of the Local Government Act, 1888, and the Highways and Locomotives (Amendment) Act, 1878. The last-named Act did not apply, so far as the provisions as to main roads were concerned, to London (in fact, the Metropolis was specially excluded by section 2 from the operation of the Act); but by section 41 of the Local Government Act, 1888, the provisions of the Highways Act relative to main roads were extended to London. Under section 15 of the Highways Act, 1878, the Common Council of the City, or any Vestry or District Board, if of opinion that any highway in its district ought to become a main road, by reason of such highway being a medium of communication between great towns, or a thoroughfare to a railway station, or otherwise, may apply to the London County Council for an order declaring such part of the road as lies within its district to be a main road; and if the Council be of opinion that there is probable cause for the application, it is to cause the road to be inspected, and, if satisfied that the road ought to be a main road, is to make an order accordingly.

All the local authorities in London, with the exception of the Court of Common Council and the Strand District Board, have exercised this power;



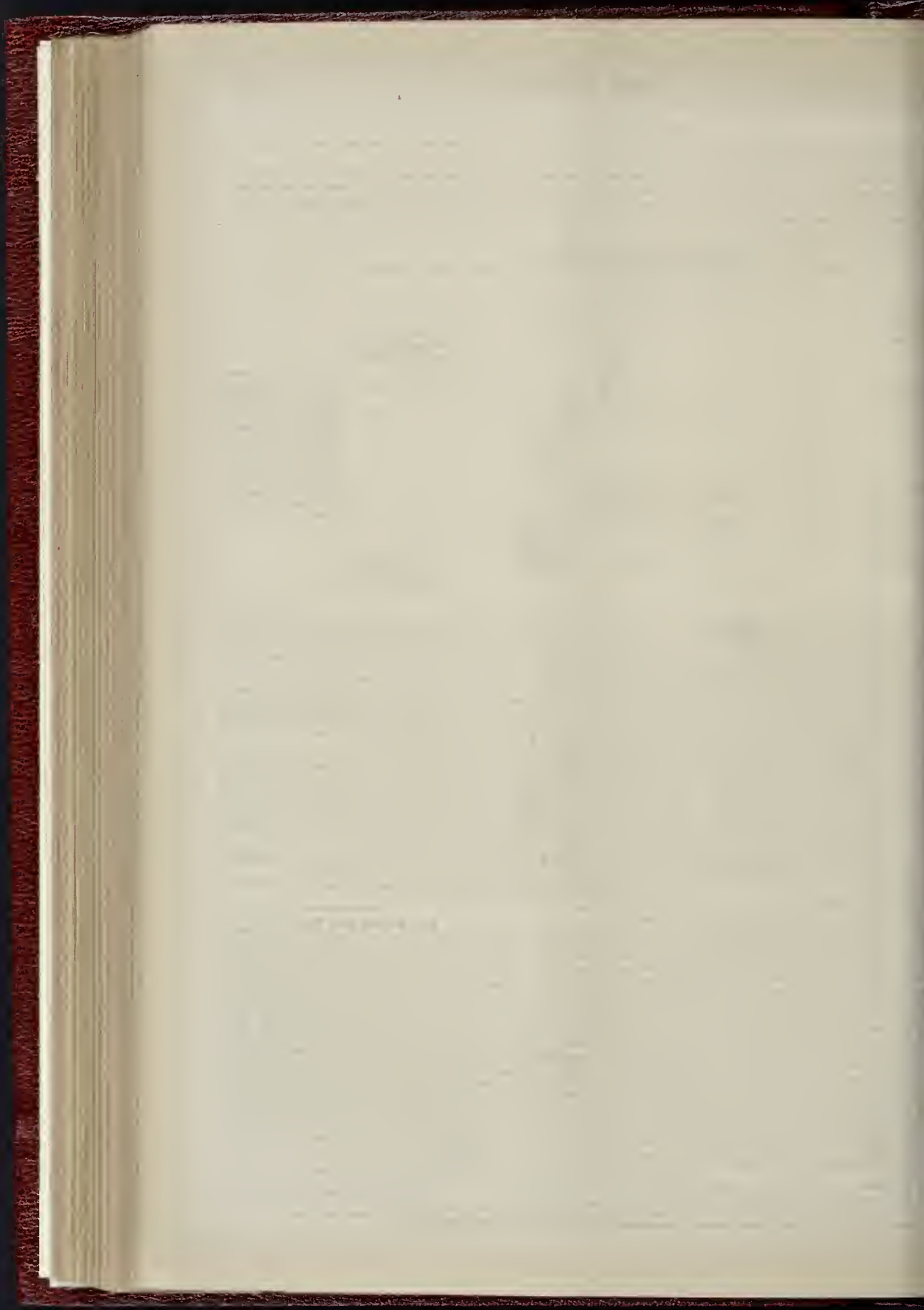
THE BUILDER, MARCH 22, 1890.





THE PHOTO. GRAPHIC & C. 32, MARTIN LANE, LONDON, E.

THE CHURCH OF THE HOLY CROSS AT BERLIN.—PROFESSOR J. OTZEN, ARCHITECT.



LIMITS OF HEIGHTS OF BUILDINGS.

WE add the following statistics as to the regulation of heights of buildings in various German cities, to those which we have already given a previous number (page 112 ante).

In Germany, the land of building regulations, we find that nearly every town of any importance has some rules referring to the height of the street front and the number of stories permissible, and these regulations are stringently enforced. It may be well to know that, for the sake of interesting comparisons, nearly every town has set up a ratio between height of street front and width of street, and we have taken note of this fact preparing the adjoining table:—

City	Width of street (= b)		Maximum height (= h) of the street front of a building. (Height measured from highest point of footpath along the facade to top of front wall.)		Ratio of height to street width.	Roofs.	Number of stories permitted.	Remarks.
	Anywhere.	In the open.	Anywhere.	In the open.				
	(Measured between the authorised lines of building frontage.)							
BRUNNEN	39 ft. 4 in.	74 ft. 2 in.	h = b	—	—	—	Five	
ESSEN	—	74 ft. 2 in.	h = b	—	—	—	Five. Only four if b is less than 82 ft.; only three if b is less than 55 ft. 9 in.	
LOGNE	37 ft. 9 in.	65 ft. 7 in.	h = b + 11 ft 6 in.	—	—	—	Four (as a rule)	Authority: — "Stadtbaumeister" T. Staebben (Cologne).—Extract from statistics of the different sanitary police regulations of continental towns, as furnished by the "Fachgruppe für Gesundheits-technik" (meeting at Vienna 12th April 1889), for publication in the "Wochenschrift des Oestr. Ing. u. Arch. Verein."
EMMEN	39 ft. 4 in.	—	If b = 19 ft 8 in., then make h (max.) = b + 19 ft. 8 in.	—	—	—	—	
SELBENDORF	32 ft. 10 in.	65 ft. 7 in.	h = b	—	—	—	—	
FURT	24 ft. 7 in.	65 ft. 7 in.	—	—	—	—	Four	
ELSRUHE	39 ft. 4 in.	—	h = $\frac{3}{2}$ b	—	—	—	Five	
UTTGART	—	65 ft. 7 in.	h = b + 14 ft. 9 in.	—	—	—	If the staircases are fire-proof, any number. (Seldom more than 5.)	

The applications received refer to thoroughfares all descriptions, and in all parts of London, the district Board, as stated by the Vestries and District Board, is a little over 412 miles. The circumstances of the main thoroughfares of London are so peculiar that your Committee have had considerable difficulty in applying the provisions of the section to the roads referred to in the applications. The thoroughfares of London are scarcely now to be considered as means of communication between great towns, in the sense which is obviously intended by the Act; for, as the greater of the goods and passenger traffic is now brought into and taken out of London by railway, there is very little of what may be deemed thoroughfare by road between great towns on either side of London; while, with so many railway stations in London, nearly every road and street may be considered to be a part of a thoroughfare to a railway station, and so would answer the description in the section. Your Committee may also point out that the extra cost of maintenance caused traffic passing through a main thoroughfare in one London district to another, or to and from a railway station, is probably more than met by the increase in the rateable value of the property consequent upon the road being used for either of these purposes.

The Local Government Act casts upon the Council the duty of maintenance of any thoroughfares declared to be main roads, but the local authorities may claim to retain the management, of such roads, and in that case the Council is obliged upon to pay the cost of such maintenance, without any power being given to the Council to exercise control in any way as to the manner in which the road shall be dealt with. Thus, in the case of a main road running through several parishes, the road may be paved with wood, or with other and granite, another with asphalt, and another part may be macadamised, at the will of the respective local authorities; but the Council, the report of its Surveyor that each part of the road has been properly maintained and repaired, and have to pay a sum, to be agreed upon from time to time, for the cost of maintenance, without any power to direct that the system of maintenance of the road shall be uniform throughout its entire length. This appears to your Committee to be an arrangement which requires some alteration, either in the direction of relieving the Council of its responsibility, or, if such responsibility be retained, of giving the Council some power of control in the manner in which the money is to be expended, and of requiring continuity in the system of paving or otherwise to be adopted with regard to the road.

The question whether a road has been maintained in a satisfactory condition, which must be decided at some time by the Council's contribution is paid, would probably give rise to constant friction. In the case of a road passing through several parishes,

the work of repair and maintenance in one district may have been done to the satisfaction of the Council's Surveyor, while in the adjoining parish the work may not have been satisfactorily performed; and should the Council require any particular standard of maintenance to be observed, as a preliminary to the payment of its contribution, great dissatisfaction might arise.

The Local Government Act provides (section 11, sub-section 7) that where the Council declares a thoroughfare to be a main road, such declaration shall not take effect until the road has been placed in proper repair and condition to the satisfaction of the Council. Some of the Vestries and District Boards have expended considerable sums in putting the thoroughfares in their districts into a state of proper repair, which sums have been borrowed on loan, and are in course of repayment; but in some districts where the roads are not in good condition, the expenditure before the declaration of the Council could take effect would probably be very large, and it might be a hardship to compel local authorities to embark at very short notice on an expenditure which they had not contemplated, and which might interfere with the carrying out of other and more pressing requirements. At the same time, it would be manifestly unfair to the other districts of London if the Council were to accept the responsibility of the cost of the future maintenance of roads which were not at the first in good and proper condition.

Under the Local Government Act, the duty of maintaining these roads in the County of London which have been disturbed since December 31, 1870, devolve upon the Council; but the local authorities have the same power of retaining the management of the portions of these roads in their respective districts, as in the case of roads to be declared by the Council to be main roads, and the Council is to make a payment towards the cost. Your Committee have found considerable difficulty in interpreting and reconciling the provisions of section 11 and the subsections thereof in the Local Government Act. Sub-section 1 casts upon the Council the duty of wholly maintaining the existing main roads; while sub-section 2 provides that in the case of a road in consideration of an annual payment by the Council for the cost of the undertaking. Your Committee have taken the opinion of counsel upon the question of the meaning of the words 'towards' and 'for,' as used in these sub-sections, but have not been able to arrive at any definite conclusion upon it.

Upon a review of all the circumstances your Committee are of opinion that the provisions in the

Local Government Act and the Highways and Locomotives Act, with reference to main roads, are totally inapplicable to the thoroughfares in the County of London, having regard to the peculiar conditions under which they are managed, and the number of authorities concerned in such management. Your Committee therefore recommend—

"That the Government be requested to take the necessary measures for the amendment of the Local Government Act by exempting the County of London from the operation of sections 11 and 41 (4) of the Act; and that the President of the Local Government Board be requested to receive a deputation from the Council on the subject."

After some discussion, in the course of which Mr. Westacott cited figures showing that the cost of maintaining main roads in the metropolis averaged 1,000l. per mile, which would mean an expenditure of 412,000l. for the 412 miles mentioned in the report, the recommendation of the Committee was agreed to.

District Councils.—On the motion of Mr. A. Hoare, it was resolved,—

"That in the opinion of the Council it is a matter of great urgency in the public interest that District Councils should be established in London."

After transacting some further business, the Council adjourned.

The English Iron Trade.—There is a partial recovery in the English iron market, at least so far as pig-iron is concerned, but the business doing is still limited. Whether the coal strike now in full operation will last long or not—and there are some who predict that it will be of brief duration—its effects have been the unsettlement of trade, and the stoppage of many works. The north of England and Scotland not being affected by the strike, it is there we observe the recovery of the market. Scotch warrants have had an upward tendency all the week, and the price of some Scotch brands has been slightly raised by makers, while Cleveland iron has advanced from 1s. to 1s. 6d. per ton on the week. In the districts subject to the cessation of work by the miners, prices of pig-iron show weakness. North-west makers of hematite have again reduced their quotation, this time by 2s. a ton. Very little is doing in finished iron and steel, and present quotations for the former are scarcely maintained. Steel rails are weak at 62. in the north-west, and this is now also the price of blooms, billets, and slabs. Shipbuilders are beginning to experience more enquiry, while engineers, where they have not been compelled by the want of fuel to restrict operations, continue fairly busy.—Iron.

Illustrations.

BUILDINGS DESIGNED BY PROFESSOR OTZEN, OF BERLIN.

WE have given in this number reproductions of some of the drawings by Professor Otzen which have been exhibited at the Institute of architects this week in connexion with a paper on the subject by Mr. A. Strong, with the double object of illustrating the paper, and of giving our provincial readers a selection from the drawings which have been exhibited to London members of the Institute.

The general subject is sufficiently discussed in Mr. Strong's paper. This section through the Einshüttel Church shows a powerful piece of work of its class, and is an example of a somewhat elaborate interior church architecture carried out in brick, with diaper surface ornament in various portions of the wall.

The style of Gothic design illustrated in the exterior of the Church of the Holy Cross, and in the reredos from a church near Wiesbaden, it is needless for us to say, is not such as is likely to meet with much favour or admiration among English architects; but it represents the class of work which is being carried out by an architect of distinction in his own country, and we presume therefore that there is a considerable population to whose tastes it appeals, which is an important fact not to be overlooked.

In the Flensburg church the spire alone is modern and the design of Herr Otzen; we selected it partly because the spire is a good example of its class, partly because the whole makes rather a pleasing and characteristic picture.

MODERNISM IN ART.*

In a paper which I had the honour of reading at the Arts and Crafts Exhibition Society, recently, on "Stained Glass," I had occasion to deplore the pedantry which still enervates and depresses so much of our decorative art; and feeling, as I do very strongly, that no art is genuine which is not modern, that no art is expressing the best of which the artist and his age are capable, I was moved to make this the subject of the paper which you kindly asked me to read to you to-night.

But there is a wide difference between the incidental reference to a question like this in its bearing on a particular technical art, and an independent examination into the question itself.

I should be shirking the responsibility I have undertaken if I contented myself with an hour's ferriand on the lack of vitality in our present day art, instead of attempting to account for it, and, if possible, to indicate a remedy.

Now what does this enquiry involve? I suppose none will deny that pedantry is an evil in art, as in everything else; that the only art worthy of the name is the work of men who speak their own minds,—not of men who pretend to be somebody else, and make a ludicrous attempt to say not what they themselves feel, but what they think somebody else would have said. But, if the thing is so manifestly absurd, how comes the evil into existence?

Here, then, is the first stage of our inquiry. What is the true cause of pedantry in art? The proximate cause is obvious. It is the lack of vitality in our artistic powers, the paucity and poverty of our ideas. No one borrows money who has a large capital of his own, and no one borrows ideas who has a wealth of them within himself clamouring for utterance.

But this answer merely leads us to the next stage. What is the cause of this low vitality? Is man going irrevocably down-hill? Is the deadly monotony and hideousness of our streets, our costume, our furniture inevitable and permanent, or is there some assignable and sufficient cause? And, if so,—finally,—is the ultimate cause one which we can reach? Can we, by getting at the root, restore health to the tree?

To me these questions appear to be the most profoundly interesting to which an artist can address himself. Till they have been answered all others seem by comparison to be academical. They concern our life, others concern the outward form which will take care of itself when life and health are restored,—if restored they can be.

* A paper by Mr. Henry Holiday, read by him to the members of the Architectural Association on the 14th inst., as elsewhere mentioned.

I have long and anxiously considered the subject myself and see no reason to depend as to an ultimate solution; no reason to suppose that the destitution, the vulgarity, and the squalor which desolate the everyday life of this age must endure and are without remedy. So long as we are aware of the evil and chafe under it, there is hope.

The unqualified satisfaction of the prosperous money-maker who comes from his office and lodgers to a home crowded with expensive articles, not one of which possesses a trace of beauty,—this is indeed a depressing subject for contemplation, but happily this state of mind is not universal. There are many who deplore the ugliness of our life and some who attempt to improve our condition.

You all know Watts's pathetic picture of "Hope." Well, this discontent, this struggle against the flaunting finery, the graceless luxury of our rich, and the crushing, brutalising misery of our poor, is the one string to our lyre, the still, small voice which must ultimately prevail.

Let us, then, with the courage of a true faith in the immortality of beauty, face the evils that beset us; let us see what they are, and whence they arise, for only so shall we be prepared to overthrow them.

First, let us contemplate this pedantry, this substitute for art which is the resource of those who have nothing to offer of their own. How came men to utter this base coin, and how came men to accept it when offered? Well, we all know how the Pugin movement began, and I take this as a very favourable instance, recognising that ecclesiastical architecture stands in many respects alone, that it embodies an ancient tradition, that it has not to meet requirements of an everyday life varying with each generation, that its conditions of existence being totally unlike those of domestic architecture, the principles which apply to one do not necessarily apply to the other.

It is not, therefore, by way of pronouncing an adverse opinion on a movement concerning which any one of you have a better right to speak than myself, that I refer to this episode to indicate how and why a course which may be necessary though regrettable in one case is followed in other cases where it is wholly objectionable.

It is long since I read Pugin's well-known comparison between Georgian and Medieval architecture, but I recall the amusing examples he gives, and his argument is a simple one: This is hideous, that is exquisite; why will you put up with this when you can have that? Whether the alternative was what Pugin thought, whether we could have "that," or only a lifeless imitation of it, I leave to architects to decide. Where we are dealing with forms only remotely, if at all, derived in any sense from nature, with mouldings and cornices, shafts and caps, arches and groings, their beauty consisting chiefly in proportion, it appears to me that an artist with a fine sense of proportion may produce and has produced works noble and impressive, though the forms in their details were borrowed from a past age. In any case there can be no doubt that the movement originated in a sincere love of beauty, and this I readily admit, though, as the lawyers say, "without prejudice"; but when we come to figure-decoration the whole question is altered.

On this the movement had a most baneful influence. The revived admiration of Medieval, and particularly thirteenth-century, architecture, having become general, it was swallowed whole with all its accompaniments with a total absence of thought and discrimination that speaks volumes for the prevalent tastelessness of the time. A thirteenth-century stained-glass window or missal exhibits commonly a power of design, a splendour of colour, and a vigour of imagination and symbolism which may well excite our wonder and envy. What effect had these windows on the commercial decorators in the early days of the Gothic revival? They saw nothing of the beauty of colour of design or of imagination. One thing alone they aimed at (to judge by their results).

Draughtsmanship in the thirteenth century was in its childhood. The figures in the best works of that period possessed a surprising vigour and spirit, but the technique was imperfect. Here was the thing to be imitated. Colour was of no consequence: the rawest and crudest that could be found would do; but a splay foot and a goggle eye would place the

work at once on a par with an Early English window. I should apologise for even referring to these babyish productions, were it not for the extraordinary fact that notwithstanding all the great advance which has since been made in the quality and colour of the material, there are still respectable decorative houses who imitate the decorative works of the thirteenth, fourteenth, and sixteenth centuries, and seem to think they are producing works of art. Not only so, but there are people who gravely accept this base coin as legal tender, and treat these travesties of genuine work as if they had anything genuine about them. Happily they are exclusively commercial productions. Art has not got so low even in this age that an artist will descend to servile, avowed imitation of other men's ideas, designs, and even manners. Nor is it expected that he should do so—outside a church. His powers may be great or small, his range of thought and conception high or low, but he is expected to give us the best he has of his own, expressed in the most perfect manner of which he is capable. A lofty soul will speak to us at our best, and will elevate that best of ours to something better. A soul of lower range may address our lighter moods, but each in its own plane may be as perfect as the other. If these that speak to us be true prophets, and have taught to say that is worth saying, they will spare no pains to see that their message is not marred by clumsiness of utterance. They will attract us by the excellence of their speech, and then move us by the worth of what they have to tell.

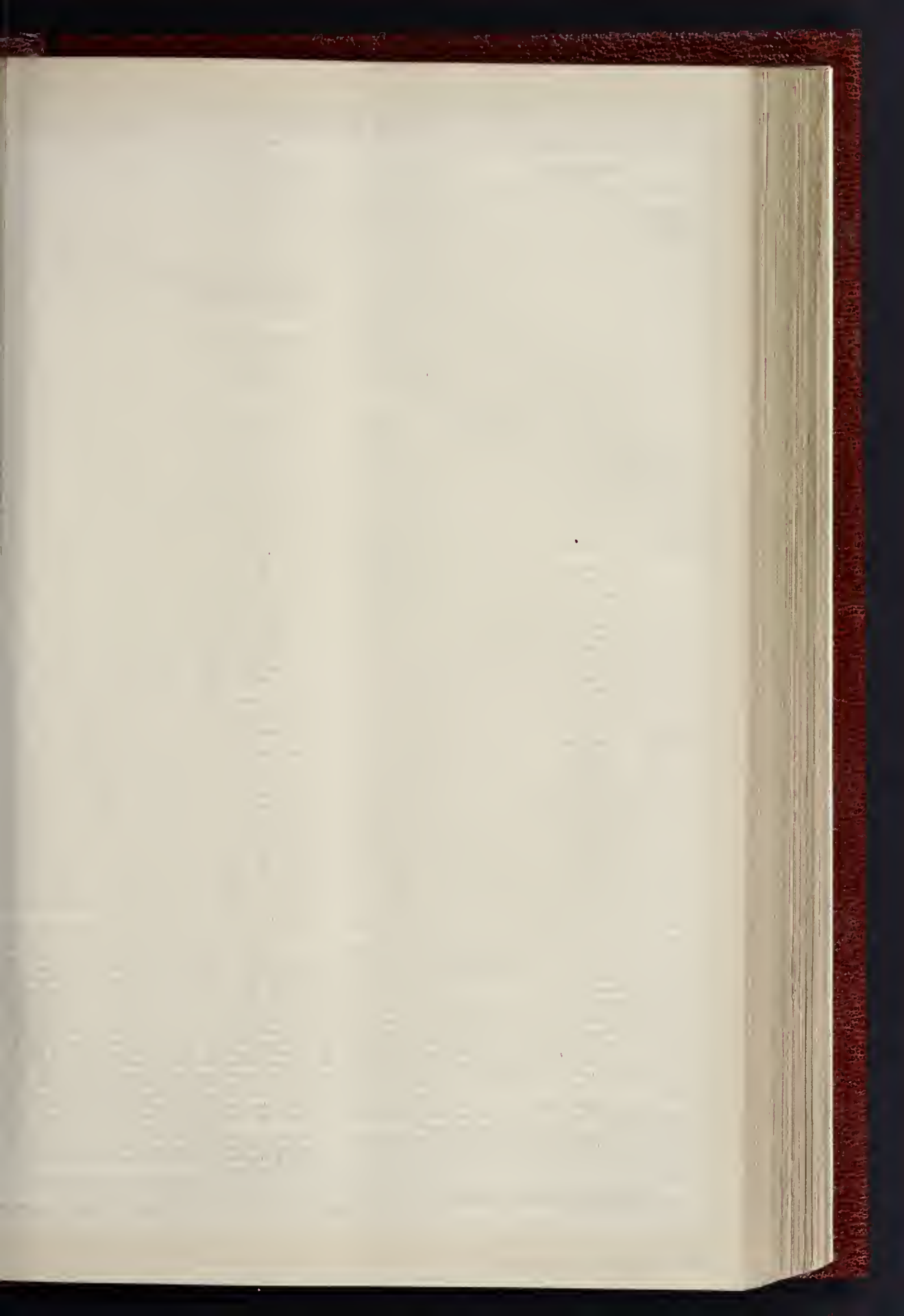
While writing this sentence, a paper was put into my hands, which I opened at these words: "To touch the heart of his reader, an author must coin his soul into words." Most true, and well said. Even so a painter must coin his soul into visible images, else he will certainly touch no hearts, and he must see that beautiful thoughts are coined into beautiful images worthy of that which they express.

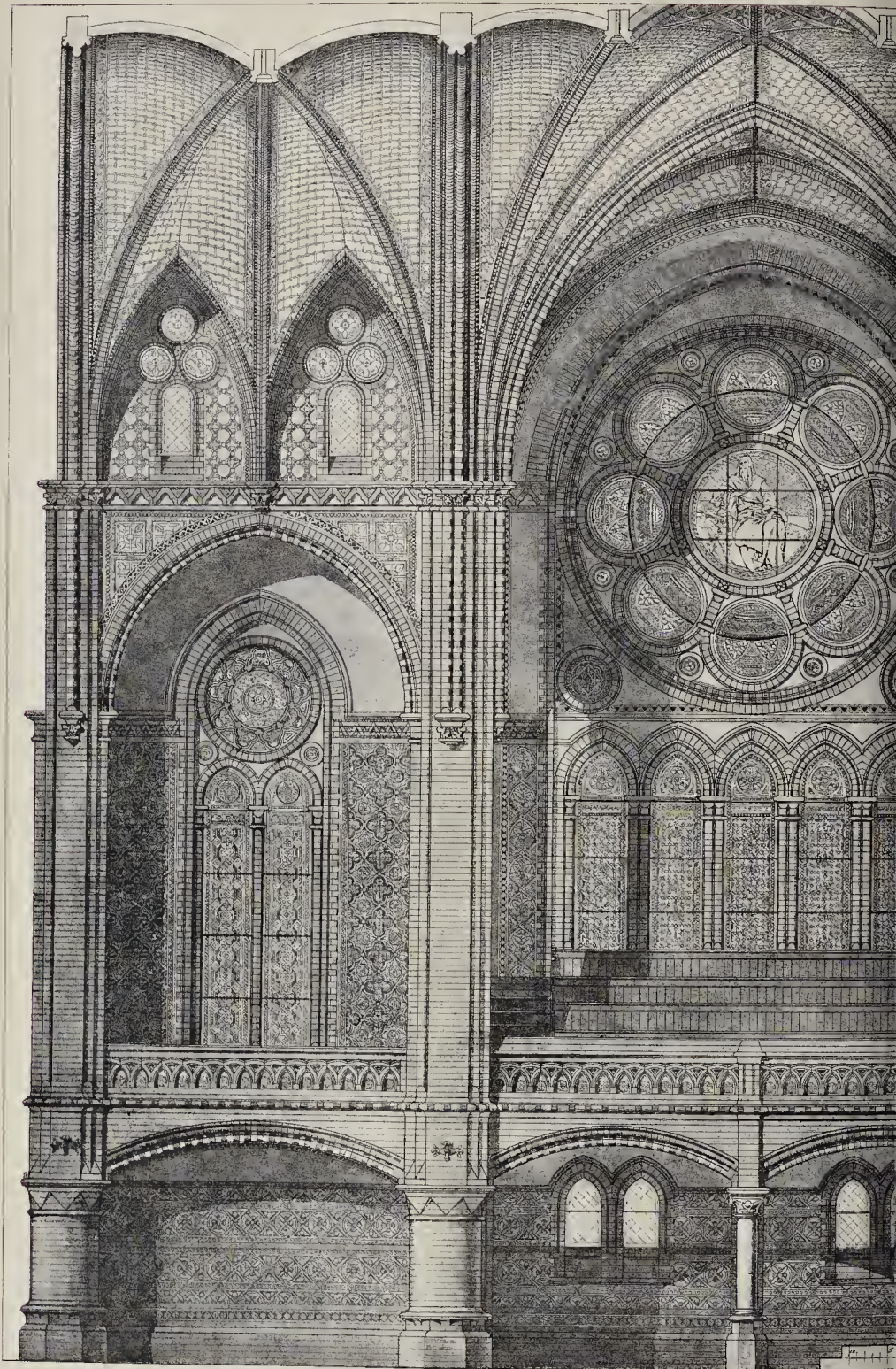
Something like this we ask for elsewhere than in a church. We do not always get it, but we often do in greater or less measure, and we value the giver in proportion as he fulfills our desire. A Watts, a Walker, or a Leech address different natures or different moods of the same nature, but each gives us of his own, and gives something that no one else can give. Whether we weep with those that weep, or laugh with those that laugh,—soul speaks to soul, heart responds to heart. But, inside a church, what have we to do with souls and hearts? There we are only concerned with thirteenth century or fifteenth century; all we want there is a commercial firm who can coach its *employés* in the correct thirteenth-century goggle eye or the fifteenth-century wrinkle, and in all the other tricks of the trade, by which the expert may know what period is being caricatured for his benefit. In the true work of art, where the technique is but the means of expressing ideas which had insisted on utterance, we respond to the influence of a master. In the hollow substitute for art where the technique is but a mechanical imitation of something else, we find nothing but the drudgery of a slave, tied down to a dull routine, on whom we can hardly even bestow compassion, for he parades his servitude with evident satisfaction.

Surely it ought to be a truism to say that all genuine art was modern when it was produced; in no past age did men try to make their work appear to have been produced in an earlier age, and, except in decorative art, it is rarely done now. A man who would send a picture to the Royal Academy imitating all the mannerisms of Giotto would be laughed at. It would be considered idle to allege that Giotto was a great genius; that would be a reason for admiration, a reason for going to him for lessons in nobility and simplicity, but not for servile imitation of his drawing, his perspective, his light and shade, and his manner, not for the violation of every principle which he maintained. For if there is one quality which distinguishes Giotto more than other, it is his intense modernism, the daring with which he broke away from the formality of the Byzantine artists, and asserted his right to say what he himself felt, refusing to be the slave of a tradition, even though that tradition was in force, not an artificially resuscitated style, ignored by every artist of the day.

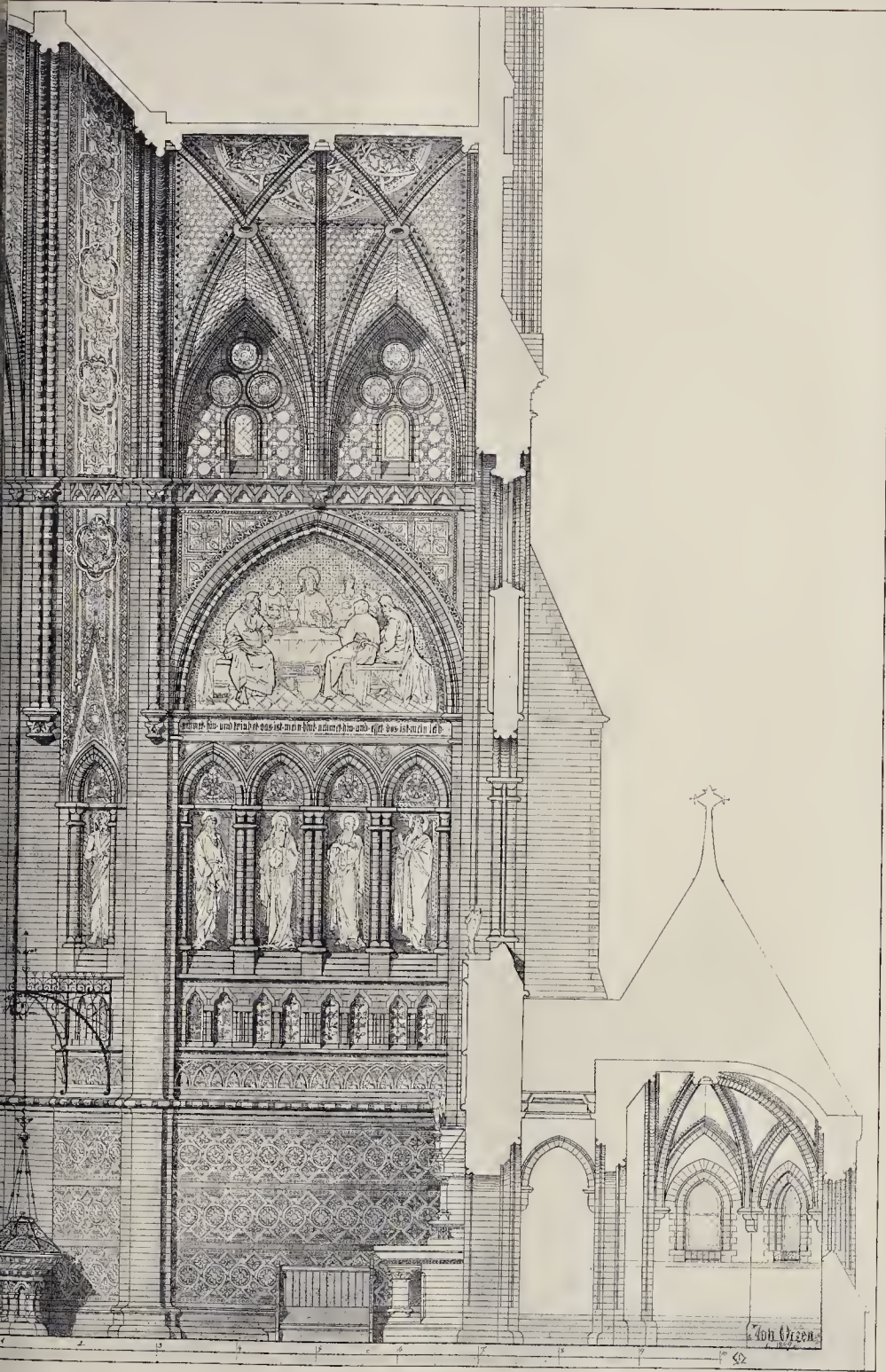
If this pedantry is absolutely indefensible on any rational artistic principle, how comes it to be permitted in any branch of art?

If modernism is the characteristic of all the



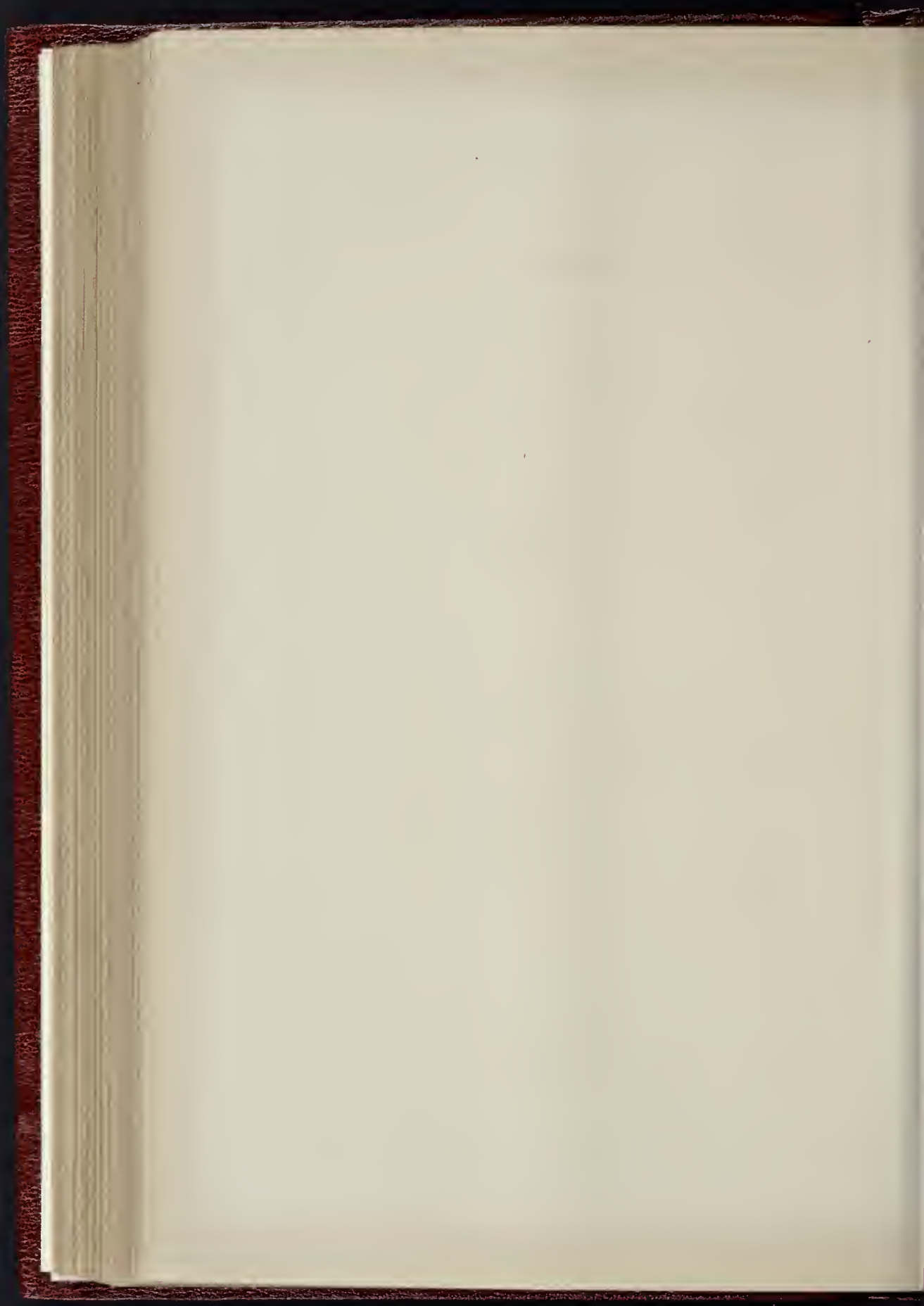


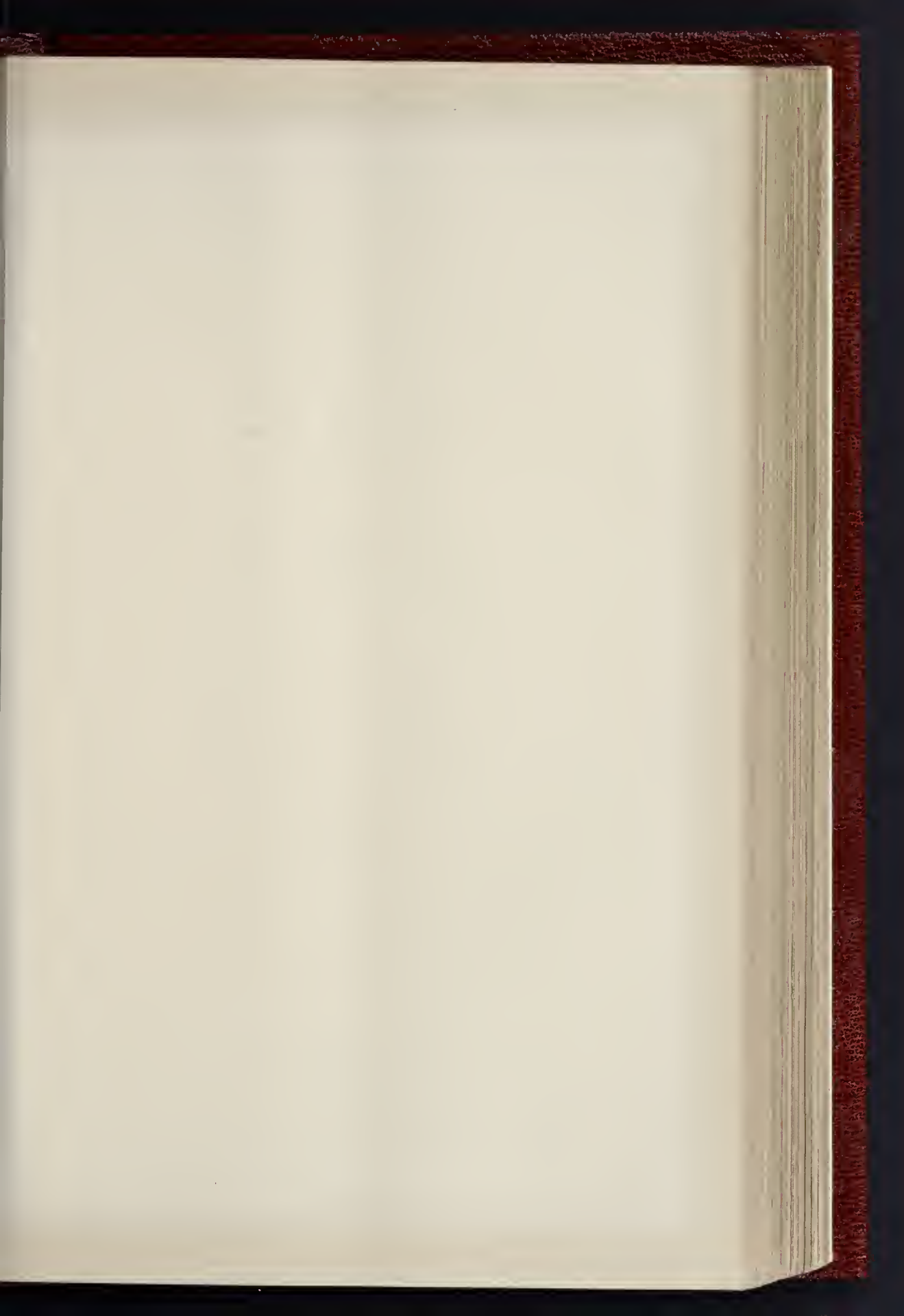
CHRIST CHURCH, EIMSBÜTTEL, 1
PART OF



G.—PROFESSOR J. OTZEN, ARCHITECT
SECTION.

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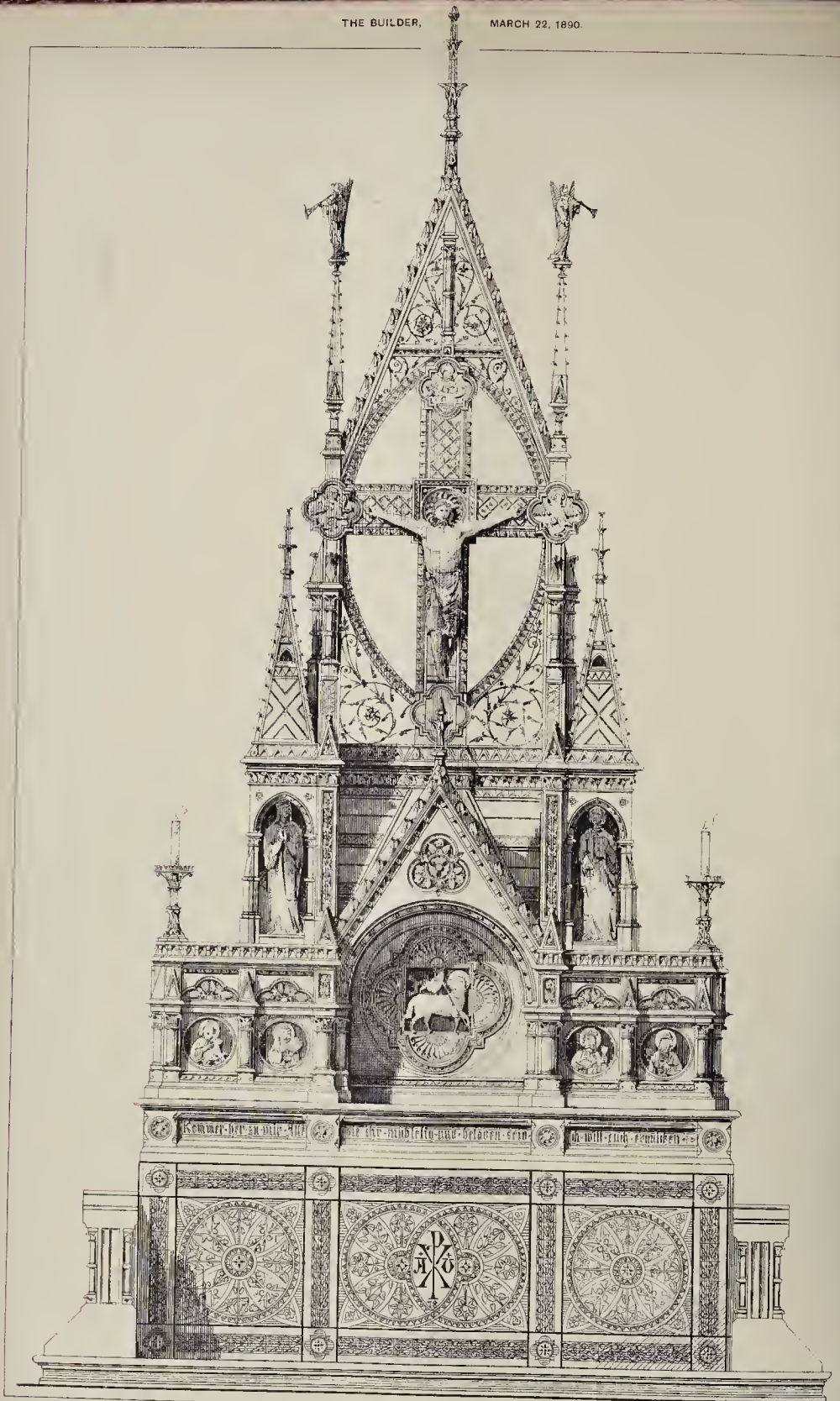


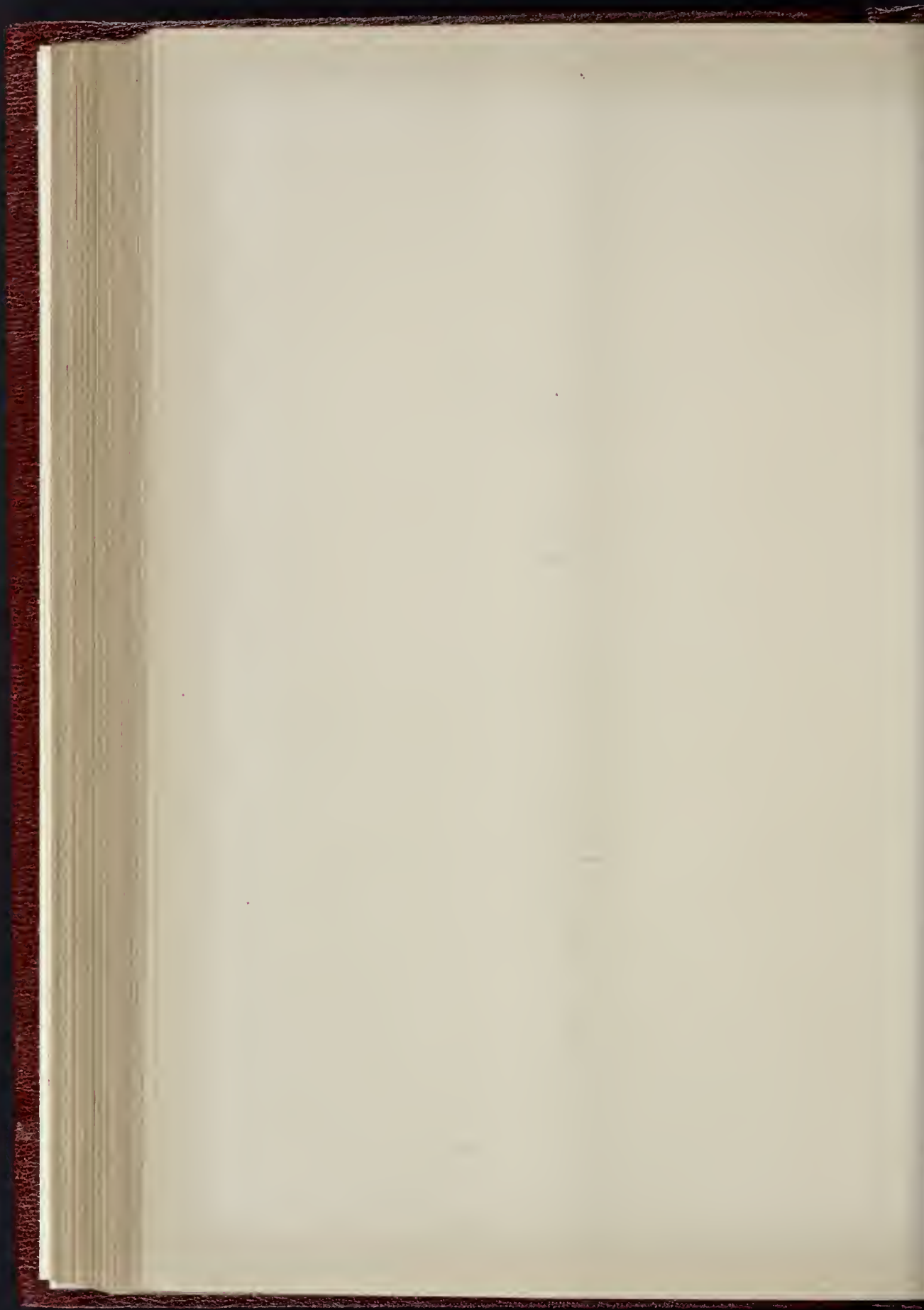
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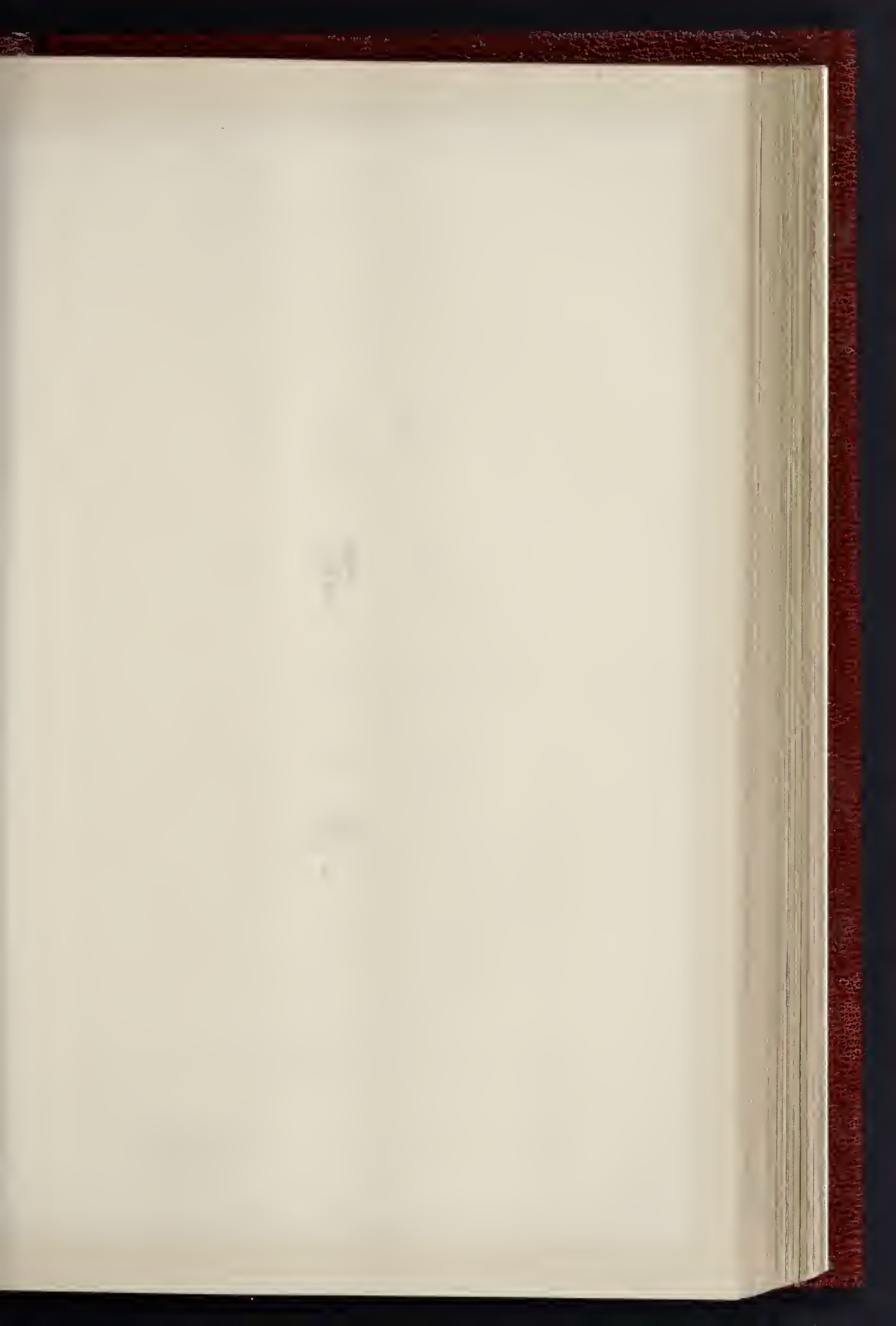
ALTAR AND REREDOS, "MOUNTAIN" CHURCH, WIESBADEN.—PROFESSOR J. OTZEN, ARCHITECT.



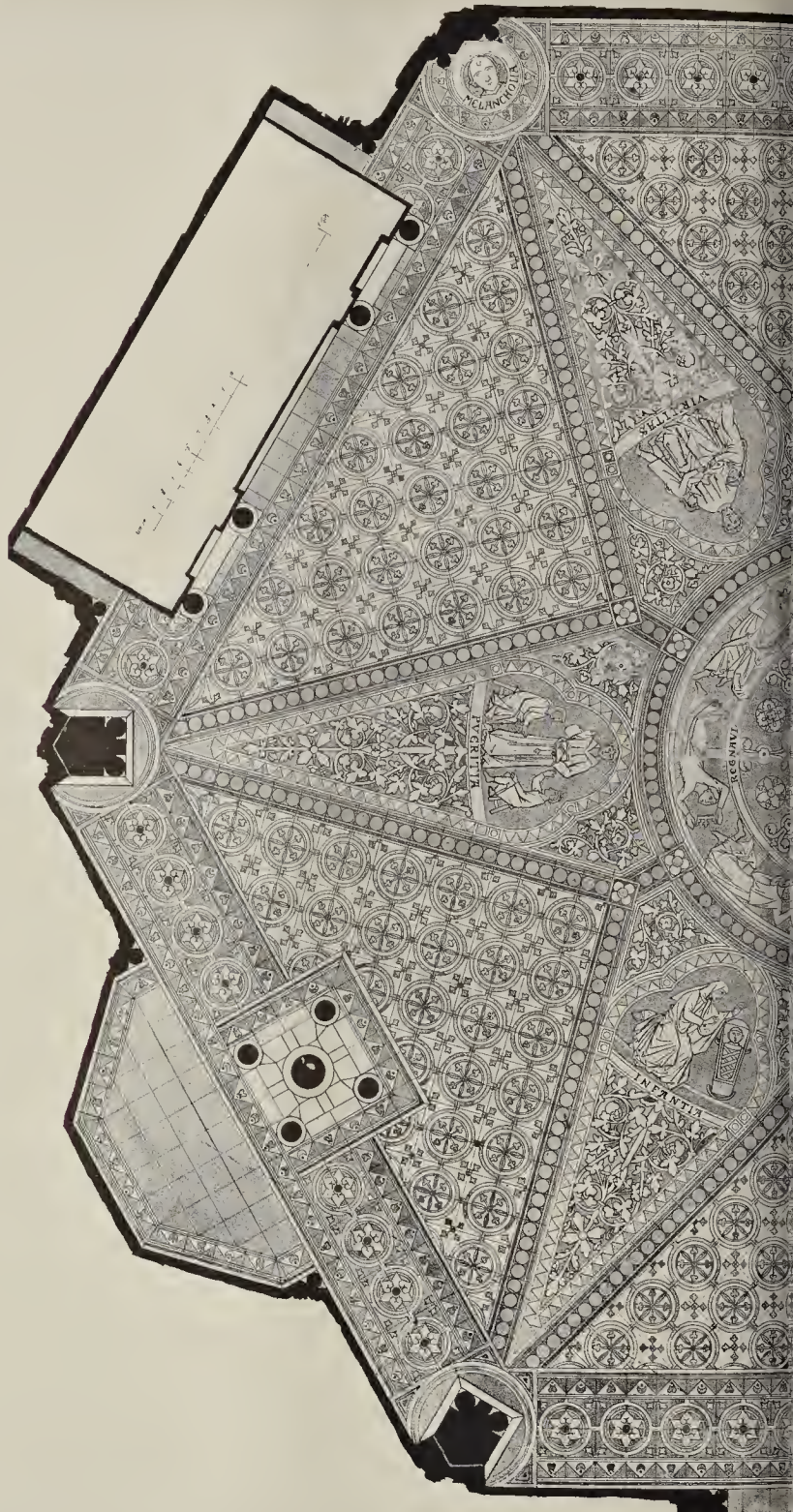
"INK PHOTO," SPRAGUE & CO., 22, MARTINS LANE, CANNON ST., LONDON, E.C.

ST. NICHOLAS CHURCH, FLENSBURG: SHOWING MODERN SPIRE.—PROFESSOR J. OTZEN, ARCHITECT.





THE BUILDER, MARCH 22, 1890





THE PHOTO BRASSIE & CO. MARTIN JANE (PRINTED IN LONDON) E.C.

PLAN OF PAVEMENT, JUBILEE CHAPEL, BERLIN.—PROFESSOR J. OTZEN, ARCHITECT.



art of other ages, if we are most moved by Giottos, the Botticellis, the Signorellis, the roses of the past, by all those, in fact, who pressed and led the sentiment of their respective ages, why do any of us now regard flimsy imitations of a past age with anything but the contempt which they deserve and which they would have received at any other epoch?—if such follies can be conceived as existing in any other period.

Unhappily the cause is only too obvious: the *use*, I say, not the justification. The poverty of art of to-day is the reason why we pilfer from that of the past. Poverty does not justify art, but it is poverty which makes men slaves; and it is only in our artistic poverty that I can find any means of accounting for the prevalence of that which, to me, is the easiest of artistic crimes; for under this obvious system we are training young draughtsmen into systematic deceit, and crushing every better impulse, every genuine faculty which they may have possessed when starting. I have seen men whom I knew as students, and who were then doing hopeful work, go to one of these commercial houses, and there by degrees have seen every faculty gradually blighted till the trace of any artistic perception remained. The method which originated in poverty ends in the destruction of what little we possess. If our artistic vitality is weak, this is the laziest and the most demoralising course we can adopt. We are poor the simulation in our outward style a wealth we do not possess with absolute certainty leads us in a disgraceful bankruptcy. After by far the most modest and modest confession of our small means, and work hard like poor men to improve our condition, than make false show with other men's goods.

So much I must say in strenuous protest against the demoralising principle that pedantry justified by the feeble vitality of the artistic sense under which our age suffers; but now as that weakness itself, what is its nature and tent? Is it merely that our decorative sense is imperfect? Is it merely that we are in the lough of the artistic wave and may in another generation or so be on the crest? We all know that in painting, in poetry, in music, and in science there are waves which pass over nations, and art rising for a time to a towering height, and then sinking out of sight, or to vary the metaphor the great luminaries in any art are usually found in constellations connected with a certain epoch and a few sporadic stars. Is this all that is the matter with us? That genius is not so plentiful as in some other eras, but may become so again in the near future? I venture to say our case is much worse than this. It is not that geniuses are few—they may or may not be—but that society is corrupt, that the conditions under which we live are conditions under which art cannot possibly thrive.

What we are concerned with is not paucity of geniuses, but the almost total absence of art in our present daily life, and the question we have to answer is, "What is there in our present condition which so stunts and suppresses that love of beauty which in every other age has been one of our dominant impulses?"

I will read you a passage written some twenty-five years ago by an acute observer and profound thinker on the motives which induce modern society. John Stuart Mill is speaking of art, but his description throws a flood of light on the subject of our inquiry:—

"The acquisition of wealth was invested with a peculiar value, independent of its intrinsic utility. It became synonymous with power; and since power is the common herd of mankind gives power, wealth became the chief source of personal consideration and a measure and stamp of success in life. To get out of one rank in society into the next above it is the aim of English middle-class life, and the acquisition of wealth the means. And, inasmuch as to be rich is a measure and stamp of success in life, to get out of one rank in society into the next above it is the aim of the social scale above those who are rich by means of industry, it becomes the object of ambition to save not only as much as will afford a large income while in it, but enough to establish business and live in affluence on realised gains. These causes have in England been greatly aided by that extreme incapacity the people for personal enjoyment which is a characteristic of countries over which Puritanism has passed. If accumulation is, on one hand, rendered easier by the absence of a taste for pleasure, it is, on the other, made more difficult by the presence of a very real and intense frugality. So strong is the association between personal consequence and the signs of wealth that the desire for the appearance of a large expenditure has the force of a passion among large classes of a nation which derives less pleasure than perhaps any other in the world from what it spends."

Now I would ask you in the light of this passage to consider that depraved taste, the predominance of which we deplore. What Mill

well designates "the silly desire for the appearance of a large expenditure," on account of the consequence it gives us in society, causes us to surround ourselves with *finery for the sake of display*, instead of seeking *beauty for the sake of enjoyment*. Let us look around for a moment and note the almost total absence of art in our present daily life.

It is admitted on all hands. It is a matter of constant discussion. There are many clever and some noble works of art produced still, that is to say, there are still men, who having made art their profession from a genuine impulse, produce works which possess beauty, and sometimes noble thought, but outside these isolated cases where is the art of our daily life, the art in our houses, in our furniture, in our dress, in all our utensils, and in nineteen-twentieths of our pictures and statues and buildings? Whence arises that deadly uniformity, that depressing, all-prevailing graysness—but that is too flattering a term—that all-prevailing dinginess which fills our life, so far as its external conditions are concerned, and has filled it throughout this century? Here and there a few educated persons are cultivating taste in form and colour as an exotic, but as a spontaneous growth it is gone. Whether we look at the earlier, middle, or later years of the century, we find the same thing. If we walk down Gower-street, Westbourne-terrace, or Cromwell-road, we look in vain for a gleam of taste, for a glimpse of anything that can charm the eye or refresh the mind.

Interminable rows of identical houses all cut down to one common type—mindless, joyless. Slaves in chains must have built them; nothing else can account for the gloom which they betray and produce.

Ornament, there is, ghastly ornament, all done to order under heavy penalties, all alike, all representing—what?—the pleasure of the worker in fashioning it? Good heavens, no! It is done by machinery. It represents what is expected of the class of society to which the owners of the houses belong, or wish to be thought to belong. Let us now look at dress. Here, surely, there will be more freedom. Cannot the individual assert his personality here? Let us see. Here is a train arriving at Moorgate Station full of well-to-do citizens going to their daily avocation. We can note the charming variety of form, colour, and material which is the natural expression of that individualism we all prize so greatly. But what is it we see? All dressed exactly alike—they must then certainly have found a type of dress so beautiful, so perfect, that they have voluntarily surrendered their individualism as a tribute to that perfection which cannot be excelled. Is it so? Are these black, cut-away coats, these black boots, these cylindrical tubes of trousers, these black top-hats, are these the ideal for which all individuality is to be sacrificed? I heard a critic of Mr. Bellamy's "Looking Backward" deprecate the orderly organisation of the system he describes with the remark that under such a routine people would be like sheep. What are these like? Rather black sheep. Gloom and the total absence of individuality are the characteristics of our system. And why this deadly uniformity, this total absence of anything to show that the wearers of these clothes, the dwellers in these houses, are anything but automata, all made to order, like the hideous and barbarous things they wear and live in? Are they all alike?

Talk to them in their offices and you might almost think they are; but know them intimately, and you soon find the widest differences. Why, then, cannot they show that they are thinking, rational beings, possessing here and there a stray idea of their own? Are they slaves, or what does it all mean? Yes, they are slaves, all working in chains crushed under the tyranny of two relentless Molochs, the great god Profit and the great god Snob. These two have enshined up individuality and trampled her under foot. Beauty they have expelled from Society (with a big S). There are one or two sanctuaries where she is still allowed a refuge, and the very few who are ever allowed by the god Profit to have a spare hour occasionally visit her; but if she appears in the street, the god Snob boots her and tramples on her.

Each have their own weapons and instruments of torture. Some of the victims of Profit suffer so grievously that they dare even to make a show of resistance. But it is futile and short-

lived. He has two elubs, called Supply and Demand, and these he swings about mercilessly, and the wretched slaves are soon cowed.

Occasionally a feeble protest is made by those who groan under the rule of the god Snob; but he also has too elubs—Respectability and Social Status. At the mere sight of them down go the slaves prostrate before their relentless idol.

And meantime poor Individuality is wasting away in her prison.

Alas! what can art do without individuality? They are inseparable, each without the other must languish. Society has taken up that liveried drudge, Ostentation, and Art must keep her lonely state in a National Gallery while we are the slaves of slaves.

The jerry-builders and the fashion-books are the slaves of the gods, Profit and Snob, and we are the slaves of the jerry-builders and the fashion-books.

But still we have only got half way in our inquiry into the ultimate cause of our almost extinct love of Art. If the views I have advanced are so far sound, we have attributed the decay in our love of beauty to the growth of our love of social status, our "silly desire for the appearance of a large expenditure." But why should we substitute the base desire for the pure now any more than our ancestors of two, or three, or six centuries ago? So far we have only shifted the inquiry one step further back. If this degradation is the effect of external conditions, what are the conditions which affect us and which did not affect our ancestors?

I have hinted by references to the god Profit that they are industrial conditions, but men worked for wages and bought and sold for profit in these past centuries. Profit may not be an elevating aim in life, but it cannot be a differentiating factor between the present age and those in which Art flourished, not merely as the cult of a few, but as a daily part of the life of all.

What, then, is that differentiating factor which has destroyed all the beauty and picturesqueness of a London street in the fourteenth century, with the variety and charm of its buildings and its costumes, and given us in its place the deadly monotony of Bayswater and the pot-hat?

In my opinion this differentiating factor is the intensity of the struggle for existence in our present crowded populations. That men should live by giving as little and getting as much as they can in every transaction of life was had in former ages as now, but the pressure was so much lighter that it was, happily, quite unable to crush that buoyancy of spirit which impelled men to seek beauty in all their surroundings. Now, the pressure, instead of being just sufficient to produce a healthy emulation and to spur men on to distinguish themselves, has degenerated into a fierce competition for the highest profits,—a struggle in which each man's one object is to get to the front and thrust his neighbour aside, and none has time to think of such frivolities as grace and beauty.

In former ages the aim of men generally was to enjoy life when not oppressed by arbitrary tyranny. Evils there were,—some of them great evils,—but they were not evils which vitiated men's whole lives, which gave a sordid motive to their every act; they had leisure and energy to bestow on their work, and could indulge the desire to make it beautiful, which is natural to a free agent. Now, the struggle to live has been substituted for the enjoyment of life. That which should be only the means has become the end. In place of an inspiring emulation, we have a fierce struggle for life and death.

If it be asked how can this be avoided, I should say by substituting order for the present anarchy in our industrial systems. Our mistake has been in supposing that the haphazard system which did fairly well in thinly-populated countries can possibly succeed in the dense crowds of to-day.

Let me give a rough-and-ready illustration. Suppose one of us asks half-a-dozen friends to dine and spend a sociable evening, no special organisation is needed to enable them to do so with comfort and pleasure. They can be hospitably entertained, and they will be able readily to find their own coats, umbrellas, and hats when they leave without any elaborate pre-arrangements to enable them to do so. But increase the numbers, and the case is altered at once. At a Royal Academy *soirée*, where there is an elaborate organisation, there is nevertheless some difficulty in obtaining re-

freshment, and in recovering one's out-door garments. Without organisation it would be impossible. There would be simply a free fight, and the battle would be the strong.

Is not this what has happened in our wholly unorganised and reckless system of production and distribution?

When feudalism died out and men obtained the right to compete freely in the industrial market they believed that they possessed all that was necessary; that industry and ability would in the long run meet with its due reward, and that this principle would prove the surest incentive to the development of the best characters and the production of the best work.

With some very serious qualifications it did something like this for a time. Inequalities not arising from greater or less industry existed, but these were partly the remains of feudalism. Technically serfdom had been abolished, but wealth, rank, and privilege held its own, and though every poor man was legally free to compete with the rest, without education or means the right was a somewhat barren one.

Time gradually, however, developed unjust inequalities arising from the system itself of so-called free competition, at first gradually, but, since the great development of machine power, with frightful rapidity, with the result that we have now reached the maximum of injustice. I appeal again to Mill for an accurate description of the present distribution of the good things of the world:—

"The produce of labour is apportioned, as we now see it, almost in an inverse ratio to the labour,—the largest portions to those who have never worked at all, the next largest to those whose work is almost nominal, and so in a descending scale, the remuneration dwindling as the work grows harder and more disagreeable, until the most fatiguing and exhausting bodily labour cannot count with certainty on being able to earn even the necessaries of life."

Such a monstrous condition of things as this is manifestly intolerable to all humane and justice-loving persons, and it has long exercised the minds of thoughtful men, who not only deplore the cruel injustice of the system, but perceive that unless we can remedy it in time, it must lead to some appalling catastrophe. It is not, however, the question of justice and humanity that concerns us directly to-night, but the influence of this industrial anarchy upon art.

Well, what has been the effect of the free fight for existence on art? Why this, that people have enough to do to live, they have no time for anything else. They cannot stop to think of enjoyment of life. Their energies are exhausted in the struggle for food, clothing, and a roof over their heads. Having, some of them, got this, they then begin the struggle to have more than their neighbour; there is still no time to think of enjoying life, they have got to imitate the class above them. The labourer who is successful and gets a rise in life looks forward to the joy of wearing a shiny black chimney-pot hat. The tradesman on whom the delights of broadcloth and pot hats have begun to pall, struggles, and wears himself out in the hope of some day riding in his carriage, and so forth and so forth, through the whole degrading series. Snobbery being the guiding impulse, profit-making the efficient machine.

Sordid struggle for the necessaries of life at the bottom of the scale, far more sordid struggle to outdo one's neighbour at the upper end of the scale.

Where do Art and Beauty come in? Where is love of good work gone? There is no time for either. Will it pay? is the one question,—not "Do I love doing it?" Is it worth having when done? If I don't produce the largest number of articles in the shortest time, if I don't screw my workmen down to the lowest wages they will put up with, and make my customers pay the highest price I can get out of them, I shall fall behind in the life and death struggle for profit. Beauty! What have I to do with beauty? Will beauty pay? Fashion! That's the point! Everybody is wearing this. Everybody is asking for that. The other? Oh, I don't keep it,—I assure you, madam, it's quite gone out—no one asks for it—that is, no of consequence.

Can anyone deny that this fairly describes the present state of respectable society? And I ask, can art live in such an atmosphere? In order to picture to ourselves more vividly the contrast between our present condition and that of earlier ages, imagine for a moment the effect if we were to take any of the pictures of

Paul Veronese, a man who lived in a great business community, a mercantile state, and drew all his images from his daily experience,—take one of his works, such as "The Marriage at Cana," and put all the figures into modern respectable costume, and you will then realise the extent to which taste has been degraded, and our daily life made hideous by the intervening rapid development of the principle of competition for profit, and the growth of greed for money, to the increasing exclusion of all other interests.

Now, if it is proposed to reform these crying evils, to get rid of the iniquitous injustices of our system; and liberate art from the stifling, noxious atmosphere which is all but destroying her, one is generally met with the cynical objection that you must regenerate human nature before you can alter these things, the objection being accompanied with a sneering scepticism as to the improbability of our nature. I should like to ask these objectors how, on their theory of the unredemable baseness of human nature, they explain the past? Whence comes all the beauty bequeathed to us by our ancestors which we treasure in our museums, if it is an ineradicable part of our nature to prefer vulgar display to true beauty, the heaping-up of profit to the doing of good work?

We have before us the past history of our race, we find in all parts of the world and in every period of its existence a prevailing love of beauty so strong that it has triumphed over the defects of our nature and the imperfect conditions of society. The sense of beauty varied much with place and time, but the love of it predominated everywhere. If ravages of war trampled upon it for a time, it sprang up again spontaneously with renewed vigour, with restored freedom and peace. We have scores of centuries teaching us one great lesson, that human nature loves beauty rather than ugliness, as surely as it loves health rather than disease, joy rather than sorrow. Against this vast mass of evidence we have one century offering a partial exception to the otherwise universal rule, and yet there are people so blind to all the teaching of history, so oblivious of everything but their own limited experience, that they speak of beauty as if it were an acquired taste foreign to our nature, and that this nature must be wholly changed before we can attach any value to it. Is it not more rational to conclude that the spirit which prevailed for thousands of years is that which truly pertains to our real human nature, and that the partial exception exhibited by this century is a temporary aberration, a disease? I referred to periods when art had been for a time trampled under foot by the ravages of war. What else is it that now tramples art under foot but a great civil war, an interminable strife between neighbours forced upon us by a system so blundering, so inadequate, that the only wonder is that men have permitted it so long.

What we have to do is to change this rotten, oppressive system, to substitute order for anarchy, and then, when men are not exhausted by the mere struggle to live, they will have freedom for the expansion of their natural faculties.

How to get rid of this industrial chaos and to establish order in its place is the great problem which is engaging the earnest attention of many of our best thinkers, and which is rapidly becoming the most prominent subject of social interest. The evils have long been recognised, and crude reformers were ready in abundance to advocate the redistribution of property regardless of the consequence that if society were made equal by Act of Parliament to-morrow they would be unequal again by acts of industry or recklessness next week. A destructive principle has happily never won the approbation of the mass of the people. The confusion is bad enough already; we cannot better our condition by aiming at a confusion worse confounded. What we need is a righteously and wisely re-modelled industrial system, which shall ensure to all the fruits of their labour, and leave to each the opportunity to assert his own individuality, which shall make worthy distinction and the gratitude of one's fellows the incentive to good work instead of the debasing attraction of piling up more money and exhibiting a more vulgar display of brainless and graceless luxury than our neighbour.

As I am not here to address you on Political Economy, but on Modern Art, I will not enter upon an elaborate examination of any of the systems having the above aim, which are now

before the world, I will only say so much as is necessary for the consideration of their bearing on Art. Some of you have probably read Mr. William Morris's "Signs of Change." Some years ago Mr. Morris's views on this subject appeared to me to lead to destruction with no principle of re-construction to follow. Such a course as this is, in my opinion, worse than no solution at all. A revolution of violence without even a clear scheme of just industrial reform in view, could only end in the re-establishment of the old tyranny on a firmer basis. A red terror is usually succeeded by a white terror. I was very glad to note a totally different tone prevailing in this recent publication. It is largely constructive, and it deals chiefly with social reform in relation to industrial arts.

The admirable volume of "Fabian Essays" published in January, of which the entire first edition was sold out within a fortnight of its issue, is a collection of most thoughtful papers wholly constructive in their aim, and these also deal ably with questions of taste and art. But the most popular, and I may also say the most daring, attempt to solve the great problem is that contained in Mr. Edward Bellamy's "Looking Backward," a book which, I suppose, I may safely assume most of you have read. The main principles advocated in the book are not new, but they are exhibited and applied with extraordinary ability, and evince a most rare capacity for organisation.

It would take me too far from my main subject to touch, even lightly, on the objections urged by some to the scheme propounded in the book, but I am fortunately able to quote again from that sound authority Mill an emphatic opinion as to its practicability, as to the greater incentive to work it would provide, and its enormous superiority to our present system:—

"Whatever may be the merits or defects of these various schemes, they cannot be truly said to be impracticable. . . . The objection ordinarily made to a system of community of property and equal distribution of the produce, that each person would be necessarily occupied in evading his fair share of the work, points, undoubtedly, to a real difficulty. But those who urge this objection forget to how great an extent the same difficulty exists under the system on which nine-tenths of the business of society is now conducted. . . . A factory operative has less personal interest in his work than a member of a Communist Association, since he is not, like him, working for a partnership of which he is himself a member. . . . If Communist labour might be less vigorous than that of a peasant proprietor or a working labourer on his own account, it would probably be more energetic than that of a labourer for hire who has no personal interest in the matter at all. . . . If, therefore, the choice were to be made between Communism with all its chances, and the present state of society with all its sufferings and injustices; if the institution of private property necessarily carried with it as a consequence that the produce of labour should be apportioned as we now see it; . . . if this, or Communism, were the alternative, all the difficulties, great or small, of Communism would be but as dust in the balance."

I must ask you to accept this weighty opinion provisionally as sufficient proof that a system such as that sketched in "Looking Backward," where all contribute to the production and all receive their share in the distribution, is not a wild Utopian idea unworthy the notice of a serious political economist. If any of you have so regarded it, I will ask you to keep in mind that the greatest political economist says,—

"Whatever be its merits or defects, it cannot be truly said to be impracticable," and that "all the difficulties, great or small, attending it would be but as dust in the balance" compared with the evils of our present system.

Having given you high authority in favour of the practicability of the scheme, I am also able to quote an authority that you will all respect as to its favourable influence on art. I have discussed the book much with Mr. G. F. Watts, who is not merely a profound believer in the wisdom and justice of the social and industrial system advocated in "Looking Backward," but in the immensely favourable influence it would exert on art.

On this point, and on the reasons for holding this view, I may say we are entirely at one. We believe that the love of beauty is inborn, and inseparable from our nature; that even under most unfavourable conditions it will assert itself, and that leisure and a wholesome life are all that are needed to give it free play.

To this most vital question let me invite your attention for a few minutes. What is Love of Beauty? What is its origin? Is it inseparable from our nature? Does an enquiry into this strong impulse, that even in this dark age still actuates so many, confirm the teaching of

ry that it must predominate if not crushed one grinding tyranny? I would say we what we are by virtue of all the influences have operated on us from the remote aons, in the primitive germs from which we are descended first possessed a sentient organic tence. We have, by an unerring and bly process, been moulded into our present lition by the action of our environment.

harmony between ourselves and that en- onment is not arbitrarily determined, but itable. Between our consciousness and the or so-called accidents of nature there may occasional dissonance. Between our con- sciousness and the great enduring facts of nature, er whose influence we have come into tence, there must be consonance,—there t be harmony as between a child and the ber that gave it birth. That quick response ur sentient nature to the great mother ure is Love of Beauty, and nothing can rly destroy it, except transportation to her universe.

has been universal, and is so still, where ful monsters Profit and Snobbery have established their corrupting role.

enove these. Let men work in comfort, without sordid cares or corrupting motives, they will naturally prefer to work well than Add to this the powerful incentive of ic esteem, and they will work with zest vigour.

hat people call a routine in Mr. Bellamy's am is a simple series of inducements, which, nsuring that each worker gets the full it of his work gives him the most powerful ntive to distinguish himself, by the excel- e of his work or by the improvements he effect.

he routine proper is only applied where od, by avoiding the waste of time on worth- objects, gives us more time to devote to which is worthy. The abolition of the nderation "will it pay?" so paralysing to will enable men to do good work for the sure of doing it and for the credit and iction they will worthily gain by it. The use of snobbery, or the abolition of class ictions, of the temptation to display and t Mill calls "the silly desire for the appear- e of a large expenditure," will set men free rround themselves with that which is them pleasure, instead of that which is sed of the class of society to which they id be thought to belong. It will remove the simplest and most wholesome motive in e of the most degrading, it will create a and for that which is beautiful instead of which is ostentations and therefore ar.

roovever, the growth of brotherhood will e a great impetus to public spirit, and, e we are adding to the charm and comfort om life by substituting simplicity and ty for the senseless gewgaws of an nsively-furnished modern drawing-room, hall unite in the erection and adornment ble public buildings which all can enjoy, which, with universal education, all will y. The spirit which produced the Parthenon e middle-age cathedrals will reappear, art will have a scope hitherto unknown.

ese are the influences which such a system exert on our daily life, but not less whole- ly will be the influence of its training and its es. Every man and woman will begin life e a perfect education, and will be brought o regard work as noble, and living idle on s' work as a degradation so shocking, though it will be on record as having been dited in the Dark Ages, that it will be as unintelli- as the massacre of St. Bartholomew is to e. Every one will take their share in the e years' labour conscription, and will enter dult life with a knowledge of what it is wholly inconceivable to us, so that umption of luxuries without any regard e cost of their production must disappear. e of Mr. Bellamy's best passages is that h treats of the disappearance of the word l from the social vocabulary, and the elation of the pure rule of life that it is to ask a service of any one which we would willingly render to them; baser still to them, except because they render to us a service, while the asking it with- out of not rendering it is like borrowing y with the intention of not repaying. e have feebly indicated the benefits which d be conferred on art by the substitution just system of production and distribution e vicious one which now stifles it, but I

hope I have said enough to show that the sub- ject is one worthy of our careful study. I would go further and say that the view is one the promotion of which is worthy of our most earnest efforts if we would see art recover from the paralysis which now afflicts it.

We all deplore the inferiority of the art, especially the technical art of the day, but, as a rule, in our efforts to improve it we deal with symptoms rather than causes. It is as if we found a man earnestly poring over a book in a room where hardly any light entered, and he mourned the darkness, declaring that the sun had not shone for years, and that he was weary with straining his eyes in his efforts to learn, and we said, "You are wrong; the sun is shining brilliantly outside; but look at your window,—it is crusted with the grime of years, through which no ray can penetrate. Clean this, and your task will be easy!" So we are groping for sound principles of art and pondering how to restore our technical arts, and do not see that the windows of our mind are crusted over with the darkness of low aims, selfish desires, with all the suffocating influences of profit-mongering, greed, ostentation, and snobbery. Let us up and clean our windows and let the light in, and we shall see to do good work.

[We will give some notes of the discussion in our next.]

ENGINEERING AND BUILDING EXHIBITION AT THE AGRICULTURAL HALL.

WHAT is grandiloquently described as an "International Exhibition of Machinery, Manufactures, Appliances, and Inventions incidental to Engineers, Electricians, Builders, and Ironmongers," was opened in the Agricultural Hall, Islington, on Monday. We say was "opened" on Monday, but that is hardly correct. The hall was opened to visitors, but barely half of the exhibitors had thought it worth while to have their stands ready; and even on Wednesday afternoon there were several stands incomplete. Its scope, as will be seen from the above description of it given by its promoters, is wide enough, but the exhibition is not a very extensive one, and the building trades are very meagrely represented. The exhibition hardly covers two-thirds of the ground area of the hall, and it only serves to strengthen the opinion which we have before expressed, that these small exhibitions, recurring at frequent intervals, are almost "played out." Where the "International" element comes in it is at first difficult to see from a glance at the catalogue, for all the exhibitors are English or Welsh firms. On closer inspection, however, one sees that some of the things exhibited are of foreign origin, and shown by English agents of the manufacturers.

As we have said, the building trades are very meagrely represented, but there are some exhibits of interest to which we may briefly direct the attention of visitors.

In the arcade leading to the Hall from the Islington green entrance. Messrs. Chambers, Monney, & Co. have a very good display of stoves, grates, and ranges. Specially worthy of attention at this stand is Rogers's patent range, which is devised on scientific principles. All the air needed to support combustion is warmed on its passage to the fire, which is, of course, closed in. This arrangement is conducive to both economy of fuel and cleanliness, and as no fender is required, the cook is able to get closer to her work.

Messrs. J. H. Heathman & Co., Stand No. 2 in the Hall, have a useful display of fire-extinguishing apparatus, telescope ladders, &c. At Stand 5 Messrs. F. Edwards & Co. show the "Teale" grates and a kitchener. Some "gas-cookers" as they are somewhat curiously termed, are shown at this stand. They are made by Messrs. Galli & Co., of Leeds. Messrs. O. Berend & Co., at Stand 8, have a showy display of electroliers, gaseliers, &c.; next comes the Bristol Wagon Co., with a collection of useful carts and wagons suitable for builders, contractors, and others. Mr. F. W. Way, at Stand 16, exhibits what looks like a very good chimney-pot, calculated to prevent down-draught, and capable of being swept right through.

Mr. Robert Adams, of Newington-causeway, exhibits at Stand 18 his patent spring and pneumatic hinges in different forms to meet varying requirements. They are all admirable of their kind, and the same may be said of his reversible sash-windows. Mr. Adarus also

exhibits a very good water-bar for French casements. At Stand 25, Turpin's Parquet Floor Company have a very good show of parquet and mosaic floorings. Their inch-thick antiseptic beech-block floor is worth seeing. Messrs. Clemens, Abell, & Co., Stand 32, exhibit a street-sweeping machine and a water-van, both of good type.

At Stand 24 Mr. Dan Rylands has a very interesting exhibit in the shape of glass-lined iron piping, specially adapted for water service-pipes, chemical factories, and for channels for electric-lighting wires. This exhibit should be looked at by visitors. These pipes are stated to cost twenty per cent. less than lead pipes. At Stand 28 Messrs. R. Anderson & Co. exhibit lightning-conductors, wire-ropes, &c. The New Wire Wove Roofing Co. (Stand 52) have a light erection showing the capabilities of their roofing materials known as "Carboline" and "Duroline;" the first-named is opaque, and the second transparent. They are both very light, and well-adapted for use in portable buildings and temporary structures.

Messrs. Shand, Mason, & Co. (Stand 53) have a very good display of fire-extinguishing apparatus. Well worth notice is a new hose-holder, which is in the form of a hollow bracket pivoted so as to turn in any direction. In this hollow bracket there is space for a 50 ft. length of hose to be lightly folded up, not rolled. One end of this length of hose is attached to the hydrant or rising main, and the other end is of course fitted with a nozzle. On an alarm of fire being raised, the bracket containing the hose can be swung round to any desired angle, and on anyone catching hold of the nozzle and running away with it, the length of hose is at once extended and the water turned on, thus saving the time which is often lost in uncoiling a length of hose. In the yard, at the side of the Barford-street entrance of the Hall, Messrs. Shand & Mason give demonstrations twice a day of the efficiency of their automatic sprinklers for fire extinction. Messrs. F. Jones & Co. (Stand 60) show the various applications to building purposes of that very useful and curious fireproof material known as "silicate cotton," or "slag wool." Next door, at Stand 61, Messrs. R. W. Hitchens & Co., show their specialities in fireproof and sound-proof plastering, including their "combination slabs." At Stand 70 Messrs. Ashworth & Kneen exhibit the "Toboggan" (or sliding) springless locks and latches, which merit the notices of visitors.

In the centre of the hall the proprietors of Aspinall's enamel have a gaily-coloured stand, showing the numerous applications, to all kinds of materials, of their useful preparation. Some of the exhibitors of mantel-pieces and over-mantels, in wood and cast-iron, have decorated their exhibits with this enamel.

Messrs. Johnson, Clapham, & Morris (Stand 74) show very well the many capabilities of their patent fireproof wire-lathing for ceilings, partitions, &c. They have also a good display of wire-work generally, including wire-ropes, lightning conductors. Messrs. Yates, Heywood, & Co. (Stand 82) have a large show of stoves and ranges, together with wood and cast-iron mantels and over-mantels. There are two or three other exhibitors of this class of goods, but there is an absence of bricks, tiles, stone, and other essential elements of an exhibition which is avowedly, in part, at least, devoted to the building trades.

At Stand 101 Mr. Henry Bassant makes an excellent display of well-executed quarry work for floors, walls, or ceilings. There are numerous types of gas-engines exhibited, but one of the quietest in working is that shown by Fawcett, Preston, & Co., at Stand 112. Messrs. G. B. Kent & Sons (Stand 125) show a case of brushes. Messrs. Messer & Thorpe (Stand 140) exhibit what they call "the patent bucket fire extinguisher," which consists of a tank or cistern in the shape of a pedestal always fully containing a number of buckets. Messrs. E. H. Bayley & Co. (Stand 145) show a very good and easily-worked tip-van suitable for slopping or contractors' purposes. At Stand 147 the Patent Wood Decorating Co. exhibit a collection of Mitchell's patent ladders and steps for a variety of purposes. They are very ingenious and strong, and are well worth the attention of visitors. The Company also show their process of decorating wood, which consists merely of a thin veneer. It is shown applied to coffins, and we were informed that a common deal coffin, veneered to look like a coffin of some costlier wood, can be sold for 25s., whereas a

coffin of the real wood imitated would cost 5*l.* or 6*l.* at least. Here is another chance for the gratification of that false ostentation which Mr. Henry Holiday condemned in his paper read before the Architectural Association the other evening, even if it does not lead to fraud by unscrupulous undertakers.

Messrs. Crossley Bros. (Stand 152) exhibit a 14-horse power horizontal "Otto" gas engine, working one of Laing, Wharton, & Downs's dynamos, supplying a number of arc-lights for illuminating their stand. Messrs. E. Jacobs & Co. (Stand 163) exhibit wood-working machinery and fans in motion. The Blackman Air Propeller Ventilating Co. (Stand 173) also exhibit fans in motion. Mr. E. S. Hindley (Stand 174) shows steam-engines and saw-benches. Messrs. Lewis & Lewis, at Stand 176, have some woodworking machinery, worked by a portable steam engine and portable shafting; and Mr. H. Heim (Stand 177) shows his specialties in stoves.

We have thus enumerated some of the exhibits which are of most interest to our readers. The exhibition will remain open until the evening of Saturday, the 29th inst. We trust that before then visitors will have the advantage of a revised catalogue. The one issued on the opening day was very incomplete, and full of mistakes.

ARCHITECTURAL SOCIETIES.

The Architectural Association.—The usual fortnightly meeting of this Association was held on Friday, the 14th inst., at 9, Conduit-street, Mr. Leonard Stokes, the President, in the chair. The minutes having been read and confirmed, the following gentlemen were duly elected:—Messrs. L. C. T. Moore, E. O. Cummins, W. H. Brown, J. J. Wilson, W. A. Sugen, E. Borissov, and H. M. Brown. Mr. F. R. Farrow (Senior Hon. Sec.) announced that he had been asked to recommend to their notice an appeal for funds for the restoration of the tower of Frampton parish church, of which Mr. C. Hodgson Fowler, of Durham, was the restoring architect. Mr. E. S. Gale (Hon. Sec.) called attention to the visit on this Saturday, the 22nd inst., to the new Central Offices for the Metropolitan Police on the Victoria Embankment. The architect of the buildings, Mr. Norman Shaw, R.A., will meet the party. Mr. H. Holiday then read a paper on "Modernism in Art," which we print in another part of this week's *Builder*.

Leeds Architectural Society.—At a meeting of the Leeds and Yorkshire Architectural Society, held on Monday evening in the Law Institute, Albion-place, Leeds, a lecture on "Henry Aldrich, his Work and Writings," was delivered by Mr. Paul Waterhouse, of London. The chair was occupied by Mr. Henry Perkin, President of the Society, and there was a good attendance. Mr. Waterhouse, in the course of his lecture, pointed out how many of the greatest names in the history of architecture, especially since 1400, were those of men who had studied, and even mastered, more than one branch of apparently alien sciences before turning to architecture,—men who, having been educated to some other profession, had been led either by inclination or opportunity to the study and practice of architecture, and turning to it had found their faculties rather prepared than hindered by even half a lifetime spent in what nowadays would be classed as irrelevant studies. As examples he cited Alberti in Italy, Perrault in France, and in England Sir Christopher Wren. The Italian, besides many other occupations, was a lawyer; the Frenchman had practised as a physician; and our fellow-countryman had arrived at so great a distinction in the scientific world before he gave attention to the art of building that he did not seriously become an architect until he was a Fellow of the Royal Society and a professor of astronomy. In the same way Henry Aldrich, Dean of Christ Church, claimed attention as one who brought into his architectural studies a mind practised in many and different branches of art and science. The four designs attributed to Aldrich, who was born at Westminster in 1647, were,—the Chapel of Trinity College, the Peckwater Quadrangle of Christ Church, the garden front of Corpus Christi College, and All Saints' Church. The features of these buildings were minutely described by the lecturer. On the motion of Principal Bodington, seconded by Mr. W. H. Thorp, and supported by Mr. G. B. Bulmer, a

vote of thanks was accorded to Mr. Paul Waterhouse for his interesting paper.

Manchester Architectural Association.—At the ordinary meeting of this Association, held at the Diocesan Buildings on Tuesday, Mr. T. Chadwick in the chair, the following gentlemen were elected as officers for the next session:—President, T. Chadwick, A.R.I.B.A.; Vice-Presidents, E. Hewitt, A.R.I.B.A., and J. D. Mould, A.R.I.B.A.; Treasurer, A. H. Davies Colley, A.R.I.B.A.; Librarian, J. S. Hodgson; Registrar, J. H. Woodhouse; Secretary, J. D. Mould, A.R.I.B.A.; Committee—P. E. Barker, A.R.I.B.A.; P. Hesketh, A.R.I.B.A.; E. P. Hyde, A.R.I.B.A.; J. Horsfall, P. W. Mee, W. E. Potts, A.R.I.B.A.; F. B. Smith, E. H. Steifox, A.R.I.B.A.; and G. H. Wiloughby. Mr. W. E. Potts read a paper entitled "Creeds in Architecture." He contended that architects voluntarily fettered their achievements, and limited the possibilities of their achievements, by subscribing to certain traditions which, in course of time, crystallised into creeds, such as the belief in the cruciform plan in churches, which in many cases was now unsuitable to the present form of worship. The paper pleaded for wider sympathies, a cultivation of an open-minded ability to discover merit wherever it might exist, and a struggle against prejudices. Messrs. Mee, Colley, Ross, and Hodgson took part in the discussion which followed.

SANITARY INSTITUTE EXAMINATIONS.

Sir,—On April 17 and 18 next the Sanitary Institute Council will hold an examination to grant certificates of competency in sanitary knowledge to would-be sanitary inspectors. The time at which the examination is to take place will be between the hours of eleven and two o'clock on each day. Surely the Board of Examiners could make the time to fit in better with the arrangements of the candidates than this. The men who will offer themselves for examination are for the most part mechanics, or others whose time is not at their own disposal, and have only Saturday afternoons and evenings at their disposal, and to be absent for the most important part of two days, or one might say the whole of two days, would be at the risk of losing their present situations.

The lectures at the Institute are held in the evening, to enable the greatest number to attend; the same rule should apply to the examination. I trust that the Council will see its way to make this alteration in the forthcoming examination in April next, and thus keep in touch with the Science and Art (South Kensington), the Birmingham Polytechnic, and kindred institutions, which hold their examinations on Saturday afternoons after two o'clock.

March 13, 1890. SANITATION.

PLATINISED PLATE GLASS.

Sir,—Will any correspondent of the *Builder* kindly inform me of the name and address of any firm where I can obtain a quantity of "Platinised Plate Glass" for builder's work?

Kinsale. A. PERRY, Builder, &c.

PREPARATION OF MOULDINGS.

Sir,—We have an inquiry from abroad for an attachment to a moulding-machine for laying on the white preparation on mouldings, preparatory to gilding or painting.

We shall be much obliged for any information that any of your readers can favour us with as to the most approved method of putting on the preparation referred to, and as to whether it has ever been done in a moulding machine?

MANCHESTER ENGINEERING CO., LD.
Stalybridge, Manchester.

Patten-makers' Company.—A court dinner of the Worshipful Company of Patten-makers was held last week at the Cannon-street Hotel, by invitation of the Master, Mr. H. H. Bartlett, head of the firm of Messrs. Perry & Co., contractors, Bow. Among the guests present were Mr. Barrow Emanuel, M.A., Past Master, Major Clifford Probyn, L.C.C., Mr. Arthur J. Baker, and Mr. H. Lovegrove, members of the Company; also Sir P. Magnus, Mr. A. M. Peebles (City Architect), Mr. W. E. Stoner, Mr. Augustus Manning, Mr. T. E. Franklin, Mr. R. L. Curtis, Mr. H. A. Hunt, Mr. C. J. Shoppee, Lt.-Col. B. Fletcher, Mr. Chas. Barry, F.S.A., Capt. J. A. Thornhill, and others connected with building matters.

Munich.—According to the *Deutsche Bauwerks-Blatt*, the proposed building for the New Law Courts is to be erected on the site of the old cadet school. The rough estimate to the design of Professor Thiersch shows a cost of some 5,000,000 marks, or nearly 250,000*l.*

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—XII.

DYNAMO-ELECTRIC MACHINES—(Continued)
DRUM ARMATURE.

THE electro-motive force only, set up in the skeleton dynamo discussed in the last article, was considered, and no device for connecting the moving conductor with a circuit, so as to produce a current available for external use, was shown. In fig. 28 the ends of the rectangular conductor are connected to the two halves of a split tube, properly insulated from each other, and against these press fixed contact-springs or "brushes." B



FIG. 28.

Such an arrangement is called a commutator. If, instead of the pieces P and Q, continuous rings or "collectors" are used, so that a brush is always in connection with the same end of A B C D, the current in the external circuit will be alternating as well as intermittent. We shall in future call A B C D a coil, which may contain many turns, though for simplicity only one complete turn is shown, and a number of such coils wound radially on to a cylinder or drum form the "armature" of a large class of direct-current dynamo-machines. Armatures built up in this way are called "drum armatures," a type of armature now adopted in perhaps, the greater number of direct-current machines made, the commutator being constructed, not of a tube split into two parts, as in fig. 29, but of a tube split into as many segments as there are coils on the drum.

The way in which the E.M.F. is set up and varies in each bobbin is more easily traced in this than in any other type of machine; but the connexions between the ends of the coils and the different segments of the commutator look complicated, and should be carefully traced. There are many different methods of making the connexions, though, as the general principles underlying all of them are the same, more than one will be given.

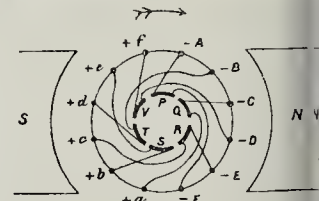


FIG. 30.

Fig. 30 represents an end view of a drum armature with six coils. On comparing fig. 26 or 27, it will be seen that the E.M.F. set up within each coil is from big letter to little letter, and the current, if allowed to flow, will be from little letter to big letter across the external connexions. The connexions of the ends of the coils with one another are made through the segments of the commutator, and it will be seen that P is joined to two ends, while S is joined to two + ends, but that all the rest of the segments connect a — and + end together. On tracing the connexions through the armature, it will be found that two equal electro-motive forces, each produced by two coils, are developed in the two paths from segment P to segment S. The paths through coils and segments are shown diagrammatically in fig. 31, which should be used in conjunction with fig. 30.

What is happening, then, is this,—the thro

Aa, Cc, Ee, are placed in series, and this set of three is put abreast with the others of three, viz., Ff, Dd, Bb. From either it is evident that P and S are the seg-

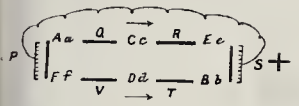


FIG. 31

ments which are at lowest and highest potential respectively, and on these press the brushes, as shown in the drawing, so as not to confuse other connexions. It must not be supposed that a machine of this kind would have but six or forty, or even sixty, according to the size of the machine, would be nearer the truth, but the connexions for so many segments could not be shown in a small figure, six are sufficient for the present purpose.

We have now to consider how the direction of the current in each coil changes as the segments of the commutator slide beneath the brushes.

We have already stated that we do not propose, in these articles, to describe the mechanical details of any particular machines, but what we endeavour to do is to assist a student in understanding the general action of any machine, the construction of which he may be ignorant of.

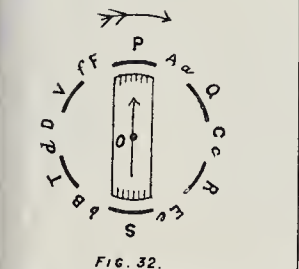


FIG. 32.

Draw the segments of the commutator on a circular piece of card, with sufficient space between them to write down the letters denoting the ends of the hobbins to which they are connected. Next cut out a piece of card O, to represent the brushes and the external circuit, with an ordinary pin as axis, fasten it to the centre of the diagram of the commutator and coils. The breadth of the brushes must be sufficient to just bridge across the space between the commutator segments, otherwise a brush quitted a segment the circuit would be broken. If the commutator be now moved in the direction of the feathered arrow, the brush-piece held vertical, the current is presented as flowing in the external circuit from brush to brush in the direction shown by the arrow on O. When the brushes connect V and another, and R and S, the coils Ff and Ee are short-circuited through them; in a properly designed machine this takes place when the short-circuited coils are not cutting lines of force, or at all events so few, that they are not counting E.M.F. sufficient to drive the current through themselves, and it is therefore of advantage to have their then useless resistance cut out of the circuit. The moment the short-circuited coils are brought into action again by brushes having finally quitted P and S, currents flow in them, but in the reverse direction. The coils of an armature, instead of being permanently connected together, as in fig. 30, are sometimes connected to separate segments of the commutator, which lie side by side, and the external connexion is made by the brush as it passes over the two pieces. Such an arrangement is called an "open-coil armature." In the diagram (fig. 32) for an armature of

this description, the parallel sets of segments must be represented by two circles instead of one, or they may be drawn on a paper cylinder, and the brush piece made to touch it on the outside.

Books.

Murray's Handbook for England and Wales. Alphabetically arranged for the use of travellers. John Murray. 1890.

THE exploration of England by means of driving tours, or in humbler fashion by cyclists, is an interesting feature of modern life. Out-of-the-way-places, unvisited since mail-coaches and post-chaises passed away, are now made special objects of search, and the result is that the "Beauties of England and Wales" are obtaining a wider appreciation, and the tourists' wants have been duly recognised by Mr. Murray. Of course, it is impossible in a single volume of less than 500 pages to give detailed descriptions of every town and village in the kingdom. There are handbooks issued by the same publisher which deal more fully with the subject, and number in all some twenty volumes—a costly and rather cumbersome collection. These local books are excellent for residents and visitors who want to see everything, but as each of them necessarily treats of a limited district, their employment is similarly limited. You may have the handbook for Surrey with you, but so soon as you cross the borders of Sussex it becomes useless. To mark, therefore, the requirements of a locomotive age, this compendious volume has been issued, and merits warm commendation. The plan adopted is to describe, in alphabetical order, the principal towns and places of interest in England and Wales, to indicate the excursions that may thence be taken, and to give cross-references in those cases where a spot, unimportant in size, has claims to separate mention. We have not read every page of the book, but have examined its contents with sufficient care to be able to say that the information given is trustworthy, and, in most cases, adequate. Little errors in such a work are unavoidable. Change of ownership, in these days, occurs so frequently as to make it almost impossible for an editor to be quite up to date, though this plea, perhaps, scarcely covers the retention of Lord Medesdale's name (p. 281), for that peer was too prominent a figure to have passed unnoticed away. We are a little disappointed with the rather casual indications of the "art treasures" which form the objects of chief interest in most country seats. Thus, under Longford Castle, here mention is made of "Claude," and no hint is given that the gallery there contains two of the finest examples of that painter to be found in all England. We notice the statement that "the restoration of Ely Cathedral was set on foot by the late Dean Peacock," and that Sir G. G. Scott was the architect. Some portion of the work surely was executed under the supervision of George Basevi, whose name might have been mentioned in connexion with it, just as that of Cottingham should have been given as the restorer of Hereford Cathedral, while that of Mr. H. H. Gibbs should not have been omitted in any account of what has been done at St. Albans Abbey. These are trifles which simply show that the book is not perfect (a good index would be an improvement); but they are not the fault-findings of a captious critic, indifferent to the real excellence which distinguishes this useful volume.

Practical Iron Founding. By the Author of "Pattern Making," &c. London: Whittaker & Co.

THIS is a clearly-written and, as it claims to be, a thoroughly practical and sound little book; but yet it is difficult to see the field of usefulness it will occupy. The author announces that "it is written both for the student and for the practical man." There is, however, little, if anything, which those who have been through a good foundry are not likely to know, the greater part of the book being occupied by ordinary every-day practice. On the other hand, "the student,"—the innocent cause of so much book compiling,—is not likely to learn the practice of iron founding from book instruction. We suppose, however, such works as these fulfil some useful purpose, or they would not be produced in such numbers.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

5,846, Gas-brackets, Gaseliers, &c. J. Watkinson and T. Dodd.

According to this invention, two telescopic tubes are used, but one tube has a swelling which is packed so as to press or bear against the surface of the other tube, making a tight joint, and yet, at the same time, allowing the tubes to slide telescopically one within the other. Near the extremity of the inner tube is screwed a collar, the outer diameter of which is rather less than the inside diameter of the joint packing. This collar does not prevent free telescopic motion, but it effectually prevents the two tubes from being accidentally separated. Any number of glands or packings may be used, and gas stems or brackets applicable for attachment to walls or other supports may be similarly treated.

18,487, Brickwork. G. M. Fisk (U.S.A.).

The improvement which is the subject of this invention consists in the promiscuous use of various sizes and proportions of rectangular bricks in such a manner as to produce the effect of broken or irregular ashlar in brick work. The bricks used are of different sizes, but are all rectangular; the faces are either smooth or rough, but the manner of laying the bricks gives a better appearance to the front of a building.

18493, Bricks. G. M. Fisk (U.S.A.).

This is another specification by the same patentee, and relates to bricks for building purposes, and consists in producing a brick the face of which, while being perfectly finished and possessing the "skin" formed by pressure in moulding, has the general appearance of "split," "tumbled," or similarly rough-faced stone. The rough face is produced by a suitable die used in the process of manufacture.

87, Screwdrivers. D. R. Hart (U.S.A.).

The object of this invention is to provide a screw-driver adapted to enter and fit very closely the slots of screw-heads, with a point so formed that its tendency to slip sideways during the insertion of a screw is effectually prevented, and having the two side extremities of its point strengthened so that danger of fracture is avoided; the driver has a sunk portion at its point adapted in thickness to enter and fit the slots of screw-heads. The rear of this sunk portion has concave shoulders to fit the form of round-headed screws.

257, Saw Swages. L. P. Halladay (U.S.A.).

A complicated machine for swaging saws by striking the toothed edge with suitable dies, movable by foot or hand-power, is described in this specification.

NEW APPLICATIONS FOR PATENTS.

March 3.—3,325, W. Summerson, Chimney Top.—3,336, T. Bibby, Saws.—3,340, S. Stelfox, Hinges.—3,343, T. Fletcher and others, Brick and Pottery Kilns.—3,345, E. Ives and C. Barker, Appliances for lifting, lowering, launching, and ending Bridges, Viaducts, &c.—3,346, F. Barnett, Construction of Low-level Composite Bridges over rivers.—3,378, R. Carside, Sash-fasteners.

March 4.—3,418, J. Dean, Water-closets.—3,431, J. Naylor and H. Williams, Moulding and Pressing semi-dry Bricks.—3,462, Baron Von Solemacher, Bricks, Tiles, &c.

March 5.—3,489, J. Thomas and T. Staff, Raising or Lowering Window-sashes.—3,513, A. Clark, Locking Faugh-tactener and opener.—3,533, W. Basingham, jun., Ventilators.

March 6.—3,592, C. Durrab, Water-waste Preventing Cisterns for W.C.'s.—3,598, C. Mills, Construction of Walls, &c.

March 7.—3,657, R. Morris, Door Checks.—3,671, B. Mills, Hinges and Door Checks.

March 8.—3,722, W. Wittoof, Flushing for Water-closets.

PROVISIONAL SPECIFICATIONS ACCEPTED.

509, W. Reynor, Testing and Flushing House Drains, &c.—579, W. Reynor, Cementing and Testing House Drains, &c., without taking up Floors, &c.—1,352, R. Sparks, T-squares, &c.—1,474, J. Griffiths and others, Fittings for Gates and heavy Doors.—1,587, J. Nagel, Door Locks.—1,776, C. Phillips, Metal Dowels.—1,900, J. A. Drexler, Roof Covering.—1,923, G. Dimmer, Chimney Cows.—1,934, C. Field, Silicious Paving and Building Stone.—2,002, E. Carson, Adjusting and Holding Window-sashes, &c., in any Vertical Position.—2,223 and 2,224, J. Rendle, Glass Roofing.—2,394, B. Field and F. Andrew, Door Knobs, &c.—2,397, W. Blackband and H. Lunn, Securing Door-knobs to Spindles.—2,473, J. Benison, Chimneys or Flues of Open or other Fire-places.—2,508, J. Gutman, Stocks for Boring Bits.—2,536, C. Thomsson, Sheet Metal Roofing.—2,560, R. & F. Ambrose, Window Sashes and Frames, &c.—2,570, J. Walford, Door Wedge, &c.—2,695, H. Haddan, Ventilating and Cooling Cellars, &c.—2,787, E. Seddon, Sand-paperting Wood.—2,896, W. Joy, Manufacture of Cement.—2,912, H. Badams, Gas Brackets and Chandeliers.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

7,650, H. Whitehouse and J. Clifford, Spring for Swing Doors.—20,914, A. Capperstuck and A. Meyer, Fireproof Ceilings and Walls.—20,976, H. Johns, Roofing Sheets of Fabric.—1,525, J. Button and Others, Ovens for Burning Bricks, &c.

RECENT SALES OF PROPERTY;

ESTATE EXCHANGE REPORT.

MARCH 6.—By J. J. WHEELER (at Chelsea). Chelsea—1 to 14, Little College-st., u.t. 18 1/2 yrs., g.r. 470, r. £315. 18s. 159 and 101, King's-rd., u.t. 12 yrs., g.r. 43, r. £92 p.a. 30, Pond-ter., u.t. 11 yrs., g.r. 425. 2,210

MARCH 10.—By T. WOODS. Anerley—"The Rising Sun" public-house, f., and house adjoining, u.t. 60 yrs., g.r. 44. 2,210

By FLEURET & SOSS. Hackney—31, Valentine-rd., u.t. 55 yrs., g.r. 45. 58. 216, Well-st., and 42, Poole-rd., u.t. 55 yrs., g.r. 418. 58, r. £128. Peckham—179, Peckham-pk. rd., u.t. 49 yrs., g.r. 45. 24. 4d, r. £25. Stoke Newington—41, Harcombe-rd., u.t. 73 yrs., g.r. 45, r. £26. Wood Green—10, Chersom-ter., u.t. 90 yrs., g.r. 46. r. £27. 210

MARCH 11.—By BOYTON & PEGRAM. Pimlico—8 and 9, Ranelagh-rd., u.t. 34 yrs., g.r. £14, r. £80. Chelsea—117, Cheyne-walk, f. beerhouse, r. £100 p.a. 1,935

By DEBENHAM, TROWSON, & CO. Kentish Town—Lgr. r. of 424, u.t. 58 yrs., g.r. 108. Shepherd's Bush—55, Woodlands, u.t. 34 yrs., g.r. 43. 108, r. 445. 460

By DRIVER & PERFECT. Holloway—11, Bedford-ter., u.t. 75 yrs., g.r. £. Old-st.—37 and 38, Baltic-st., f., r. 472. 108, p.a. 265 and 267, Old-st., f., r. 475 p.a. 1,010

By WALKER & RUNTZ. West Ham—F.g.r. of 880, reversion in 58 yrs. F.g.r. of 441. 106, reversion in 30 yrs. St. George's-in-the-East—Lgr. of 430, u.t. 7 yrs., g.r. £10 p.a. Whitechapel—Lgr. of 480, u.t. 11 yrs., g.r. £10. Mile End-rd.—Lgr. of 418, u.t. 19 yrs., g.r. £13. Commercial-rd. E.—Lgr. of 484. 108, u.t. 7 yrs., g.r. £13. Whitechapel—Lgr. of 426. 68, u.t. 17 yrs., g.r. £13. 13. Kensington—Lgr. of 440, u.t. 14 yrs., g.r. 45. 108. Brixton—Lgr. of 415, u.t. 5 yrs. 40

MARCH 12.—By G. E. CLARKE. Walthamstow, Prospect-hill—"The Residence 'Melrose', r. £43 p.a. 560

By M. LIEBL. Bow-rd.—No. 212, c. South Bromley—108 and 110, Teviot-st., u.t. 75 yrs., g.r. £8. 108, r. 465. 112, Teviot-st., u.t. 75 yrs., g.r. £4. 88, r. 432. 108. Mile-end-2 and 3, St. Helen's-ter., u.t. 57 yrs., g.r. £14, r. 428. 6, St. Helen's-ter., u.t. 57 yrs., g.r. £4, r. 432. 820

By D. YOUNG. South Lambeth—29, Priory-rd., u.t. 90 yrs., g.r. £8. 820

MARCH 13.—By PRICKEETT & VENABLES. Finchley, Church-end—"The Residence called 'Morpeth', u.t. 94 yrs., g.r. 47. 910 Kentish Town—148, Carlton-rd., u.t. 70 yrs., g.r. 48, r. £31. 265 Notting Hill—123 and 125, Elgin-crescent, u.t. 49 yrs., g.r. £17, r. £28. 605

By FAREBROTHER, ELLIS, & CO. Wandsworth-rd., &c.—F.g.r. of 4388. 146. 2H. with reversions from 53 to 58 yrs. 9,105

By C. C. & T. MOORE. Ratcliff—103, 105, and 107, Brook-st., c. Shadwell—3 and 4, Albert-st., u.t. 72 yrs., g.r. £12. Hoxton—69, Shatesbury-st., u.t. 11 yrs., g.r. £4, r. £31. 100

By NEWBORN & HARDING. Barnsbury—51, Wymond-rd., u.t. 55 yrs., g.r. £6, r. £40. 325 Hoxton—110, New North-rd., u.t. 13 yrs., g.r. £6. Islington—42, Queensbury-st., u.t. 21 yrs., g.r. £4, r. £28. 200 Barnsbury—62, Offord-rd., u.t. 39 yrs., g.r. £7, r. £14. 200 Islington—30, Arlington-sq., u.t. 37 yrs., g.r. £5. 5s., r. £44. 505 26, Oakley-rd., u.t. 50 yrs., g.r. 45. 108, r. £43. Kingsland—101, Downham-rd., u.t. 29 yrs., g.r. £5. 5s., r. £38. 250

By E. STIMSON. Bermondsey—188, 188, and 190, Fort-rd., u.t. 47 yrs., g.r. £15. 850 6 to 9, Woodland-pl., u.t. 38 yrs., g.r. £12. 389 Putney—78, Disraeli-rd., f. 345 New Road—42 and 44, Lancaster-rd., u.t. 88 yrs., g.r. £22. 600 Brixton—5 to 11 (odd), Bransford-rd., u.t. 84 yrs., g.r. £26. 555 Row—62, Mayfield-rd., u.t. r. £60 p.a. 580 Poplar—Lgr. r. of £10, u.t. 11 yrs. 75 Borough—76 and 78, Red Cross-st., u.t. 54 yrs., g.r. £32. 80

MARCH 14.—By G. PEARCE & SONS. Dalston—71 to 87 (odd), Hollybk., u.t. 37 yrs., g.r. £16. £1,520 Hoxton—12, Curzon-st., u.t. 41 yrs., g.r. £2. 178. 6d, r. £39 p.a. 260 Hackney—95 and 97, Beatham-rd., u.t. 58 yrs., g.r. £9, r. £70. 148. 460

By G. STOCKINGS. Highgate—5, York-pl., f., r. £100. 800 High-st.—A plot of f. land. 290 98 North-rd., f. 550 Two plots of f. land. 120 Tottenham—E.g.r. of £22. 2s. 6d., with reversion in 28 yrs. 750 Malden—F.g.r. of 47, reversion omitted. 160 Rotherhithe—602, Lower Queen-st., f. 210

[Contractions used in these lists.—F.g.r. for freehold ground-rent; L.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

MEETINGS.

SATURDAY, MARCH 22. Architectural Association.—Visit to the new Central Offices for the Metropolitan Police on the Victoria Embankment, Mr. R. Norman Shaw, R.A., architect. 3 p.m. Royal Institution.—The Right Hon. Lord Rayleigh, M.A., F.R.S., on "Electricity and Magnetism." VI. 3 p.m.

MONDAY, MARCH 24. Surveyors' Institution.—Adjourned discussion on Mr. T. W. Wheeler's paper on "Butterments." 8 p.m. Society of Arts (Centur Lectures).—Professor A. H. Church, M.A., F.R.S., on "Some Considerations Concerning Colour and Colouring." II. 8 p.m. Estate Exchange.—Annual General Meeting of Members.—Auction Mart. 3 p.m.

TUESDAY, MARCH 25. Institution of Civil Engineers.—(1) Further discussion on Mr. J. Price's paper on "Lough Erne Drainage" (2, time permitting) Mr. J. Robinson on "Barry Dock and Railways." 8 p.m. Society of Arts (Applied Art Section).—Mr. W. J. Linton on "Engraving in Wood, Old and New." 8 p.m. Sanitary Institute (Lectures for Sanitary Inspectors).—Mr. A. Wynter Blyth on "Diseases of Animals in Relation to Meat Supply." 8 p.m. Royal Historical and Archeological Association of Ireland.—Four papers will be read. 8 p.m.

WEDNESDAY, MARCH 26. Society of Arts.—Mr. G. N. Hooper on "Carriage Building and Street Trains in England and France." 8 p.m. Liverpool Engineering Society.—Mr. T. L. Miller on "The Efficiency of Gas-engines." 8 p.m.

THURSDAY, MARCH 27. Institution of Civil Engineers.—Mr. H. N. Lawrence and Mr. A. Hartley, M.D., on "Alternate or Continuous Currents in Relation to the Human Body." 8 p.m.

FRIDAY, MARCH 28. Architectural Association.—Mr. Keith D. Young on "Hospitals." 7.30 p.m. Institution of Civil Engineers (Students' Meeting).—Mr. A. E. Young on "Detection of Spiral Springs." 7.30 p.m. Sanitary Institute (Lectures for Sanitary Inspectors).—Mr. A. Wynter Blyth on "Sanitary Law, General Enactments, Public Health Act, 1875, Model By-laws." 8 p.m.

SATURDAY, MARCH 29. Architectural Association.—Visit to the new Hospital for Women, Marylebone-rd., Mr. J. M. Brydon, architect. 3 p.m. Royal Institution.—The Right Hon. Lord Rayleigh, M.A., F.R.S., on "Electricity and Magnetism." VII. 3 p.m. Edinburgh Architectural Association.—Visit to Preston Tower, Preston Cross, and Prestonpans Church.

Miscellaneous.

Edinburgh Electrical Exhibition.—The Dean of Guild Court last week passed plans for additions to the International Electrical Exhibition buildings. These consist of a sculpture gallery extending from the west end of the main buildings and leading to the picture galleries. These galleries will be six in number, each 60 ft. long by 30 ft. wide, intersected by a gallery 40 ft. wide which will lead to the eastern annexe. This annexe will be 300 ft. long by 100 ft. wide, and will be mostly devoted to general exhibits and partly to a hall for lectures and concerts. From the west end of the annexe there will be a covered court, 40 ft. wide, carried by a bridge over the suburban railway and leading directly into the machinery department. In this way visitors who enter the main buildings by either of the principal doors may walk through the whole extent of the exhibition buildings, nearly half a mile, under cover. The construction of a Japanese village has commenced, and Swiss chalets, kiosks, &c., are to be erected in the grounds, to be appropriated as restaurants, cafes, &c.

Borough New Synagogue.—We are informed that the announcement in last week's Builder that the competition for the local minister's house had been awarded was unauthorised and premature, the award in the competition not having yet been made.

The Lock-out of Kentish Brick-makers.

According to the South-Eastern Gazette, lock-out of the Kentish brick-makers, referred in our last, appears likely to last for an indefinite period. The clergy of Sittingbourne district have sent an appeal to the brickmasters, urging them to reconsider their decision, and to re-open their works. The managers received via the effect that they are unable to do this while the barge traffic between Sittingbourne and London is at a stand-still on account of the strike of the barge-men. The Committee of the Brick-makers' Association have issued a manifesto, in which they express their regret if any dispute should have arisen with the barge-men, but they desire to record the fact that quarrel was forced upon them by the Barge-men's Protection Society. The masters of brickworks, which at the present time are being offered in the London market at a price which it is impossible to make clamp-bricks. The Kent and Essex brick trade is in a critical condition, and any further addition to the heavy burden it has already to bear would probably result in its destruction, we already several of the larger makers are preparing to reduce their prices. The managers assert that the closing of the fields is the direct and necessary result of the arbitrary action of the Barge-men's Society. The trade to the district is being paralysed by the deadlock.

New Vestry Hall and Free Library.

St. Martin's-in-the-Fields.—On Tuesday the Prince of Wales laid the foundation-stone of the new Vestry Hall and offices for the Royal parish of St. Martin's-in-the-Fields, which is part of the city of Westminster, and also a memorial-stone of the new library and reading-room. The parish has secured a site at the south-east corner of the Chancery cross-road, facing the opening to Trafalgar square, and opposite to St. Martin's Church, both municipal buildings and library for its inhabitants. The architect of the new building is Mr. Robert Walker, and the builders Messrs. John Mowlem & Co.

Free Lectures at Carpenters' Hall.

The last of this year's series of free lectures at Carpenters' Hall was delivered on Wednesday evening last by Professor W. C. Unwin, F.R.S., his subject being "The Construction of Walls." Mr. Banister Fletcher, Master of the Carpenter Company, presided, and there was, as usual, large attendance. At the close, the Chairman announced that these lectures would in all probability be continued next year, as the present course had been so much appreciated. We hope to give a report of Professor Unwin's lecture in our next.

Old Cottage Architecture.

The following letter has been received by Mr. Ralph New from Mr. R. R. Holmes, the librarian at Windmill Castle:—"Windsor Castle, March 18, 1890. Sir.—Your work on 'Old Cottage and Domestic Architecture in South-west Surrey' has been submitted to the Queen, who has been pleased to accept it. I am commanded to thank you for this interesting and useful addition to the Royal Library."

Classes in Architecture, University College, London.

The course of lectures in Modern Practice, having been completed, the usual Examination has been held, with the result that Mr. A. L. Jacob has gained a prize, and he and Mr. Dendy Watney will receive First-class Certificates, and Mr. H. Applebee and Mr. H. Halsdon will receive Second-class Certificates.

Death of Mr. J. R. Herbert, E.A.

J. R. Herbert, Hon. Retired R.A., died on Monday last, at his residence, "The Chimney Kilburn." He was in his 81st year.

PRICES CURRENT OF MATERIALS.

Table with columns: MATERIALS, UNIT, £ s. d., and £ s. d. Rows include Greenheart, Teak, Sapoia, Ash, Birch, Elm, Fir, Oak, Canada, Pine, Lath, St. Petersburg, Walscott, Deals, and various other materials.

Table with columns: Timber (continued), £. s. d., and various timber types like Pine, Spruce, Fir, etc.

Table with columns: Metals, £. s. d., and various metal types like Iron, Copper, Lead, Tin, Oils, etc.

Table with columns: Building, £. s. d., and various building materials and services like Ealing, Harrow, Hastings, etc.

CONTRACTS & PUBLIC APPOINTMENT.

Epitome of Advertisements in this Number.

CONTRACTS.

Table with columns: Nature of Work or Materials, By whom Required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page.

PUBLIC APPOINTMENT.

Table with columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page.

TENDERS.

Table with columns: Communications for insertion under this heading, and various tender notices for construction projects.

HASTINGS.—For formation of roads and surface-water drainage, at the site of the new workhouse, Elphinstone-road, Hastings. Mr. Philip H. Tree, architect, 59, London-road, St. Leonard-on-Sea.

LONDON.—For the erection of a house in the Leigham Court-road, Streatham, for Mr. F. Syer. Mr. T. H. Smith, architect, 17 and 18, Basinghall-street, E.C.

LONDON.—For the erection of a new police-station in the Cavendish-road, Balham, S.W., for the Receiver for the Metropolitan Police District. Mr. John Butler, architect. Quantities by Mr. W. H. Thurgood.

LONDON.—For outside painting, &c., at the North Surrey District Schools, Anerley. Mr. A. G. Hennell, architect.

LONDON.—For painting and sanitary works to Nos. 7 and 8, Talbot-villas, Leyland-road, Blackheath, under the superintendence of Messrs. Dyer, Son, & Hilton, surveyors, Wallbrook, E.C.

LONDON.—For repairs and decorations at the "Amherst Arms," Amherst-road, Beckeney, for Messrs. Watney & Co., Stag Brewery, Plumico. Mr. J. G. Ennos, architect & surveyor.

LONDON.—For pulling-down and rebuilding front of No. 22, Bishopsgate-street, E.C., for Mr. A. Wagstaff. Mr. D. R. Davis, architect, 8, Union-court, Old Broad-street, E.C.

LONDON.—For external painting and repairs to be done at the Licensed Victuallers' Asylum, Asylum-road, Old Kent-road, London, S.E. Mr. W. E. Potter, architect. Quantities prepared by Mr. C. R. Griffiths, Bank chambers, Tooley-street, London Bridge, S.E. —

W. Wythe, Dalston	250 0 0
Spencer & Co., Lambeth	800 0 0
Walker Brothers, Poplar	827 0 0
B. Cook, Stonecutter-street	690 0 0
R. J. Amos, Deptford	585 0 0
W. Wells, Paddington	525 0 0
S. Hayworth & Sons, Kingsland (accepted)	445 0 0

LONDON.—For alterations and additions to the "Surrey Canal Tavern," Trafalgar-road, Peckham, S.E., for Mr. J. M. Jones. Mr. J. Jones, jun., architect.—

Gregory	2397 0 0
Pryor	890 0 0
Bright & Co.	850 0 0
Johnson	820 0 0
Holloway	773 0 0
A. & W. Garner, Peckham	529 0 0

* Accepted subject to alterations.

LONDON.—For fitting up offices of mineral water factory at Horse Shoe-alley, Bankside, for Robert's Capsule Stopper Company, Limited.—

Money Marsland, Wandsworth	2643 0 0
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* Accepted.

LONDON.—For fitting up offices, &c., at 58, South-west-street, for Messrs. Ross, Allardye, & Co.—

Money Marsland, Wandsworth	2157 0 0
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* Accepted.

LONDON.—For repairs and alterations to eight houses in Bernersley. Mr. Richard Peters, architect, Wool Exchange, Coleman-street, E.C.—

Watson	£130 0 0
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LONDON.—For completion of five houses, Percy-road, Shepherd's Bush. Mr. Richard Peters, architect, 72, Wool Exchange, Coleman-street.—

Sturte	£120 0 0
Bishop Bros.	95 0 0
Smith	79 0 0
Serff Horle & Co. (accepted)	75 0 0

LONDON.—For the erection of two fire-escape stairs at the infirmary wing of the St. Pancras Workhouse, for the Guardians of St. Pancras. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C. Quantities not supplied.—

W. Whitford & Co.	£1,295 0 0
Marshall & Hatch	350 0 0
Kirk & Randall	895 0 0
St. Pancras Iron Works Co.	815 0 0

* Accepted.

LONDON.—For pine single-nook, chimney-pieces, and panelling for hall and dining-room, at Palace-court, W., for Mr. Chas. O. Tagart. Mr. J. Armstrong Stanhouse, architect.—

C. Hindley & Sons (accepted)	£145 0 0
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LONDON.—For alterations and enlargement of drawing-room erection at No. 1, Landseer-road, Holloway, for Mrs. Sallman. Mr. James Norris, architect, 80, Vauxhall Bridge-road, Westminster.—

F. A. Aneur & Son, 1, Wood-street, Westminster	£119 0 0
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[No competition.]

NEWMARKET.—For enlarging the girls' and infants' schools for the parish of Newmarket St. Mary's. Messrs. Holland & Son, architects, Newmarket. No quantities supplied.—

H. J. Linnell	£297 0 0
J. Cowell	565 0 0
Ryth & Hunt	510 0 0
H. Plummer	509 0 0
Simpson & Son	405 0 0
Kent & Holland (accepted)	490 0 0

WEST COWES.—For scavenging the Local Board District. Mr. N. F. Dennis, C.E., Town Surveyor.—

F. Cotter	£630 0 0
John Drudge	600 0 0
R. G. Cole	587 0 0
Chas. Harvey & Son	535 0 0
H. Hales	570 0 0
John Meader	570 0 0
J. Humbert	540 0 0
W. Fritchett	540 0 0
John Atrill (accepted)	500 0 0

WEST COWES.—For the paving, &c., of Beckford-road, for the Local Board. Mr. N. F. Dennis, C.E., Town Surveyor.—

Messons' Work. Tar Paving.	
J. Meader	£81 19 0
W. Coker	144 17 4
W. G. Thomas	84 14 7
Bensted & Son	107 9 10
Hobman & Co.	102 7 6
Tarrant & Harvey	69 10 5

Accepted.

WEST COWES.—For the reconstruction of the west side and strengthening the south side of No. 2 Reserve-voir, for the Local Board. Mr. N. F. Dennis, C.E., Town Surveyor.—

E. Tarrant, West Cowes	£1,065 0 0
W. Hill & Co., Portsmouth	1,025 0 0
John Meader, West Cowes	1,020 0 0
W. G. Thomas, West Cowes	984 0 0
Thos. Jenkins, Newport	947 0 0
Jas Fickthall, Leckford	947 0 0

* Accepted.

[Surveyor's estimate, £1,088.]

YORKSHIRE.—For pine single-nook, chimney-pieces for billiard-room, &c., at Wintanley Hall, for Mr. Bankes. Mr. W. Swinden Barber, architect.—

C. Hindley & Sons (accepted)	£130 0 0
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Rebuilding of the Olympic Theatre.—Messrs. Holliday & Greenwood write to say that the list of tenders for this job, printed in our list, was not published by their sanction.

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The Builder.

Vol. LVIII. No. 240.

SATURDAY, MARCH 29, 1890.

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Design submitted by Mr. W. Campbell Jones (with two plans)	Double-Page Photo-Litho.
Design submitted by Mr. John Robinson (with two plans)	Double-Page Photo-Litho.
Design submitted by Mr. R. Stark Wilkinson (with three plans)	Double-Page Photo-Litho.

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Yorkshire Stone: Halifax District.



MALIFAX is surrounded on all sides by stone quarries; the hills bristle with cranes. Mount Tahor, Ringby, Northowram, Hipperholme, Lightcliffe, Brighouse, Southowram, Rastrick, Elland, Barkisland, form almost a complete circle around it. Sandstone of various colours and degrees of hardness, flaggy, fissile, and massive, abounds. To enumerate the quarries and quarry-owners within four miles of Halifax would prove quite a formidable task. In that part of the West Riding of Yorkshire which is known as "The Clothing District," there are more than four hundred quarry-owners and stone-merchants. In many cases the proprietor is a man of little capital, a workman himself, finding employment for perhaps half-a-score of fellow-workers. It is a large firm that holds three quarries. It would be almost impossible to describe the produce of every quarry; it would certainly be unprofitable, for many of them are worked out in a very few years, being of so limited an extent. Their small size is due in part, as before stated, to the small capital of their owners, which prevents them acquiring larger tracts of ground, and also in part to the risk that attaches to every purchase of land, inasmuch as the stone in it may prove almost worthless. Fifty yards may make all the difference between valuable and worthless in the bed of stone. The difference is not one so much of weight, or hardness, or durability, as of lamination and uniformity of colour. Each group of quarries has, however, certain characteristics more or less common to every one of that group, and, in a slight degree, differentiating it from the remaining quarries of the neighbourhood. It may, therefore, be of use to note the several groups, the mode of working them, the nature of their stones, and so forth.

It will perhaps be best, in the first place, to answer briefly the question, "What is 'Yorkshire stone'?" It is, of course, a sandstone, and, as Professor Page says, "Sandstone is simply consolidated sand, the particles having been compacted by pressure, or cemented together by lime, clay, iron-oxide, or other material." Sand consists chiefly of quartz grains, practically imperishable; it is

therefore the matrix in which these are imbedded upon which the durability of the stone depends. The matrix of "Yorkshire stone" contains little or no lime; and consequently it is, says Professor Hull, "admirably adapted for resisting smoky atmospheres." That the stone does weather well in smoky atmospheres any one can see who looks at the buildings of Bradford, Halifax, Huddersfield, and neighbouring towns; only a few days ago we visited Manchester Town-hall, built of Spinkwell stone (Bradford), and found that the mouldings and carvings and plain surfaces, though black with soot, were practically as perfect as on the day they left the mason's hands, twenty years ago. How different is the present appearance of this noble building from that of the once-beautiful church at Halsey Hill, Halifax. The latter, designed by Sir George Gilbert Scott, was built of some kind of limestone (from what quarry we do not know), and has for several years been covered with white patches, showing where the stone is rapidly crumbling away. So great was its decay that last autumn an advertisement appeared in certain Yorkshire papers asking for contributions towards a fund "for its permanent repair," and towards a bazaar "for its immediate restoration, which is sadly needed." This is somewhat of a digression, but it is a peg whereon to hang a very important maxim—it is wise to ascertain the nature of the materials which a certain locality supplies, before introducing into it from another district a material the conduct of which, under such a change of circumstances, is, to say the least, exceedingly difficult to predicate.

It is not, however, of freestone like the Spinkwell of which we wish to treat at present, but of the laminated stone which, too hard for ornamental purposes, is so extensively used for flags, landings, and wall-stones. This stone is got from the lower beds of the Upper or True Coal Measures, which rest on the Millstone Grit, and form the highest group of rocks in the Carboniferous System. This system, which is of the Palaeozoic or Primary period, lies immediately above the Old Red Sandstone or Devonian System (quarried chiefly in the far north-east of Scotland and south-west of England), and below the Permian (New Red Sandstone) System, which is quarried principally in the counties adjoining North Wales, in North-east Yorkshire, and on either side of the head of Solway Firth. The principal quarries of "Yorkshire stone" form a rough semicircle

from Leeds, by Bradford and Halifax, to Huddersfield, and if the chord of this arc be drawn, the segment will enclose the chief iron-mines of Yorkshire (Lowmoor, Bowling, Kirkstall, and Parnley), and a considerable number of valuable coal-pits. The Halifax stone-district is terminated towards the east by a great "throw" or fault, extending in a direction south-east by south from Coley to Lightcliffe to Brighouse. A shaft was sunk some time ago near Lightcliffe, and from this headings were driven east and west. From the latter valuable stone was obtained; from the former nothing but shale, rag, and thin seams of coal. The dip of the strata throughout the district is to the south of south-east, or, as the quarrymen pictorially express it, "towards the ten o'clock sun," the strata being thrown off from the anticlinal axis of the Pennine chain.

Of the quarries, or rather groups of quarries, in the vicinity of Halifax, writers have, we believe, seldom or never mentioned more than four. Comparatively little has been added to our knowledge of building stones since the Report of the Royal Commission on the Selection of Stone for Building the new Houses of Parliament was published, fifty years ago. Subsequent writers have used this as a rich mine, from which they could gather information at will. It is Gwilt's gospel. To say the least, however, this report, while still true in the main, perhaps, requires considerable additions to bring it up to date. Of Halifax quarries, Gwilt,* Professor Hull,† and Mr. John Slater, B.A.,‡ mention only Elland Edge; in the series of articles on "Stone Quarries" which appeared in the *Builder* in 1886, we named the North and South Owham Quarries; and Rivington's "Notes on Building Construction" (Part III.) includes Ringby in addition to the foregoing. But the demand for "Yorkshire stone" has increased so much during the last quarter of a century that numerous other groups of quarries have been opened or extended, notably at Hipperholme, Lightcliffe, Brighouse, and Rastrick; also at Barkisland, Greetland, Thornton, &c.

A few words may with advantage be said of the manner of quarrying the stone, which varies at different places. For whereas at Lightcliffe the whole of the quarries are opened out, at Brighouse nearly all are stone-

* Encyclopædia of Architecture

† "On Building and Ornamental Stones,"

‡ Paper on "Building Stones," read before the London Architectural Association in March, 1885.

mines. The mode of working adopted depends chiefly upon the depth at which the valuable beds are situated; to open out a quarry at Brighouse, where the stone lies about forty yards below the surface, is an undertaking seldom attempted, but at Lightcliffe a good bed of stone is found at a depth of little more than a dozen yards, and here open working is adopted. Southowram and Northowram are at elevations considerably greater than the places just mentioned, but the stone, on account of the inclination of the stratum, is not as far from the surface as at Brighouse; consequently nearly all are open quarries, the exceptions being three shafts at Park, Northowram, belonging to Messrs. J. Brooke & Sons. There is no doubt that open working is—considered apart from the first cost of clearing the ground—considerably more economical, and it has this further advantage, that blocks of stone for landings may be obtained of the largest size that the vertical seams in the rock will allow, whereas in mines the size of stone is limited by the diameter of the pit-shaft (usually 9 ft.); thus, at Roper's pit or mine at Brighouse we saw landings 12 ft. by 6 ft. 6 in., which are almost as large as can there be obtained, while at the open quarry belonging to Farrars, Limited, situate about a hundred yards from Roper's, landings have been got 16 ft. by 9 ft. 6 in., and others 10 ft. and 12 ft. square. It may be asked, "Why not enlarge the pit-shaft?" Messrs. Roper & Sons did begin to increase their shaft to 11 ft. in diameter, but desisted because it would not pay. Landings do not constitute the chief produce of their quarries, and therefore pit-owners are content to let rival traders supply stones of exceptional sizes, not considering it worth while to enter into competition with them.

It may here be stated that, as a rule, the open workings of the districts are huge pits in the earth, the stone being attacked from above,—not quarries on steep hill sides where the whole vertical face of the stone is exposed to view. There, it is true, a considerable number of the latter kind within easy distance of Halifax, situate among the precipitous hills of the Pennine range, on the borders of Lancashire and Yorkshire, but the stone from these quarries is of the Millstone Grit formation, and of a coarser texture and more massive structure than the "Yorkshire stone" of which we are speaking. It may not be out of place to say that this coarse sandstone (known in the immediate vicinity as "native sandstone" or "coarse grit," in contradistinction to the "Yorkshire stone," which is known as "fine grit") is used for heavy works, such as engine-heds, &c., and in bygone years was extensively used for building purposes; but the smaller cost of "flat-bedded" wallstones from the neighbourhood of Halifax, and the increased facilities of transporting them by boat and rail, have almost stopped its use. The stone, however, weathers excellently, as the numerous many-mullioned farm-houses, chiefly built in the peaceful years that opened the seventeenth century, testify to all who care to wander over the hills near Todmorden and Hehden Bridge.

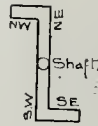
To return to our Yorkshire quarries: we will take one special one, which is a fair type of its class. Here we find the steam-cranes are perched on the very edge of the perpendicular face of the working. Their situation is precarious; now and then one goes headlong to the bottom,—very likely to the ruin of its owner. The section of the ground shows various strata and bands of more or less worthless material, and three beds of valuable stone. The band of "hard stone" near the surface is full of small dark streaks,—fossil-twigs, or rather their impressions,—and is of no use except for road-metal and for filling-up disused workings of neighbouring stone mines; the "rag" is sold for footings in various widths and thicknesses up to 4 or 5 ft. and 8 or 9 in. respectively,* but if there are no orders in

* It is not far from truth to say that no brick foundations are used in the neighbourhood of Halifax, nor is concrete common except in large buildings; the general method of forming foundations is by one or two courses of stone footings, the upper course being narrower than the lower.

hand for footings, the rag is thrown into a worked-out portion of the quarry as so much rubbish cumbering the ground above. The band of stone in thin layers supplies the commonest kind of flags, termed "shoddy flags;" the sound rag under the last is used for steps. After a course of rough rag, a bed of ashlar, 6 ft. thick, with planes of hedding practically invisible, is reached; this is used for paving-sets, as numerous marl-balls and patches of hard glittering spar render it unfit for larger and better work. The first bed of good rock, about 10 ft. thick, now follows, and this is separated from the second by about 2 ft. of rubbish. The second bed is 4 ft. thick, and 5 ft. below it is the third or bottom bed, 11 ft. in thickness. The stone from the bottom bed is the best in the quarry, close in texture, of uniform colour, sound, hard, and durable; it will also take a good polish. The stone from the top and middle beds cleaves rather more readily than the last, and is, perhaps, not quite as close in texture, but the difference can only be perceived by a practised eye; however, there is a difference, sufficient to induce the owners to classify the two stones as of different qualities.

It will be seen from this description how various are the beds of stone which are worked in a single quarry, and the architect cannot but feel that, do what he may to select a good quarry, he is, after all, very much at the mercy of its owner. It is one thing to specify that all stone shall be from a certain bed; it is another thing to get what is specified. The carelessness of workmen, the apparent similarity of the stone from another bed,—apart from actual dishonesty—are quite enough to account for the presence of pieces of inferior stone in any large consignment. These may not be detected at the time (it is impossible for the architect to examine every single stone that comes to a job, and clerks of works, too, are only mortal), but they will proclaim themselves in a few years by discoloration or decay, or, in the case of flags, by wearing off in flakes. For the difference of quality in one consignment, stone-merchants likewise are largely responsible, as stones from several quarries, having perhaps little in common with each other, are mixed together and sold indiscriminately; the result is usually more or less unsatisfactory.

We will now look at one of the Brighouse quarries or mines, and notice the mode of working usually adopted. A circular shaft, 9 ft. in diameter, is sunk through the gravel, shale, and rag, until the bed of good stone is reached at a depth varying from 38 to 42 yards. From the bottom of the shaft a heading is driven at right angles to the dip of the strata, that is to say, nearly north-east and south-west. The width of the heading is largely regulated by the vertical "bottoming seams" which occur in the bed of stone; five or six yards may be taken as an average width, and an increase of this is not desired, as it necessitates larger timbers for supporting the roof, and consequently additional expense. The height, of course, varies with the thickness of the bed, which in some quarries is about 5 ft., in others 20 ft. The heading, however, is always 2 or 3 ft. higher than the stratum of stone which is to be quarried, just enough, in fact, to permit the insertion of the roof-timbers before the underlying stone is removed. When the roof has been securely timbered for a few yards the stone-getting begins, and the valuable stone and all rubbish which would otherwise obstruct the work are carried to the surface. As soon as this



main heading has been driven to the limits of the ground belonging to the owner, cross-

headings are commenced from one or both ends of it. In Mr. Cliffe's quarry the cross-headings are, for the sake of safety, in opposite directions. Each of these, when the stone has been exhausted to the full extent of the ground, is filled up with the waste material which had been taken to the surface, and also with large blocks of hard, rough stone from neighbouring open quarries. Some of these blocks may be had for the fetching, but for others the mine-owner must pay a shilling a load (frequently of one or two stones only), and be at the expense of carting them a distance, in some cases, of two or three miles. The roof-beams are usually removed as the filling proceeds, and when this work is completed back to the main gallery again another breadth of stone is attacked, the roof-timbers now resting at one end on the built-up gallery, and at the other on the solid rock. In this manner operations are carried on until very little stone indeed of any value is left in the pit; the shaft is filled up, and the ground left to settle. In a few years an adventurous person may perhaps utilise it as building land.

Sometimes both open-working and mining are adopted in the same quarry, as at Twait's at Southowram, where a heading is driven from the bottom of the open part under a hill which rises rapidly behind the quarry.

Let us now turn to the working of the stone after it has been brought to the surface of the ground. It is first necessary to state that the stone is divisible into two classes, which may be distinguished either as "thin lift" and "thick lift" stone, or as "self-bedded" and "ripping" stone. The terms "thin-lift" and "self-bedded" are applied to that class of stone which is separated naturally by plates of mica into layers, varying in thickness from $\frac{1}{2}$ in. to 7 in. or 8 in.; in fact the stone is that known by geologists as "flaggy." Each face of every layer is, in the language of the quarrymen, "black;" the colour when dry really varies from light grey to brown, and is powdered with glittering flakes of mica. Ripple-marks are frequently noticeable, rendering the surface of the stone uneven. The "thick-lift" or "ripping" stone is more correctly known as "fissile;" it can be split with wedges in planes parallel to the planes of bedding, but does not exhibit plates of mica, the riven faces being "white." Every group of quarries supplies some stone of the "thin-lift" or "self-bedded" class; but not by any means in equal proportions to the "ripping" stone. For instance, at Messrs. Cliffe's and other mines at Lane Head, Brighouse, the stone is obtained from a "thin-lift" bed about 3 ft. thick, and a "ripping" bed about 4 ft. thick immediately above it. At Lightcliffe and Hipperholme, and also at Northowram, the stone consists almost entirely of ripping rock. In the section of Messrs. J. Brooke & Sons' Yew Tree Quarry at Lightcliffe, the "thin-lift" band occurs about halfway down the quarry; it is little more than a foot thick, and from this and an occasional thin layer between two thick lifts of ripping rock, they obtain a very limited quantity of self-bedded material. The three groups of quarries last mentioned are on the same hill within a short distance of each other. Southowram, like Brighouse, has beds of both classes. Rastrick and Elland Lower Edge have little but ripping rock; in fact, at the latter place, the thin-lift band is only about a foot thick, whereas the remainder of the stone (which is here below the thin-lift band) is upwards of 30 ft. in thickness. At Elland and Upper Edge some of the mines and quarries are similar to the last-named, while others supply self-bedded stone almost exclusively. This general statement of the class of stone obtained at each group of quarries must be borne in mind, as the nature and marketable form of the two classes vary.

The "self-bedded" stones, on reaching the surface, are roughly squared and sorted according to their quality and thickness. Those with rough, uneven surfaces, or much thinner at one end than the other, are sold as "rough shoddy flags," at prices varying from 1s. to 2s.

s. 6d. a yard.* Architects are only just beginning to learn that such a quality of stone is obtainable, but builders have known it long enough, and, very frequently, indeed, within our own knowledge, have taken advantage of the architect's ignorance by substituting shoddy flags for the self-faced flags specified; if the architect said that the surfaces were rough and so on, the builder had the reply pat, "Ab, well, Sir, you only specified self-faced flags, and that's what these are so they are; if you want a downright good job, you should have tooled flags, Sir." The builder's conscience, as a rule, however, permits him to lay shoddy flags in cellars only, where their defects are not so easily seen.

The stones with smooth mica faces and of fairly uniform thickness are sorted according to their thickness and sold as follows: $\frac{1}{2}$ -in. thin grey slates, three-quarters to seven-eighths of an inch; "best grey slates," inch and inch-and-a-quarter; "thin shoddy flags," $1\frac{1}{2}$ in., 2 in., $2\frac{1}{2}$ in., 3 in., and (sometimes) 4 in. "self-faced flags," and "self-faced landings," up to 7 in. and even 1 ft. thick. The slates are used chiefly in the immediate vicinity of the quarries, and are sold at about 30s. per "hundred" of 120 slates of various sizes, estimated to cover about 18 square yards when laid. "River slates" with "white" faces are supplied from many quarries; these are worth 10s. per "hundred" more than the self-faced ones, and are considered more durable, but a hundred will cover only about 16 yards. The jerry builders of Lancashire buy most of the "thin shoddy flags;" they are, of course, cheaper than the thicker "self-faced flags," and being lighter cost less in carriage; when laid, no one can see the thickness, so what does it matter to the jerry-builder? Two-inch self-faced flags are sold at 2s. 2d. per square yard; $2\frac{1}{2}$ in. at 2s. 6d.; and 3 in. at 2s. 8d. The prices vary a little at the different quarries; landings, 30 ft. to 50 ft., 2d. per in. thick, 50 ft. to 90 ft., $2\frac{1}{2}$ d., above 90 ft., 3d., but seldom more than a 1d. or 2d. per yard. It is scarcely possible to give the price of landings, as it varies so much according to the size; but one rule in vogue among the quarry owners is to consider all landings containing more than about 50 square ft. to be worth per square ft. 2d. for 1 in. in thickness; thus, a large 5-in. landing would be worth 10d. a foot.

Of the sizes of landings we have already said a little in the previous article. At Roper's quarry, Lightcliffe-road, Brighouse, we saw self-faced landings measuring 12 ft. by 6 ft. 6 in., and only $2\frac{1}{2}$ in. thick. Marshall & Walker, of Elland, Upper Edge, supplied a landing 16 ft. 6 in. by 5 ft. 9 in. by 3 in. for the balcony, at the Town Hall recently built at Elland; this landing when brought to the surface measured 18 ft. by 7 ft. 9 in., and as the shaft at the quarry is only 9 ft. in diameter, the difficulty involved in raising so large a stone must have been very great. The largest landing, as far as we know, which has been sent from the Halifax district, was obtained by Farrars, Limited, at their Granny Hall Quarry, Lightcliffe-road, Brighouse; it measured 16 ft. by 9 ft. 6 in., containing therefore 152 square feet, and was 10 in. thick. Doubtless landings of this size have been and can be obtained from other quarries, but we have no accurate information on the subject.

For self-bedded material generally, we may say that Brighouse, Southwram, and Elland Upper Edge are the best in the district. Southwram stone is chiefly put into trucks at Halifax Station; the other two groups send their stone from Brighouse Station.

The "thick-lift" or "riving" rock is brought to the surface in blocks up to a yard in thickness. It is then split by wedges along the lines of lamination: these are darker streaks, sometimes barely visible, sometimes well defined. It must not be considered, however, that the stone is easily

cleft along these lines; rather, it must be understood that it *can* be split or riven in this direction, but with difficulty. The different layers, as split one after another from the block, do not present, as a rule, smooth level faces, and can therefore seldom be sold as "self-faced" material. Some of them are roughly dressed with a boasting chisel, the prominences being worked off and the flags (as it is termed) "taken out of twist." No regularity is attempted in this mode of working; the chisel-marks are at all angles with the sides of the flag, and occur merely where quite necessary. These flags are sold as "knotted" or "boasted" in various thicknesses: the $2\frac{1}{2}$ in. ones being worth nearly 3s. a yard. They are extensively used for footpaths of streets, where strict economy is practised, and are as a rule durable, although certainly not of a prepossessing appearance. Some of the flags obtained from "riving rock," if varying much in thickness or otherwise unsuitable for hoisting or tooling, are put into the class of "rough shoddy flags," previously described. By far the greatest quantity of the "thick-lift" stone, however, is carefully tooled with a chisel about 4 in. broad, and sold as "tooled flags." The usual thicknesses are $2\frac{1}{2}$ in. and 3 in., but $3\frac{1}{2}$ in. and 4 in. flags may be had to order. With the exception of those at Upper and Lower Elland Edge, all the quarries supply tooled flags. The prices vary a little, but 5s. 5d. per yard for $2\frac{1}{2}$ in. flags may be taken as the general rate. Some quarry-owners ask a penny a yard more for 3 in. flags, but others are content to sell them at the same price as $2\frac{1}{2}$ in. The reason they give for this is the extensive demand in London for $2\frac{1}{2}$ in. flags on account of the saving in carriage, and consequently an enhancement of the price of $2\frac{1}{2}$ in. and a depreciation of 3 in. Roughly speaking there are 5½ square yards of 3 in. flags to the ton, and 6½ of $2\frac{1}{2}$ in., and as the rate of carriage from the district to London is 10s. 10d. a ton, the saving effected in carriage is rather more than 3½d. a yard.

A considerable number of "polished" flags are put into the market, but none whatever are supplied from the Elland Edges, Rastrick, or Brighouse. Messrs. Joseph Brooke & Sons, at their Yew Tree Quarry, Lightcliffe, polish selected stone from their quarries at Northwram, Hipperholme, and Lightcliffe (bottom bed), and classify it as their "Silex Brand." We have specimens from all the three quarries, and notice that all of them are so close in texture that the polished surface has a considerable sheen, after the nature of granite, but, of course, inferior to it. In addition to their own stone, Messrs. Brooke & Sons polish stone for other quarry-owners at Hipperholme and Lightcliffe. The method of polishing has a primitive appearance, and consists of a strong horizontal double beam, balanced at the middle on an upright shaft, which receives a rotary motion underground from an adjoining steam-engine. The beam is 30 ft. long, and a circular table of "knotted" flags (containing about 90 square yards) is carefully laid under it; to the beam itself about 40 additional yards of flags, steps, &c., are attached by a number of chains, and these flags, as the beam turns round on its central pivot, are dragged over the table below, until they are polished. Water is continually streaming on to the stones from a supply in the centre, and a man is employed to scatter sand over the table. The upper (moving) stones are sufficiently polished in twelve or thirteen hours; the lower are finished in about double the time.

Messrs. Charnock & Sons have a polishing-machine at Charlestown in Halifax, and here stone from Southwram is brought. Messrs. John Farrar & Sons polish their stone from Southwram at Brookfoot, and also polish their stone at Thornton; but as this is nearer Bradford than Halifax, it is beyond the province of this article. We may say, however, that the stone is of a blue-grey colour, very similar to Northwram stone, but perhaps a little coarser in texture. The polishing-machines just mentioned consist of a rotary

circular table of flags, over which a rectangular table moves to-and-fro. They do not turn out as much work in a certain time as does the machine in use at Lightcliffe.

The price of $2\frac{1}{2}$ in. polished flags is about 4s. per yard.

Landings, of course, may be had either tooled, polished, or boasted. It must be borne in mind, however, that the same remarks apply to these as to flags,—namely, that all quarries except those at the Elland Edges supply tooled flags, and that there are only three firms in the district who own polishing-machines.

A considerable number of landings are supplied for the construction of chemical cisterns in Widnes and other Lancashire towns. From Farrars' quarries at Brighouse stones 12 ft. square and 1 ft. thick, weighing about ten tons each, have been sent for this purpose. Stone is severely tested by chemical manufacturers before being adopted, and it may fairly be argued that whatever will resist the continued action of powerful chemicals will be able to withstand the same chemicals in the diluted form in which they are present in the atmosphere. Stone also from Northwram and Lightcliffe is used for chemical purposes. One of the tests to which the stone from Brooke's quarries has been subjected is submersion in hydrochloric acid, both cold and heated to 120 deg. Fahrenheit; it stood both tests perfectly, did not decompose or diminish in weight, and showed no traces of lime in its composition. The presence of iron was, however, detected,—more particularly in the bluer varieties.

Besides the material already mentioned, most of the quarries supply paving-sets, steps, and curbs for footpaths. Elland Lower Edge enjoys a great reputation for paving-sets; in fact, it is not far from the mark to say that the four quarries at this place and three of those at Upper Edge supply nothing but sets, curbs, and steps. Sheffield and other Corporations, and numerous Local Boards, have used this stone. Its weight, according to the report of the Commissioners for selecting stone for the Houses of Parliament, is 153½ lbs. per cubic ft.; for purposes of comparison we may say that the Commissioners state the weight of Bath stone to be from 116 to 123 lbs. per ft., of Portland stone from 126½ (roach) to 145½ (curf), of Craigleith stone about 145 lbs., and of granite about 166 lbs.—very nearly the same weight as the Kentish rag.

Steps are frequently delivered in a rough state, and worked on the building site itself. They may, however, be obtained either tooled or polished. Street-curbs are supplied self-faced and tooled. In addition to these some of the Brighouse and Lightcliffe quarries send a large quantity of platform coping to the various railway companies. These are all brought to uniform widths of 3 or 4 ft., are 3 or 4 in. in thickness, tooled, and bull-nosed along one edge.

We may say that flags for the best work are supplied of uniform widths, or as it is termed, of a certain "gauge," so that they can be laid in equal parallel rows.

In our issue of the 14th of September last year, we printed a letter from Sir Robert Rawlinson, loudly in praise of artificial stone, and equally loudly in condemnation of Yorkshire flagstones. Sir Robert's letter elicited two excellent replies from "Town Surveyor," but we now know that certain Yorkshiresmen refrained from writing simply because they thought it was not worth while. The gist of Sir Robert's letter is in the following passage:—"I have . . . walked over the York-flagged foot-pavements in the West-end of London, and can only say that in wear they are true to the name flagstone—a stone which wears in flakes. *There is not a single square yard of foot pavement of Yorkshire flags which has been six months in wear which is not showing flakes.* The artificial Croft flags, on the contrary, will wear to the last, and be sound." Now, we do not pretend to have carefully examined every square yard of flags in the West-end of London, but we can certainly say that we entirely dissent from the

* All prices given in this article are for stone put in truck at the nearest railway station, and may be taken as the average prices current at the present time.

strong statement which we have printed in italics. It cannot be denied that a large number of the Yorkshire flags which are laid in London do in a very short time begin to wear in flakes. A cursory examination of these, before they were laid, would in most cases have shown that such would be the case,—the lines of lamination would be numerous and distinctly marked. We have seen flags which are closely striated throughout their thickness, some of the lines being dark brown,—almost black; others we have seen in which the striations only appear when the stone is wet; and others, again, there are,—we have a sample before us now,—in which even water will reveal no lines of lamination. We could point Sir Robert Rawlinson to flags, landings, and steps which are worn into hollows more than $\frac{1}{2}$ in. deep (owing to excess of traffic in particular places), and which yet do not show flakes. Just as there is good artificial stone and had, there are good and had flags. But there is another point which ought to be raised, and it is one on which Sir Robert gives no information,—are the best Yorkshire flags as durable as the best artificial ones? Of course, the instance mentioned by Sir Robert, of an artificial step lasting as long as three Portland stone steps, has nothing to do with our present subject.

NOTES.



THE coal strike terminated, as we anticipated, at the end of last week, the masters' combination not being complete enough to effectively resist the demands of the miners. The announcement that the dispute had been settled was naturally received with general satisfaction, and the incident, which created much alarm and uneasiness, will soon be forgotten. The most satisfactory feature of the affair, to our mind, consists in the statement that proposals were made at the conference for dealing with wages questions in future, and agreed upon in principle. It is time that such questions were settled in a more reasonable manner, for, as a contemporary well remarks, "the excessive cumbersomeness and costliness of the present method of haggling were never better illustrated." The prejudice which exists amongst most bodies of workmen against arbitration has long been overcome in the case of the Northumberland and Durham collieries, where the representatives of employers and employed meet periodically for the discussion of disputed points, and have been successful in settling very many such questions. Indeed, Dr. Spencer Watson, of Newcastle, in a paper read at Manchester on the 12th inst., stated that in a single year no fewer than 629 disputes were thus settled; questions upon which agreement had been found impossible being referred for decision to one or more independent persons mutually agreed upon. These conferences have from time to time established sliding scales by which wages are automatically regulated, and it seems probable that had this system been more general the recent trouble might have been averted. The question is already before the House of Commons, a Bill having been introduced this Session "for dealing with strikes among workmen and remedying some of the evils of the sweating system." We should have thought that these two great labour questions differed sufficiently in their nature to have been made the subjects of separate measures. The Bill consists of seven clauses, and the principle of dealing with strikes may be described as compulsory arbitration. It is proposed to form Courts of Arbitration, consisting of an equal number of representatives of employers and employed, Her Majesty's Inspectors of Mines, —or of Factories and Workshops, as the case may be,—being empowered to compel disputants to submit their case to such tribunal when the differences are likely to lead to a stoppage of work. Should this result in the adoption of a mutually satisfactory arrange-

ment which would obviate these vexatious and expensive disputes, it will certainly be most beneficial to the entire community.

IT is difficult to understand whence and how there first arose the idea of making a watering-place and holiday resort of Southend. Its distinction in that sense appears to date from about the last decade of the last century; at the time Jane Austen wrote it was regarded as a good seaside place to go to for a London man who could not afford the expense of a coaching journey to Cromer with a large family. Easy distance from London of course, counted for a great deal more in those days; but why choose a place where there is a shallow a mile wide in front of the beach, only just covered by the sea at high water, and not leaving at low tide even a "practicable" sandy shore, but only a wet and muddy expanse? Yet Southend seems to be by no means quiescent, but rather putting on new life. In addition to Southend proper, which is reached from Fenchurch-street, there is now a kind of new hamlet springing up half a mile inland, called for distinction Southend-on-Sea (apparently because it is exactly the part which is *not* on the sea), reached from Liverpool-street, and where the well-huilt and rather ambitious new terminal station seems to argue that the Great Eastern Railway Company, at all events, expect a considerable traffic in that direction. New traffic is partly looked for, no doubt, from future residents on the building estates along the line of railway; on the Fenchurch-street line, for instance, between Tilbury and Southend, we pass a notice-board in the midst of fields, inscribed "authorised site of the ——— station" (the name has escaped our memory). But why people should go to Southend, except because more attractive places are full, we fail to understand: still less why they should go to Southend-on-Sea. There is no sea at the one, and no pretty country at the other. Southend itself, which formerly lined the shore, has spread up into a main street inland towards the railway: the usual watering-place street. The old town, irregular and dilapidated without being picturesque, but with an interesting old house here and there, skirts the shore eastwards, with a triangular plot of ground at the eastern part, between the houses and the sea, which seems to have been meant as a "village green" originally. On the high ground westwards of the end of the main street stands the principal hotel, and extending from it westwards is "Royal terrace," dating from the time when Southend was discovered; a neat clean well-huilt row of Georgian houses with pilastered front doors and a wide gravel walk before it, the centre of the terrace emphasised architecturally by stucco pilasters after the fashion of the day. In one of these it was, no doubt, that Mr. John Knightly stayed with his family on the occasion when he incurred the criticism of the Hartfield "apothecary," Mr. Perry, for his shortsightedness as a father in taking his family there instead of to Cromer (*vide* Jane Austen's "Emma"). Westward of Royal terrace extends, at a much greater length, the row of houses forming modern Southend. They make watering-places deliberately on a set pattern now, and this part of Southend is exactly like "The Lees" at Folkestone on a smaller scale; the houses, the drive, the turf margin, and the curving walks down the cliff side, are all repeated here: but there is not the Folkestone sea, unfortunately. From the bottom of the hill beneath the hotel extends the pier, a mile and a quarter long, enabling the visitor to get out to the water at low tide. The original pier was a rather narrow timber one, but a well-built erection of its kind, constructed about forty years ago. A new and wider iron pier is being carried out alongside of it, and is now about half finished. The end of the long pier is at all events a place to breathe fresh air and see a large expanse of sea and sky, as well as plenty of craft to give life to the scene. One real beauty of Southend, we can easily imagine, will be found in the effects of sunlight seen

from the terrace, looking south across the broad estuary of the Thames, with the coastline of Kent opposite. It was a fine scene on the day we saw it, lit only by the scanty sunlight of a rather bleak early March day; under certain conditions of weather there may well be splendid effects from the terrace level: the one real attraction we could fancy in Southend.

THE Town Council of Bolton has been heaving itself, and not a moment too soon, if one may judge by the high death-rate in the borough in a recent week (43 per 1,000), and by the description which was given at its last meeting of some of the "rookeries" in the town. The present condition of the place is certainly deplorable. In many cases unoccupied cellar-dwellings are used as ashpits; back-to-back houses are common; people are living in "wretched shanties" clustered together in filthy alleys; sink-pipes are directly connected with the drains; the street-sewers are scarcely ventilated except into the houses; the public scavenging is done in a parsimonious manner; "a very large proportion of the cinder-sifting closets are now without rubbish-boxes, and, consequently, are in a highly objectionable condition;" in fact, sanitation appears to have been hitherto utterly neglected by the Council. These terrible charges are not made by any irresponsible person, but most of them by Dr. Sergeant, the Medical Officer of Health for the Borough. In his February report he further states that "the whole of Derby Ward has undergone inspection. The result shows that the sink-pipes of 1,330 houses were in direct connexion with the drains." The Sanitary Committee of the borough is now hard at work, attempting to remedy some of the existing nuisances; perhaps when the sink-pipes are all disconnected, other evils will be abated. A resolution has been passed ordering five houses in Meadow-street to be closed as unfit for habitation, and others are only waiting their turn. Ward by ward the whole town is to be purified. In Exchange Ward alone,—the first to be dealt with,—the committee found "scores of houses that required immediate attention." Houses that cannot be satisfactorily amended are to be pulled down. But the committee does not intend to build any dwellings to take the place of those demolished. This part of the sanitary reforms is to be left to "private enterprise,"—in other words, to the jerry-builder. This portion of the committee's report was subjected to considerable criticism at the last meeting of the Council. The main argument brought against those who advocated the erection of dwellings by the Corporation was the wearisome one of "economy." They would not "pay," or, as one councillor put it, they would not show "a satisfactory financial result." But it must be remembered that in providing sanitary dwellings for the poor, the larger taxpayers are not lengthening the lives of these alone, but probably their own lives too; fever bred in the slums will sometimes spread to the terrace and villa.

THE annual "Schinkel-fest" of the Berlin "Architekten-Verein" was held as usual on the anniversary of the great architect's birthday. After the annual report had been read, and the (this time very long) list of members who had died during the year had been gone through, the representative for the Minister of Public Works presented the Schinkel Medallion to Herr Jules Boethke* (Kgl. Reg.-Baufuehrer), whom the President, on behalf of the members, congratulated in hearty terms. A very interesting paper on "The Life of the deceased Archaeologist, Karl Boetticher," read by "Post-Baurath" Tuckermann, followed, the latter bringing Schinkel's and Boetticher's names in close connexion with one another,—and after a vote of thanks to the lecturer, a small pause in the proceedings of the evening followed, in which interval, however, a very fine collection of the archaeologist's drawings could be viewed. After the pause

* See *Builder*, March 15, 1890. "Schinkel Competition."

the second part,—the annual dinner, with the various performances between courses,—took place, and, even if the tone was an earnest one on the whole, as time went on mirth had its rights. An allegorical piece, written for the occasion, titled "The Competition of the Building Styles," showed some excellent ideas, "The Style of the Future" being represented by a veiled warrior, clad in resplendent mail from head to foot; whilst M. Rococo" showed a contemptuously comic figure. Ancient, Byzantine, Gothic, Italian, and German Renaissance were all typically represented; and "Culture," the controlling goddess of the piece, made an excellent impression with her strictly logical comments.

THE mausoleum for the deceased Emperor Frederick, now in course of erection at Potsdam, is progressing rapidly, but it is doubtful whether the building will be complete in time for the ceremony on the anniversary of the monarch's death, as was originally intended. The building, which has been designed by Professor Raschdorff (Hon. Cor. member of the R.I.B.A.), in accordance with the Empress Victoria's ideas, or rather special wishes, is, as far as we can now see, likely to be a success. It will, however, be advisable to leave the description till after the opening ceremony. The site has been admirably chosen, and the style is in harmony with the surroundings and with the "Friedenskirche" close by.

IN regard to the subject of technical education it may be of interest to note that Austria has at present five technical colleges. A total of 1,760 persons are being benefited by the instruction given at these institutions, and of this number 1,576 are students proper. The Vienna College, with 88 names, takes the lead; the combined Bohemian and German divisions of the one at Prague show 601 (i.e., 334 + 167) and then follow three smaller ones: Lemberg, 158; Graz, 167; and Brün, 148. Of the total of 1,760 names, only 152 have been entered for architecture. This is owing to the fact that the Austrian architectural students prefer to study at the "Kunst-Akademie" at Vienna. In comparing the above numbers with those of the German institutions,* we find that the number of students at the Royal Technical College at Berlin does not fall so very short of the number of technical students of the combined colleges in Austria.

IN a "Note" of May 4, of last year, we adverted to the establishment of a "Memorial Tablet Fund," at Newcastle-on-Tyne, for the marking of certain houses connected with the careers of its most famous townsmen. According to the *Athenæum* a similar project has been undertaken by the Clifton Antiquarian Club in respect of Bristol and Clifton. It appears, too, that the Club propose to extend their labours in a purely topographical direction, for "Roman camps and roads of the neighbourhood are likewise to receive annotations on their respective sites." Amongst the many worthies who should find special honour at Bristol, the names of the two William Canynges, who rebuilt St. Mary Redcliff Church in the fifteenth century; John Shipward, Whitson, and Edward Colston, merchant-adventurers; Thomas Blanket, wool stapler, temp. Edward III.; and the Cabots and Hugh Elliott, navigators, are pre-eminent. John Cabot, together with his three sons, Sebastian, Louis, and Saucius, by the King's charter, sailed from this port in quest of India in May, 1497, and reached the Terra Prima Vista, by the gulf of St. Lawrence. In the year following Sebastian was equipped by his fellow-burgesses for a voyage which resulted in the discovery of the Labrador coast and of what are now Nova Scotia and Newfoundland. Passing on to later times, it is to be hoped that, besides Chatterton's, the haunts or homes of the following will be indicated. Coleridge

sojourned at Clevedon and Bristol, being attracted thither by Southey, who was born in Wine, or Winch, street, where by the sign of the Hare, since the Golden Key, his father kept a draper's shop. Sir Thomas Lawrence, P.R.A., son of the landlord of the Black Bear Inn, Devizes, for a while stayed in Bristol, and set up, when sixteen years of age, in Bath. Jane Porter, novelist, with her sister, Anna Maria, natives of Durham, lived latterly in Bristol. Hannah More and her sisters kept a school here; their father was also a schoolmaster in the city. Also E. H. Baily, R.A., F.R.S., sculptor of "Eve at the Fountain," and of the "Graces" and the "Morning Star," whose father was a ship-carver at Bristol. Dr. J. C. Pritchard, the great ethnologist, born in Ross, co. Hereford, who settled at Bristol in 1810, and in 1813 gave to the world his first edition of "Researches into the Physical History of Mankind." William Herapath, analytical chemist, inventor of the blow-pipe known by his name, and the magnetic balance, and who, with Henry Clark, founded (1828) the Bristol Medical School; Thomas Edward Bowditch, whose travels on the western coast of Africa were prematurely ended by his death at the Niger's mouth in 1824; and of Miss Mary Carpenter whose philanthropic labours need no encomium. We understand that a portion of Colston's house was incorporated in the new Assize Courts buildings.

THE exhibition of the Institute of Painters in Water-colours may be characterised as

"This sown with aught of profit or delight."

The proportion of absolutely commonplace works seems greater than ever, and there are evidently a considerable number of people pursuing the craft of artist in water-colours who would have been better employed in some less ambitious calling. There are others worse than commonplace; large drawings hung on the line which are so absolutely vulgar both artistically and otherwise that to hang them in the best places in an exhibition is a kind of offence against public taste. The Hanging Committee do not seem to know what to do with some of the few really good works they have, as it is not uncommon to find a drawing that is quite above the average of the exhibition put down on the floor. Among the noticeable works Sir Jas. Linton's "Miss Ashbee" (16) is, of course, fine in colour, but very wooden and expressionless as regards the head; his other work, "Waiting" (44) is far superior—a beautiful face, picturesque costume, and very fine and rich colour. Mr. Slocombe's "Portrait of a Guarnerius Violin" (46), lovingly portrayed with its ruddy and amber tones, is an interesting and unusual work. Mr. Fulleylove's small drawing of "Greenwich Hospital" (127) shows a bit of bright breezy sky which in itself is worth a dozen of the ordinary run of works present. Mr. Anderson Hague's "Uncertain Glory of an April Day" (110) is a fine landscape effect rather spoiled by uncertain drawing of foreground figures and details. Mr. Cahianca's "Grey Weather" (137) is notable for originality of subject and composition—two white-bonnetted *religieuses* flanked by a long dull grey wall and heavy masses of trees over it. Mr. Orrock's "A Common in Essex" (184) is a fine work, apparently a little wanting in foreground colour. In "Windsor" (211) Miss Donald Smith has caught the look of moving river-water on a calm day very well. "The Last Request" (248) by Mr. H. J. Dobson, is a truly pathetic little picture which has been floored, so that it is likely to be missed unless looked for. Not so with Mr. Charles Green's brilliant little work showing "John Gilpin" (282) proud and corpulent in his "trainband" uniform, admired by his wife and daughter, in a room every detail of which is given with the greatest finish and precision. Mr. Towneley Green's "Mother and Child" (284), with less of brilliant execution of detail, is a higher work in feeling; a kind of modern Ostade in water-colour. Miss Kate Greenaway's "Boy with a Basket of Apples" (295)

is a kind of poetry-book boy walking in front of a prettily composed landscape; an original work, a little odd in colour. Mr. Fulleylove gives "Sta. Maria del Popolo from the Pincian" (296), a good little work of its class. Mr. F. Dadd's "Hawks Abroad" (303) is very cleverly painted, but wants point and incident. Mr. Gregory's little miniature, "A Step on the Stairs" (322) should be looked at. Mr. Arthur Severn sends a large study of "La Salute, Venice" (334), noticeable rather for colour than the treatment of architectural detail. Mrs. Harry Hine's "Study of a Street in Sunlight" (349) is slight but very true and bright in effect. Mr. Ammonier's large landscape (367) is hardly equal to his best. Mr. Dollman's "Hawks dinna pike out hawks' een" (427) is one of the now fashionable highwaymen subjects, clever enough, but the joke is hardly worth so much paper. Mr. Charles Green's "Pickwick Club" (435), with Mr. Pickwick standing on a chair for a benevolent speech, shows a great deal of study of character in the faces, but is not an attractive work; perhaps the subject is too near farce to admit of being seriously painted. Mr. Steer's painting of Goldsmith playing the flute to ragged children in his garret (452) is to be looked at, and Mr. Charles E. Wilson's "Blowing Bubbles" (471), a single figure of a child seated before the darkness of an open door. Mr. Carlton Smith's "Grace" (478), a family rustic scene, is not of the highest class of painting, but the expression of the child's head on the left is very sweet. In the third room Mr. Bernard Evans makes a landscape of the old school in "Byland Abbey" (545), effective in a way, but too like a revival. Mr. Hugh Carter's various figure subjects are all good, but all in too manifest and palpable imitation of Israels to give their author the credit he might otherwise gain from them. Mr. Knight's "Sheltered Vale" (639) is a fine work in his usual brown style; his smaller drawing, "A Breezy Day" (292) is better, however,—notably the bright windy sky. Mr. Chas. E. Mottram's "High Tide, Ramsgate" (634) is a very fine bit of sea-painting on a squally day. Mr. Harry Hine sends a large view of Lincoln Cathedral from the north-west (776), very correct and finished, but very deficient in tone and atmosphere.

A COLLECTION of paintings by various foreign artists, now on view at Messrs. Dowdeswell's in New Bond-street, contains a good many interesting pictures. Some of them indeed are small examples with great names, and those of Diaz do not tend to recommend him. One or two small Troyons are beautiful examples of the painter. Herr Muhrmann's more or less impressionist landscapes are unequal but include some original things. Among works by modern Italian painters Innocenti's "The Dance" is a beautiful little picture. There are some fine examples of that remarkable and versatile painter Courbet, including two very fine landscapes, "Les Saules" and "Le Ravin," and an equally fine figure study, "La Dormeuse." There are also some remarkable works in their way, by Signor Segantini, who seems to be a kind of Italian Holman Hunt, or at all events reminds one a good deal of that painter in his tendency to very strongly marked and hard painting of detail, and strong contrasts of light and shadow. But perhaps the most interesting works in the gallery are the landscapes by the late Georges Michel. None of these are large, but they are all grand, landscapes; broad and powerful in effect and composition, and full of the poetry of nature. Michel's place will eventually be higher than it has been yet.

WITHOUT going beyond our *métier* to express any opinion on the great event of the past week in European politics, we cannot withhold a word of admiration for Mr. Tenniel's pictorial comment upon it, under the title "Dropping the Pilot." Among the many cartoons, full alike of artistic and intellectual power, which have illustrated Mr. Tenniel's

* See *Builder*, February 22, 1890.

† Restored by the late George Godwin, F.R.S.

brilliant career as the chief artistic contributor to *Punch*, we do not know that he has ever done anything finer, more pathetic, and more straight to the point than this.

THE MAUSOLEUM AT CHARLOTTENBURG.

A WEEK or two since all the members of the Imperial Family of Germany in town at the time were present at the solemn ceremony held for the first time in the new extension of the Mausoleum at Charlottenburg, in honour of Emperor William I, the anniversary of whose death was the 9th of this month. The old Mausoleum building, designed by Schinkel as a tomb for the remains of Queen Louise of Prussia, was erected in 1810 (in accordance with Schinkel's design) by "Hofbaurath" Gentz, and received new façades of a more monumental material in 1826. In 1841 the Mausoleum was extended for the remains of King Frederic William III., and since that year this well-known monument has been visited by hundreds of people, not only on account of the patriotic interest of the place, but also on account of the two splendid sarcophagi it contains, the work of the sculptor Rauch. In accordance with an express wish of the late Emperor William to his dearly beloved mother, the Mausoleum has again been extended, and there is now room enough in the upper chapel, not only for the two above-named pieces of sculpture, but also for fitting tombs for the deceased founder of the new German Empire and the Empress Augusta.

Seen from the front, the Mausoleum as it now stands does not seem to have been altered, although, in fact, the alterations have been of a very extensive and also difficult kind. The back wall of the building, and hence also the apse, or rather altar-niche, in this wall, had to be pushed back some five metres, and the cupola over this niche, weighing about 800 cwt., had to make the journey as a whole, it being of great importance that the fresco on its intrados should not be damaged. These alterations and extensions have been designed by "Hofbaueinspector" Geyer, in accordance with the ideas of the late Empress Augusta, and the responsible position of architect in charge fell to Herr "Regierungs-Baumeister" Weber.

Upon entering the building we find that that part of Schinkel's design which was originally intended for Queen Louise's sarcophagus, but which now fulfils the function of a vestibule, has in its main parts been left as formerly intended. Passing between a couple of columns we find ourselves in the new, *i.e.*, extended chapel, which instead of having the long rectangular form of 1841 now shows a nearly square one, the present dimensions being 11.20 m. width to 11.60 m. depth, the altar-niche referred to above as being situated on the centre-line of the back-wall showing an opening of 4.50 m. diameter. This chapel, which is kept in light and bright colouring, makes an exceedingly good impression on the visitor, and the sites marked out for the sarcophagi receive good light through two windows on the sidewalls, each having a width of about 4 metres. The ceiling is specially worthy of note—it is a coffered one, constructed, however, in iron and stone. Its ribs, which rest on the walls at a height of about 8.50 m. above the floor, are of $\frac{1}{2}$ iron, placed 1.30 m. apart from one another. The lower and visible side of these girders shows a pattern in bronze and gold, whilst the square bays, which are of a fine grey stone, show a natural coloured margin as a frame to a deep blue ground, set out with metal rosettes in gold and white. The decoration of the walls is, of course, kept in the same strict Classic style as the remainder of the building. The flooring is of black and white marble slabs. The raised marble altar has not been altered, and has, together with the two very fine candelabra, found its old place in the apse.

Below the chapel we find the crypt in which the coffins of the deceased rest. This part of the Mausoleum can be as easily entered as before, the position of the entrances not having been altered. Passing through the old crypt, which now stands empty, and also serves as a kind of vestibule, we reach the sufficiently-well-lighted crypt proper. Here four red granite pillars serve to support the vaulted ceiling, and in the apse, which has a small window on the centre line, we see a plain altar of black marble

The floor is of this same material, and this, together with the dark-grey colour of the walls, gives the whole an extremely solemn effect.

FREE LECTURES TO ARTISANS AT CARPENTERS' HALL.

PROFESSOR KENNEDY ON THE FORTH BRIDGE.

The fifth of this series of lectures was delivered on the 5th inst. by Professor A. B. W. Kennedy, F.R.S., Professor of Engineering at University College, London.

The lecturer, at the outset, remarked that he appeared more in the capacity of a showman than in that of a lecturer. When he was asked to give the present lecture he communicated with his friend Mr. (now Sir) Benjamin Baker, to ask whether he would be good enough to lend him (the Professor), for the benefit of his audience, a series of photographs of the bridge in its construction, which he had prepared for showing in the lantern. Sir Benjamin acceded at once to his request, and really his (the Professor's) lecture would be a running description of the bridge illustrated by these photographs. When people wanted to put a bridge over a large river or ravine, there were three different fashions in which they could go to work. Supposing they were savages, the first manner in which they would go to work would be to put a tree trunk over it. If the savage grew to be an engineer, the tree trunk became a lattice girder, which was perfectly familiar to all those present. Failing the tree trunk, they might throw some kind of a rope across the river and attach a platform to it. The pre-historic rope had developed in our own time into the suspension bridge. But there was a third way in which the very oldest makers made bridges, and that was known as the cantilever principle. This very old fashion or type of bridge had had its latest development in the Forth Bridge, which was opened on the previous day. To show in what respect the cantilever bridge differed from the tree-trunk bridge or girder, and from the rope or suspension bridge, the Professor gave an illustration of the very earliest type of the cantilever bridge. The Forth Bridge had to be built across an arm of the sea over a mile in breadth, and the smallest length which could be got for one single span was a little over 1,700 ft. For certain constructive reasons it was impossible to bridge the entire span with a lattice girder. If the span had been bridged on the suspension principle the structure would not have been stiff enough to carry the enormous traffic for which it was intended, and there remained only the use of the cantilever type of bridge. The structure consisted of three piers—one on the north or Eife side of the river Forth, one on the south or Queensferry side, and the other in the middle, on an island called Inchgarvie. It was a very considerable engineering feat to build the Eiffe Tower on a firm foundation, but it was a much more difficult affair to construct the Forth Bridge, each span of which was equivalent to two Eiffe Towers built out horizontally. Views showing the progress of the undertaking from its initial to its final stage were thrown upon the screen, and the lecturer described the method of constructing the foundations of the piers, and the way in which the whole superstructure was erected. He concluded by expressing the hope that he had been able to give some kind of picture of the methods and course of construction of an undertaking which was one of the most remarkable as well as the largest of engineering structures of our time.*

PROFESSOR MARSHALL WARD ON "THE TREE, FROM THE SAPLING TO THE BENCH."

The sixth lecture of the course was delivered on the 12th inst. by Prof. H. Marshall Ward, M.A., F.R.S., F.L.S., &c., on the subject indicated in the above title. The subject was mainly treated from the arboriculturist's or forester's point of view, and was illustrated by a large number of views thrown on the screen.

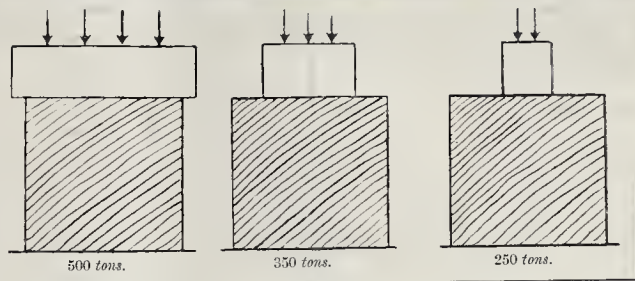
The following illustrations of the Forth Bridge have been given in *The Builder*:—On January 2, 1886, we gave a general view of the bridge, two sheets of drawings showing construction of the superstructure, and a sheet showing construction of the construction and placing of the caissons for the foundations. On July 16, 1887, we gave several sketches showing the progress of the work. On February 11, 1888, and May 26 of the same year we gave other sketches and diagrams showing the further progress of the work. On July 28 following we gave two views showing the progress of the three piers and of the Inchgarvie north cantilever.

by means of a lantern. It was a mistake, said the lecturer, to imagine that trees would grow anywhere, and it was another mistake to suppose that the aid of science was not necessary for their production and selection. True, the forester and the botanist did not grow the timber,—they let it grow,—but they had a good deal to say in the matter of the thousand and one vicissitudes which affected the tree as it grew, and the forester's art was based largely on the scientific experience of the botanist. The lecturer proceeded to describe some of the vicissitudes referred to, and to sketch some of the phenomena which the tree exhibited as it passed through its long life from the seedling to the sapling and thence to the tree cut out for timber to be used in the arts. He then proceeded to enumerate the kinds of trees which yielded the timbers employed in building. All over the world, except in extreme positions towards the poles, or on high mountain tops, we met with trees, but it was not every large tree which was a timber tree in the builder's sense. For instance, the tree-ferns of Ceylon and New Zealand, although their whole column-like trunks could be used for supports, would not cut into timber in the shape of planks or beams. The same remarks applied to many other trees, including the Talipot palms of India and Ceylon. The lecturer next proceeded to describe the often unsuspected infection of timber by fungi picked up in the forests. These fungi made their way into the timber by means of cracks or wounds, and they flourished at its expense, especially when the wood was damp and warm. If the fungus got into the log as it lay on the ground before it commenced its long river journey as a portion of a raft, the damp would cause the cracks in the log to close up, and the spore would lie as snug as possible in the log as the latter pursued its watery course. Then, when the logs were stored in the collecting-yards at the other end, the warm, damp, still conditions in the timber stacks just suited the fungus, and it surely but slowly made its devastating way along the interior of the wood. There were other fungi which could penetrate into the roots of a living tree, and then ascend the stem and gradually scoop out the heart from below, and make the trunk hollow. The lecturer said he had seen miles of fine-looking tall spruce firs in Austria the stems of which were hollow for several feet up, owing to the ravages of the pest referred to. Looking at a transverse section of a piece of timber, we saw the annual rings, in addition to the medullary rays, &c. Now these "rings" were really the expression of so many cylindrical layers of the structures composing wood, and they only appeared as "rings" because they were cut across. In all ordinary timbers one of them was produced each year, and the sharp line which separated them was simply due to the greater density of the structure in that part of the annual ring which was formed at the end of the summer. In illustration of this point, the lecturer showed a highly-magnified transverse section of Rhamnus, showing how the "annual ring" was marked by the sharp contrast between the more dense and compact wood formed in the autumn, and the more open spongy wood formed in the following spring. Passing on, the lecturer insisted upon the point that it was of importance where and how a tree was grown if it were to yield good timber. In illustration, he showed the sections, side by side, of three specimens of spruce-fir grown under different conditions. They greatly differed in solidity and firmness of construction, and therefore in relative weight and hardness. Every timber had its own structural character. The lecturer, in conclusion, referred briefly to the ravages of dry-rot in the timber of floors, &c., and to the means to be taken to prevent them,—*viz.*, dry air and good ventilation.

PROFESSOR UNWIN ON THE CONSTRUCTION OF WALLS.

The seventh and concluding lecture of the course was delivered on the 19th inst., by Professor W. C. Unwin, F.R.S., who took as his subject "The Construction of Walls."

Professor Unwin, after some introductory remarks, said:—The architect and the engineer are both engaged in constructive work which in many cases is of essentially the same kind. Both alike have to build structures with pretty much the same materials and with the same object, that they shall support the loads they have to carry, and endure the destructive action



their numerical meaning and their physical meaning. The diagram shows to scale a 1-ft. cube of red Mansfield supporting a cube 21 ft. in length of side. That 21-ft. cube has a weight which is just equal to the crushing strength of the 1-ft. cube. So much for the numerical significance of the numbers.

Next, what does the crushing strength mean? As a matter of fact, stones never crush at all. They shear along diagonal planes into tolerably regular pyramids. Stone is tested usually in cubes, and great care is taken to get a uniform distribution of the load on the surface of the cube. At some value of this crushing load, reckoned on a square unit of surface of the cube, the stone gives suddenly shears along diagonal planes into a top and bottom and four side pyramids. If the crushing takes place in any other way, we may be sure the stone was badly hedged, and that the crushing resistance is less than for a well-hedged stone.

There is a special case which unavoidably occurs in building where the load, instead of being spread over the whole surface of a stone, is put on a small part of its area. Suppose a stone so strong that a cube of 1 ft. length of side would carry 500 tons uniformly distributed. If the pressure comes on the central half of its area it would crush with 350 tons; if on the central quarter of the area, with 250 tons. If the load is eccentric, or if the pressure area is diminished below as well as above, the strength is still further reduced. Now, the practical importance of that is this,—that it shows us how necessary it is that stone should be well bedded if its strength is to be depended on.

There must be unequal pressure of the stones on each other in actual structures, and hence experience has taught us never to load our structures to anything near their crushing strength. There are very few structures in which the average crushing stress in the masonry reaches 10 tons per square foot. A few great piers or pillars of churches carry more. Some of the pillars in St. Paul's are believed to be loaded to 18 tons per square foot, and, in very rare cases, double that stress seems to be safely carried. One remarkable case is the great chimney at St. Bellox, where, on the brickwork, the stress is believed to reach 30 tons in a strong wind-storm. Generally, for rubble masonry, the stress does not exceed 1 ton per square foot, or for ashlar 5 tons.

Artificial Stones.—Bricks are well known to us in London, as they were, indeed, to the Romans, from whom we have derived much of our modern constructive methods. Bricks vary much more than stone in strength, in porosity, in hardness. There are bricks made of slate refuse, blue in colour, very dense, very heavy, which carry, fairly tested, 1,000 tons to the square foot. For some engineering works they are invaluable. Staffordshire blue bricks will carry 400 tons. But most ordinary building bricks do not carry more than 100 to 150 tons. There is another thing about brickwork. So far as we know, masses of brickwork are materially weaker than single bricks. I suppose this must be due to the impossibility of getting uniform and perfect bedding, even with mortar-joints, in such compound masses.

Limes and Cements.—We shall see that in the older wall constructions no mortar or cement was used. In later times a greater use has been made of cementing material, so that some reference to this is necessary. The cementing materials now used are:—Fat limes; hydraulic limes; hydraulic cements.

The fat limes, produced by calcining nearly pure limestones, slake violently when mixed with water, and when made into mortar with sand, harden very slowly by absorbing CO₂

from the atmosphere. The mortar made with lime and sand only is even at the best of times very poor stuff from an engineer's point of view. It has little strength, little tenacity, little adherence to stone or brick. Really, the ordinary mortar used for walls can be regarded as little better than so much convenient packing material, which serves to give the stones or bricks a fair seating on each other, and to distribute their pressure evenly. In many Mediaeval structures, where mortar of this kind has been used in large quantities for filling of piers and walls, it has remained unset and unhardened to this day, and some disasters to great architectural buildings have come from this cause.

The Romans ten centuries ago had admirable and strong cements, made from volcanic material. In mediaeval work and in modern work it was common to use the poorest kind of cement, made almost entirely of lime and sand. It was known to modern builders that certain limes which slaked very slowly had the property of hardening under water, and were much stronger when set than ordinary limes. The property of these hydraulic limes was traced to their containing a proportion of alumina and silica, which in burning were brought to a condition in which, when ground and mixed with water, slow chemical combination and crystallisation went on. Then it occurred to some manufacturer to artificially produce this mixture of lime and alumina and silica, and so, about 1850, a new cement called Portland cement was introduced, which has proved of quite extraordinary value in building work. It is not too much to say that some of the great masonry walls I shall speak of presently could not have been built without it. It is immensely stronger and more trustworthy than lime of any kind. Its only fault is its cost. Lately a cheaper cement has been made from slag, almost as strong as Portland cement, with the same quick-setting property, and probably much less costly. It promises to be very valuable to the builder.

Walls.—The object of a wall is to be a fence,—a fence against enemies, like the Great Wall of China, or the early city walls, like those of Tyrins and Mycena or our own London Wall; a fence against weather, like dwelling-house walls; a fence against the slipping of embankments, like the retaining walls of railways; or a fence against water, like some of the great masonry dams. Constructurally the fortress-wall, the house-wall, the retaining-wall, and the dam are very little different except in size.

A wall rests on the soil, and if the soil is weak, its base must be spread out by footing-courses, or a concrete bed must be prepared. But I have not time now to speak of foundations, excepting just this, that a large part of the disasters to walls have arisen from the weakness of the foundation; and one object in giving a good deal of strength to a wall is just this, to enable one part to help another if the foundation under it partially fails.

The walls of Tyrins and Mycena are of large blocks (each so heavy that two oxen were required to move it), packed with smaller stones, but without mortar.

The earliest walls of importance which still exist in Southern Europe are known as Cyclopean, Pelagic, or polygonal walls. In their roughest form they consist of unworked, or nearly unworked, stones of large size, packed with smaller stones. But in the finest Cyclopean walls the stones are worked so as to bed fairly on each other. The stones are irregular prisms, with plane-worked faces on ends and beds. Such walls have no mortar.

Now, it must soon have been perceived that, on the whole, it was more convenient and practical to work the stones to a regular

f wind and rain. But there is in more respects than one a great difference in the way in which an architect and an engineer looks at a structure to be built. The architect always has to consider questions of appearance, of style of decoration as well as questions of stability or of strength. The engineer, on the other hand, pays but little attention to questions of this kind, but laying, on the whole, larger and more severely loaded structures to build, he is obliged to consider much more carefully how his structure may be made safe with the least expenditure of material. There is another difference. The architect follows a profession of great antiquity, and for the most part has to erect structures of a common type and of similar materials. He hardly needs again and again to consider how strong his structures should be. That has been settled for him by long preceding generations of builders. With the engineer it is quite otherwise. He has constantly to construct structures of new types and to work in new materials. He is far less able to rely on precedent and far more often compelled to justify his action on scientific principles.

Now it would be presumptuous in me to lecture to you from the architect's point of view; but there may be some use in looking even at architectural constructions from an engineer's point of view.

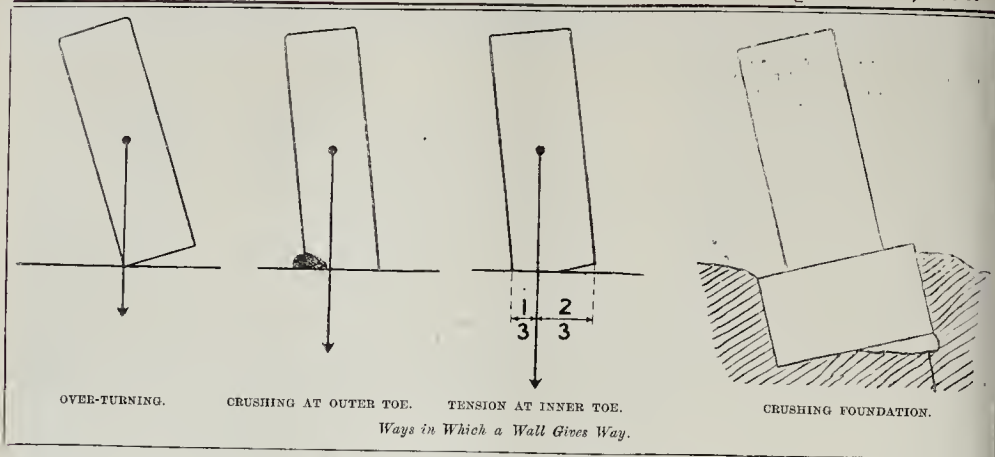
The Materials of which Walls are Built.—Walls are built of natural stones or of artificial stones. I need not say much about either, but I want to point out one or two characteristics important to the builder. Natural stones may for our purpose be classified as *crystalline stones*, such as granite and marble, the former used as a common building stone in Scotland, the latter in Italy—both hard, durable, and strong; *strata stones*, of which roofing slate is the commonest example, and used as building stone in Westmoreland and Wales. These are very strong and durable, but not easily cut to regular forms. Then come the great class of ordinary building stones, which are granular, or composed of grains, with a matrix of cementing material, and these are in two principal classes: the limestones, composed chiefly, sometimes almost entirely, of carbonate of lime; and the siliceous stones or sandstones, in which the grains are of silica. Some of the sandstones, especially when the cementing matrix is chiefly silica, are very durable. This and the facility with which they can be dressed make them very valuable for building stones. When the matrix contains alumina or lime the sandstone is less durable, sometimes quite dangerously perishable. The limestones, again, have a great range of quality. Portland stone, the merits of which Wren discovered, is one of the best and most durable of building stones. Other limestones will not stand the action of the weather, but are valuable for inside work. They admit of beautiful and delicate carving.

The durability of a stone depends partly on its chemical composition, as has been slightly indicated, but more on its hardness and resistance to absorbing water. There is no completely satisfactory test of hardness. But granite resists abrasion about three times as well as the hardest sandstones, and about ten times as well as marble, and about eighty times as well as Bath stone, the soft limestone we use for inside work. The absorption of water by stones is more easily tested. The granites in small blocks absorb less than 1 per cent. of their weight of water; the harder sandstones generally less than 7 per cent.; the limestones something like 8 to 12 per cent. Now, the importance of absorption is chiefly this, that if water absorbed by the stone freezes, its expansion disintegrates the stone; so that in selecting stone, the easy test of absorption gives really valuable information.

There remains one quality of stone which is of importance to the wall builder, and that is the strength of the stone. Almost always masonry is subject only to compression, and hence the measure of the strength of the stone for builders' purposes is its crushing strength. The following table shows some values:—

Crushing Strength of Stone.	Tons per sq. ft.
Granite.....	1,500
Siliceous block.....	800
Sandstone, York Grit.....	700
" Mansfield.....	600
Limestone, Portland.....	600
" Ketton.....	300
" Caen.....	200

I should like you to understand a little more fully what those numbers mean, both as to



prismatic form. So we get what we call ashlar. I give a diagram of a characteristic form of Greek ashlar masonry, the stones in each course being of equal height and fairly bedded with broken joints. The Greeks frequently built without mortar, and the stability of their walls depends solely on the weight of the blocks.

Now, it was not always convenient to find stone large enough to build in that way. Then came the method of building walls with faces of brick or stone and a rubble interior. Bonding stones at intervals connect the two faces. Such a wall may still be a block-work structure depending on gravity for stability.

More commonly, however, and especially in Roman building, the rubble interior is a concrete of strong cement and stone, and may be as strong or stronger than any other part of the wall. The Romans obtained from volcanic ash a splendid cement, and so originated structures in which the resistance to destruction depends not on the mere stability of the blocks, or the resistance to displacement due to their weight, but on the strength of the cemented mass. For the cement makes the wall practically a monolithic structure, and every part helps every other part. Pushing this new principle of building further, the Romans became the originators of rubble work, in which quite irregular stones are bedded in cement mortar, and the structure depends almost entirely on the cohesion of the mortar to the stones and its resistance to shearing and crushing.

You see, then, there are two absolutely different principles of building. In the Greek method, a pile of uncemented stones, each member resists displacement only by its friction due to the weight resting on it. The hedding of the stones is due entirely to masons' skill. In the Roman method the soft mortar makes the hedding without any skill at all, and, when set, forms a solid mass of a strength sometimes little inferior to stone itself.

Bond.—The bonding of stones or bricks, or placing them so as to break joint, is commonly insisted on as very important, and so, no doubt, it is, with the ordinary kinds of weak cementing material which are used. A properly-bonded wall has strength to resist shearing or tearing apart, quite irrespective of any adhesion of the mortar. But without bond it would have no strength. When we come to use really strong cementing material then the importance of bond vanishes. For instance, here is a block of cement concrete which has been crushed. The stones were without any proper bond, and yet in crushing the fracture has run almost indifferently through cement and stone.

Suppose, however, we have no cement, or a very weak cement, how must the stones or bricks be placed? I will consider brickwork as the simplest case. There are three quite distinct objects in properly placing or bonding the bricks. First, by placing the bricks properly any pressure coming on one is distributed widely to the bricks below, so that the inequalities of pressure on the lower and heavily strained courses are reduced.

Next, if the bricks break joint the wall cannot shear without cutting through the bricks themselves.

Lastly, quite apart from any tenacity due to

the mortar, the wall gets a resistance to tearing apart horizontally. In order that the wall may tear apart, the overlapping portions on one side must slide on those below; but in consequence of the weight resting on these overlapping portions there is frictional resistance to sliding.

Let us call the resistance to this horizontal sliding the longitudinal tenacity of the wall. Obviously the longitudinal tenacity of any course of brickwork is proportional to the height of brickwork above it, so that the longitudinal tenacity of the whole wall increases nearly as the square of its height; but the longitudinal tenacity also depends on the amount of overlap, and hence we shall find the longitudinal tenacity varies with different arrangements of the bricks. It is greatest if the courses are all stretchers, for then the overlap is half a brick length. In English bond and Flemish bond the overlap is a quarter-brick length, and they have the same longitudinal tenacity.

But now generally walls have more than one course of bricks in their thickness. Then these courses require bonding together, or the wall will split into two thicknesses, and, indeed, in some Mediaeval walls this has happened. The tenacity across the wall is dealt with in the same way as the longitudinal tenacity. We get the greatest transverse tenacity by putting the bricks all headers. In English bond the transverse tenacity for a 9-in. wall is double the longitudinal tenacity. In Flemish bond the transverse tenacity is less.

In the London Building Act there is a provision that the openings in a wall should not exceed half its area. Now, that strikes an engineer as a somewhat remarkable provision. I imagine there can be no reason for such a rule, except the necessity of preserving the longitudinal tenacity of the wall. Of course, the openings do diminish the tenacity, and that seriously. I have on the wall a sketch of one of the houses in Sicily shaken by the great earthquake of 1857. You see the wall has failed from end to end from imperfect tenacity, and is torn by cracks roughly normal to the direction of the earthquake wave. Further, most of these cracks have elected to pass through the wall openings. Now, a rule which merely takes note of the area of wall openings ignores the conditions which secure longitudinal tenacity altogether. Under the rule, it is possible the wall no longitudinal tenacity at all. Surely, if there is to be a rule of this kind, it should be so framed as to secure a reasonable connexion in the parts of the wall. If for a shop-front, a very large part of the wall is cut away, then the rule should provide that the tenacity destroyed should be made up for by iron, which, in fact, is commonly done.

There is a passage about the bonding of bricks in one of Smeaton's reports which is worth referring to: "There are even some workmen who suppose that nothing more is required of them than that the bricks should be properly bedded and the work level and perpendicular. But the workman who would attain perfection must acquaint himself with the different arrangements of placing (bonding) the bricks so that one part of the work shall strengthen another."

Now you know that Smeaton built the Eddy stone Lighthouse, and that structure was probably the most remarkable instance of perfect bonding ever erected in masonry work. It would have stood the impact of the waves almost as perfectly without mortar in the joints as with it. The courses in plan look more like ingenious Chinese puzzles in stone than ordinary mason work. Now, Smeaton's Lighthouse has had to be removed, not from any weakness in the tower itself, but because the rock on which it stood was being undermined, and a new and larger tower has been erected. I give a diagram which shows the bonding adopted in this case. The dovetail joints are filled with Portland cement, and the tower is probably as strong as a monolith of granite.

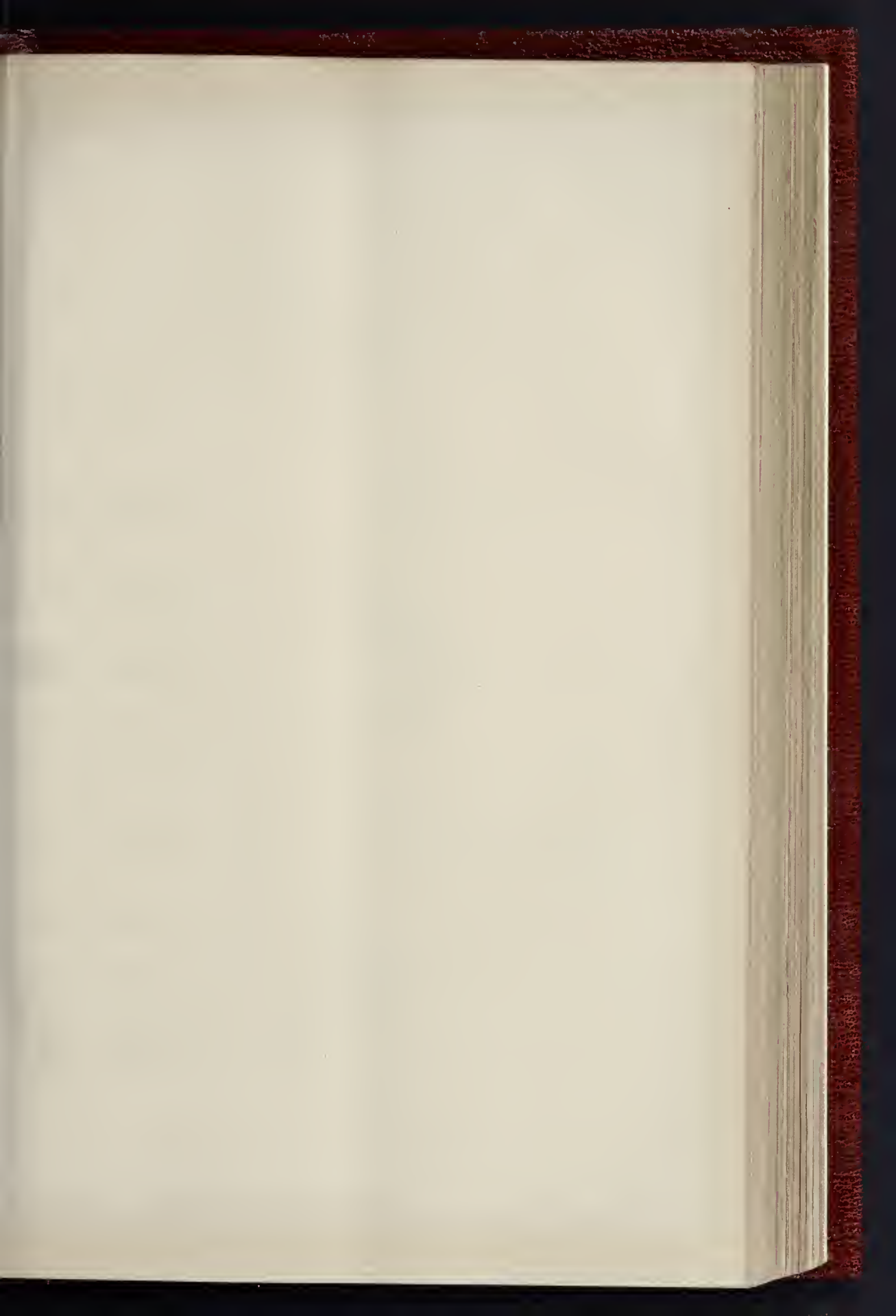
Resistance of Walls to Crushing and Overturning.—Looking at a wall from the engineer's point of view, the first question which has to be considered is how strong it ought to be. Curiously enough, I suppose that the thicknesses of walls required in modern building Acts are not based on any scientific examination of what a wall has to do, but purely on precedent extending back to Roman times. One great French engineer, Rondelet, did (a century ago, nearly) undertake a scientific investigation of the proper strength of walls, and he based his calculations largely on an examination of ancient Roman walls which have stood the storms of eight or ten centuries. There are standing now at Tivoli the lofty walls of Hadrian's palace. Rondelet found that these walls had a thickness of one-sixteenth of their height, and that is not widely different from the thickness which would now be required in strong and lofty buildings.

If a wall has to sustain a vertical load only it is easy to see what in an extreme case its form must be. Some thickness is required at the top for constructive reasons, and that thickness will be sufficient for a distance below the top. But at some distance below the top we shall come to a joint where the stress due to the superincumbent weight reaches the safe working limit of stress in the material. It may be one ton or five tons per square foot, according to the quality of the materials and the factor of safety we wish to allow. Below that level the wall must be splayed out, and we may so arrange the splaying that the stress on every horizontal section is the same. All the material will be at its working limit of stress, and the wall will then be of the most economical form possible.

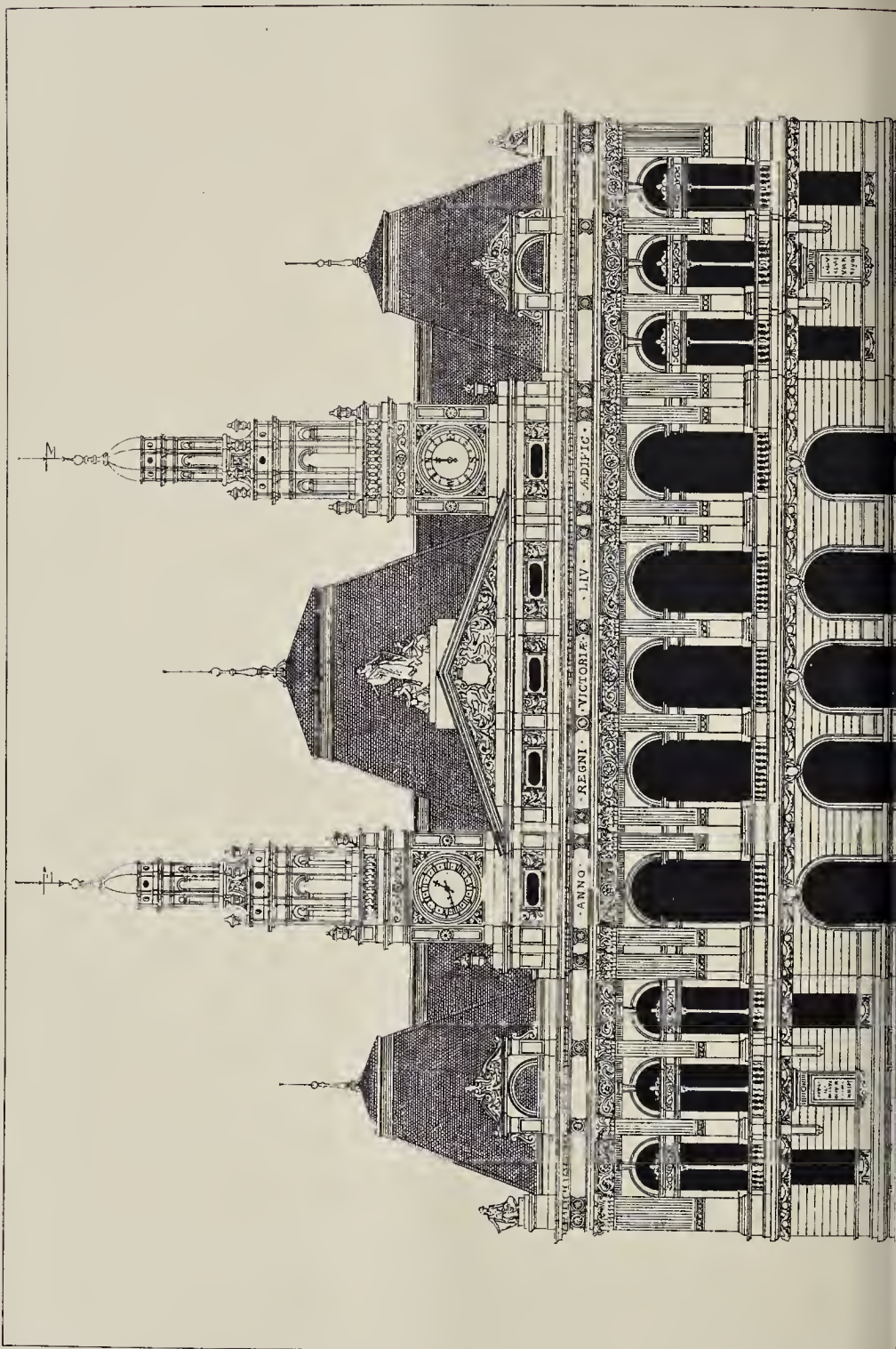
But generally speaking the vertical load is not the most dangerous of the straining actions to which walls are subjected. If walls give way it is not often by direct vertical crushing but by some kind of overturning.

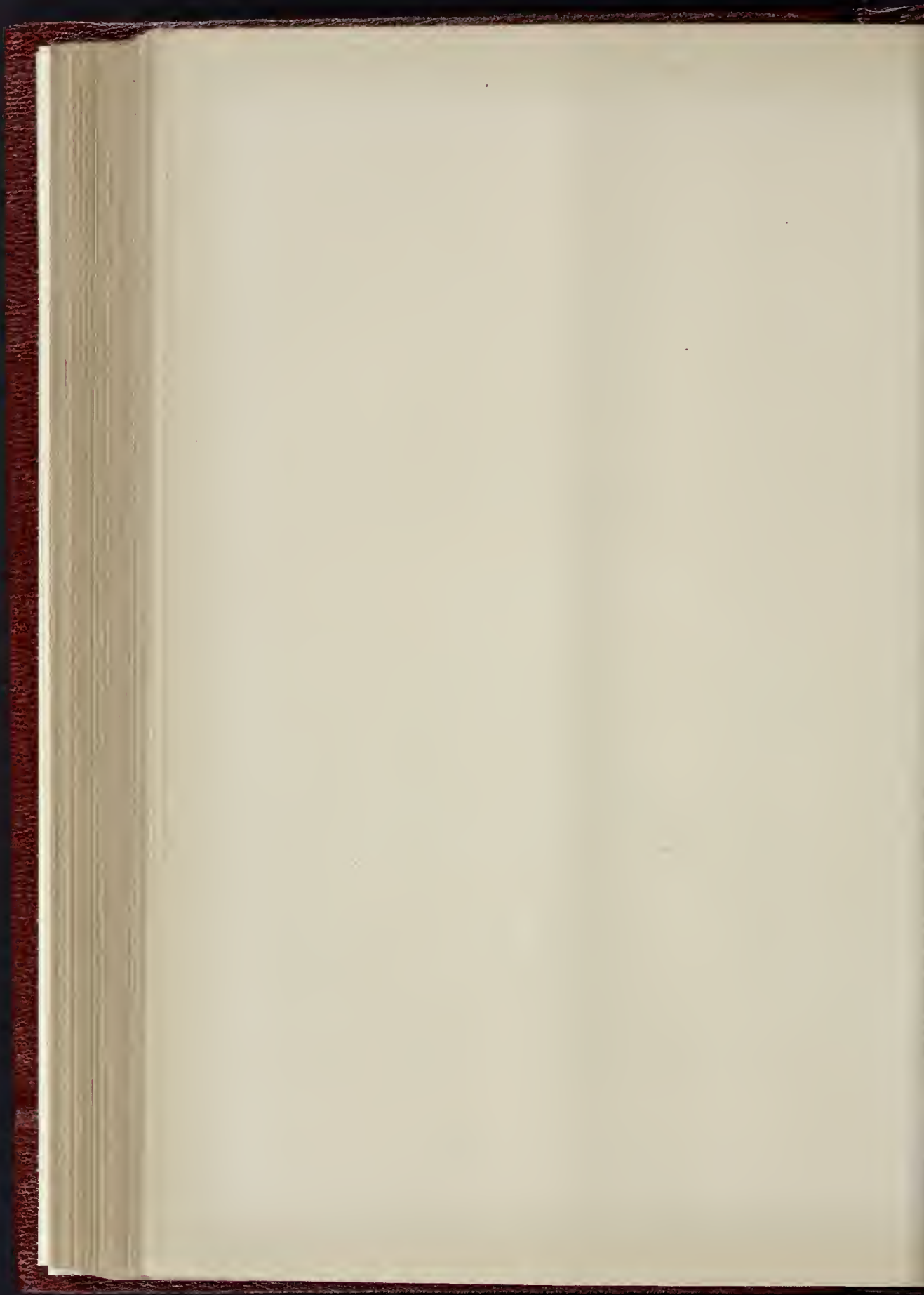
In lofty buildings in exposed positions, the wind is the most dangerous force to which a wall is exposed. In this country wind-storms giving pressures of 30 lbs. per square foot on vertical surfaces in exposed places occur every year, and in specially-exposed places a wind-pressure of 50 to 60 lbs. per square foot has been registered. Such a lateral pressure tends to overturn a wall, and is the most dangerous action to which it can be exposed.

The precise way in which a wall gives way by overturning should be understood. In some



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ses the pressure on the toe of the foundation may cause the foundation to yield. It is easy to provide against that by giving adequate width to the foundation. Generally the resultant pressure on the base of the wall is kept in the middle half of the width of the foundation. In other cases the wall gives way by opening a horizontal joint and overturning.

In most books, the overturning of the wall is treated as a question of stability. The wall is regarded as perfectly rigid, and a calculation is made of the force required to make it turn over on one of its edges. The wall is taken to be stable enough if it would require from two to two and a-half times as much force to overturn it as the greatest force likely to come against it.

The wall would be just on the point of overturning if the resultant of its weight and the horizontal pressure on it just passed through one of its edges. To put it another way, the wall is just on the point of overturning if the resultant force does not deviate from the vertical by half its thickness. For safety, the actual moment to which the wall is subjected should not exceed half or two-fifths of this.

Now against this, as a practical rule, I have nothing to say. It provides, in most cases, stability enough. But it assumes a mode of overturning which, in lofty structures, could not possibly occur. The material of the wall is not strong enough to support a wall on its edge as supposed. Before any such overturning could begin the wall would crush near the edge. Hence, in lofty walls, it is much more rational to design the wall for some safe limit of crushing pressure than for some moment of overturning.

There is another accident in walls which needs to be provided against, especially in walls which have to resist a pressure of water. Supposing we cannot depend on any great adhesion of the mortar to the stones, then, in most cases, before there is any tendency to crush the one edge of the wall, the joint opens at the other edge. If the mortar is weak the joint opens at any tension occurs, and there will be tension in the resultant pressure at a joint deviates by as much as one-sixth of the thickness of the wall from the centre of the joint.

Hence, to sum up: If the resultant pressure deviates by half the thickness of the wall from its centre the wall must overturn, and the edge will crush with a less deviation than this. Further, the joints will open on the tension side unless the adhesion of the mortar prevents it, when the deviation is only one-sixth of the thickness of the wall.

Now, if these principles are applied to determine the stability of ordinary walls of buildings, I think most architects will be surprised to find how small the stability of their walls is. No doubt, in towns the wind-pressure seldom strikes against buildings with any great force. No doubt, also, most ordinary buildings have cross-walls, which add enormously to their stability. For ordinary purposes the ordinary proportions given to walls are, obviously, sufficient, for very few buildings fall down, and, when they do, some very obvious cause of bad material or weak foundation is almost always discoverable. But buildings have to be put up in exposed places, and sometimes great lengths of wall are built without support from cross-walls, and in such cases the architect should be aware of the risk he runs.

I have calculated out what may be termed a limiting case, a wall of indefinite length, standing alone, without support from cross-walls or floors.

The wall is 70 ft. high, and of at least as great thickness as any ordinary mill wall. I have supposed that besides its own weight it has to support a horizontal uniform wind pressure. I have calculated the wind pressure necessary for each of the stories to bring the walls to two conditions,—first, the wind pressure which would cause the resultant pressure on a joint to deviate one-sixth of the thickness of the wall from its centre. I think an engineer would take that condition as the limiting condition of safety. Secondly, I have calculated the wind pressure which would make the resultant pressure at a joint deviate by half the thickness of the wall. It is certain that the wall must overturn with a less pressure than that, unless (what is very improbable) a considerable adhesion of the mortar could be relied on.

Now the pressures arrived at are rather strikingly small. It seems that the wall would

become unsafe with less pressure than 5 lbs. per square foot, and must certainly overturn with 12 lbs. per square foot.

Mr. Arrol gave in evidence that every temporary work even in connexion with the Forth Bridge was braced so as to resist a wind pressure of 40 lbs. per square foot. Bearing this in mind, the stability of the wall to stand alone certainly seems inadequate.

Now, if I were really going to investigate the stability of a building, I should have to go a step further. It would be necessary to consider whether the cross walls gave any support, and whether the floors were capable of transmitting any of the pressure to the back wall.

As to the cross walls, I may be wrong, but I fail to see that when the cross walls are at distances so great as 100 ft. apart they can render any effective support to the middle part of the wall.

As to the floors, the case is somewhat more difficult. But I suppose, on the most extremely favourable assumption as to the action of the floors, they could only be assumed to transmit half the pressure to the back wall. If they did as much as that, the stability of the wall would be doubled. It would carry twice the wind pressures tabulated above. But even then the stability of the wall would seem somewhat too small to an engineer.

It can hardly be hoped that the floors will do as much as this. They are not built with any object of supporting the walls, but for a quite different purpose. If they are to fulfil that function, they should be designed with that end in view. Next, the long, elastic, and flexible joists can only transmit pressure to the back wall in proportion to the amount of the yielding of the front wall, and any yielding means a diminution of stability. Lastly, the load of the floors must itself in general be so applied to the wall as in general to diminish rather than increase the stability of the wall. If the weight of the floor comes on the inside edge of the wall, it may very seriously diminish the stability.

Most buildings in towns, no doubt, are never subjected to any appreciable wind pressure at all. They are screened by neighbouring buildings from any direct impact of the wind. All I want to draw as a moral from this discussion of wind pressure is this: architects should bear in mind that wall thicknesses which may be amply sufficient in the ordinary case of buildings in towns, may prove insufficient in more exposed places, and especially when a building has abnormally little support from cross walls. Further, I should like to see building rules take note of the fact that this cross support is important. All rules I have seen make the thickness of a wall depend only on its height. With walls as thin as those commonly built, it seems to me that the thickness should also increase when there is a great distance between the cross walls. Church architects do act as if this were their principle. They do make a much larger use of buttresses than is common in civil architecture.

Most of you must have heard of a lamentable disaster which happened at Glasgow in November last. A large mill, in course of erection, was blown down, and many lives were lost. The mill had the joists of the floors on, but not the floors, and was not roofed. It was probable, therefore, that it was exactly in the condition least favourable for resisting wind pressure. Not only was the wind directed on to the face wall by neighbouring buildings, but also, as Mr. Arrol pointed out, probably the wind found access through the window openings, and produced some, though probably a small, pressure on the back wall. It was given in evidence in the inquiry before Commissioners that the walls were of rather more than usual thickness, that they were well and strongly built, and that in all respects the owners of the mill had taken care to have a strong, well-built, carefully-designed mill. Now, notwithstanding this, the mill fell with disastrous consequences, and that in a storm of wind which, according to the evidence, was not of exceptional fury. There is no doubt, I think, that, like the Tay Bridge, the mill was blown down.

Reservoir Dams.—I now come to deal with walls of another kind and of a greater size, but strictly walls, and performing essentially the same functions as other walls.

In all countries, and for a long period, it has been necessary to husband the water-supply derived from the rainfall, by storing it in the wet period of the year, for use during the dry period; or to reserve water falling in cycles of

wet seasons, to use years after in cycles of dry seasons. Sometimes the object has been the storage of water for town's supply, in other cases the storage of water for irrigation. In either case very large quantities of water must be stored, and the mode of storing it is much the same.

In some valleys draining a sufficient catchment basin an artificial lake is formed by damming up one end of the valley by a wall of earth or masonry. The water accumulates behind the dam, and can be drawn off by suitable appliances at the times when it is needed. That is the simple idea of water storage. To carry it out under the varied condition imposed by the resources of generations of engineers.

Anyone who will look at a tolerably large-scale map of Southern India will find that the river lines look like necklaces of beads. All along every river course chains of storage reservoirs or tanks were constructed for irrigation purposes by the ancient owners of the soil; for without the irrigation water in the dry, hot season, the soil was almost uncultivable. Thousands of these tanks dot the map. In course of time many of these tanks silted up, and it has been one of the greatest tasks of the English rulers of India to restore these old tanks, and to bring abandoned land again under cultivation.

In Northern Europe, and in quite modern times, the aggregation of the population in large towns has caused also an urgent want of regular supply of large quantities of water for drinking and sanitation, and the increasing pollution of the rivers has forced us to construct large numbers of storage reservoirs precisely on the plan of irrigation tanks.

In this country it was till lately the custom to form the storage reservoir by throwing a huge earth-bank across the valley from side to side. Such earthen dams are really walls of a peculiar type. Some of them are from 100 to 120 ft. in height, and one-eighth of a mile to half a mile in length. They are not adapted for moist climates and for positions where a rock foundation is not attainable. But they are subject to two very serious kinds of danger. The water may creep through them, and if it does, it very soon enlarges its passage-way in the loose material and destroys the dam; or the water, accumulating in some violent rain-storm, may overtop the bank, and if it does, it very soon cuts down a gap which sets the waters free. Disasters of the most serious kind have happened in both these ways.

In 1864 the Dale Dyke reservoir burst at Sheffield, and 11,000,000 cubic ft. of water rushed down the valley, destroying an enormous amount of property and causing the loss of 200 lives. In that case the water crept through the dam and undermined it. Only last year the Conemaugh Dam in Pennsylvania burst, the water overtopping it and cutting a gap. In that case 3,000 lives were lost. There have been other cases.

Now, there are cases where only an earthen wall can be constructed, and for heights up to 100 ft. no doubt, with care and foresight, an earthen dam can be made safe; but it is not wonderful that engineers should have sought for some securer way of doing battle against the enormous pressure of the water. Earthen dams are built of cheap materials, it is true, but as they are loose banks, with no coherence, an enormous mass is required. On the other hand, a stone wall is much dearer per cubic foot, but if much less material is wanted it may be cheaper than an earthen dam. At any rate, it is to stone walls that engineers have looked as safer and stronger than earth banks.

The first condition of a stone wall to resist water pressure is that it should be free from fissures. But a high wall cannot be free from fissures if it is built on a yielding foundation, or a porous foundation through which the water can find a way. Hence masonry dams are only built on rock foundations. We now believe that on a sound rock foundation reservoir walls can be built which may remain uncracked and undecaying for centuries, and may be almost as permanent as the hills.

Masonry dams of quite gigantic size were built in Spain two or three centuries ago. Naturally, the Spanish engineers were the first in modern times to construct a masonry dam. A great masonry dam was built at Puentes in 1802, 150 ft. in height. Unfortunately, it was built on piles; it was undermined when the reservoir first filled, and broke, causing a loss of 800 lives. Probably the disaster at Puentes

made engineers reluctant to build stone dams for some time. However, in 1858 the French Government was directing attention to storage of water, and it became necessary to construct a dam on the Euren river, 165 ft. in height, in a narrow gorge. The engineers decided to have a masonry dam, and for the first time investigated scientifically exactly in what form such a dam should be built. The older dams were trapezoidal, and it is easy to see why such a form should be chosen.

If, as is natural, we look chiefly to the condition of things when the reservoir is full, we see we have two forces to deal with—the horizontal water pressure tending to overturn the dam, and the vertical weight of the masonry tending to prevent overturning.

Suppose the weight of the masonry is double that of the water, and the base of the dam three-fourths its height, then in a triangular dam the resultant pressure on each joint comes just within the middle third of the width—a condition we have seen to be one of the conditions of stability. Now the triangular form is not convenient, but the trapezoidal is an approximation to it.

Liverpool was one of the first towns to obtain power for the supply of water by the Municipality, and very fine reservoir storage works were constructed at Rivington between 1852 and 1857. Then Liverpool adopted constant-supply in 1864; however, in a long drought, constant-supply had to be suspended, and at one period in the next year the available water in the reservoirs only amounted to ten days' supply. Various expedients were adopted from that time to this to make the supply adequate for daily requirements till a new source of supply could be found and the necessary works carried out. The most important remedial measure was the introduction by Mr. Deacon, the Water Engineer, in 1873, of a system of measuring the flow in the mains of each district by recording meters termed waste-water meters. As soon as systematic observations were made, it was discovered that a quite enormous waste of water was going on in consequence of leaks in the mains and faulty house-fittings. By preventing this waste, without restricting any legitimate use of the water, the supply has just been made adequate up to the present time; but Liverpool has more than once been on the verge of a water famine, and a new supply was a matter of the most urgent necessity.

Now in these times there is only one way, in most cases, of obtaining a supply large enough for a town, and pure enough to be healthy. This is, to seek the water on some remote hill valley, where the rainfall is abundant and the streams unpolluted. Many sources of supply were examined. The English lakes, Ulleswater, Howeswater, Windermere, and Bala Lake in Wales were all considered. But a natural lake is not always a favourable source of supply. To get the water out of it you must tunnel beneath its bed, and more than this, you have generally the need to raise its level and increase its storage capacity by damming up its outlet. Further, round most lakes population has aggregated, the land is valuable, and the drainage is no longer unpolluted. Other districts were considered, but finally a lonely valley in mid-Wales was selected, down which flows the Yrwyd, one of the tributaries of the Severn. The valley is an old glacier-hed lying 750 ft. above the sea, and high enough to send its waters to Liverpool, seventy miles off, at a pressure then sufficient to command all parts of the town. The moorlands rise to a level of about 2,000 ft. all round the valley. The rainfall is copious and the land uncultivated. The rocks are slate, interspersed with beds of very ancient volcanic ash. Here it was that the Liverpool Corporation decided to create a new lake as large as Bala Lake itself by damming up the outlet of the valley. The dam, 1,172 ft. in length, has been built. During the past year the waters were allowed to gather. A quite beautiful lake, five miles in length, occupies the old dry valley-bottom. The small village of Llanwddyn, the only one in the valley, is submerged. The pipe-line is laid, seventy miles in length, and when, early next year, the tunnel under the Mersey is finished, Liverpool will have an abundant supply of the purest possible water. The whole cost of this great municipal work reaches nearly two millions, and as a great engineering enterprise it takes rank with the Forth Bridge and the Manchester Canal—monuments of knowledge and skill and organization and enlightened expenditure. The area of

lake is 1,121 acres; the volume of water is 12,000 million gallons; the greatest depth of water, 84 ft.

Now, of the scheme of water-supply it is not for me here to speak in detail; but the great dam which closes the valley and forms the lake is strictly a masonry wall. In some respects, it is the greatest of all these great masonry dams hitherto built. It is not quite so high as the Euren and Villar dams, nor quite so wide of base as the Vervier dam; but it is much longer than these, and has a much greater cube of masonry; and it is the first great masonry wall of this kind built in this country by English engineers.

Then, if masonry is to be used, what kind of masonry should be adopted? Should it be a great block-work structure, the ashlar blocks set in Portland cement to make the joints watertight? Well, I suppose it would have been impossible in any reasonable time, at any practicable cost, to hew the rough but hard and strong slate rock of the valley into ashlar blocks. Had it been possible it is probable it would not have been best to do so, for a blockwork mass has a regular system of thin joints, which form planes of weakness throughout the mass. It is just possible that by some settlement fissures might be formed, taking definite directions along these joints and leading the water into the core of the work. A system of rubble work, with its irregular joining, seems liable to no such danger. Hence a system of rubble masonry is adopted in all these great masonry dams, the structure being rendered almost monolithic by hedding the rubble stones in the strongest cement.

At the Yrwyd the masonry is really of a new type. It is rubble masonry of quite gigantic blocks. The limit to the size of the blocks is determined by the power of the lifting machinery at the quarry and on the work. With steam cranes it was possible to handle and set blocks of seven or eight tons' weight. Each block, selected with quite curious skill by the mason to fit its neighbours, was dropped into a soft bed of cement-mortar, and every accessible crevice packed with smaller stones and concrete. On the faces only of the dam the blocks are squared.

The slate rock on cubes carries 800 tons per square foot. The concrete in cubical blocks 180 tons. As the concrete is in comparatively thin layers between the cyclopean blocks the strength of the masonry of the dam is probably not inferior to that of slate rock itself.

Before beginning the dam an immense trench was opened across the valley, the whole of the alluvial and glacial deposits being removed and the underlying rock exposed. The greatest part of the mass of the dam is thus below ground. The form is not widely different from the theoretical form required. The height from the rock foundation in the middle of the dam is 127 ft., and the width at ground level 101 ft. Two great culverts are constructed through the dam. Through one a stream of 10,000,000 gallons a day flows to feed the Severn, while the water-supply of Liverpool, which may reach 40,000,000 gallons a day, is taken through a tunnel in a lateral hay of the lake.

A very great danger for most reservoir embankments is the discharge of surplus water if a flood occurs after the reservoir is full. For most reservoirs a by-wash or channel is constructed to lead away the surplus water down the hillside to a point below the dam. But many have been the disasters due to insufficient provision for discharging floods. The Yrwyd dam forms an immense weir over which surplus flood-water will flow, finding its way harmlessly in a comparatively thin sheet down the outer face of the dam to a water cushion below.

I have given some particulars of the strength of masonry structures. Under no conditions can the crushing stress in the Yrwyd dam exceed 9 tons to the square foot. In fact, the crushing stress is slightly greater on the inner toe when the reservoir is empty than on the outer toe when the reservoir is full.

The masonry dam alone,—apart, that is, from the pipe-line and service reservoirs and other great works which are necessary for the conveyance of the water,—has cost over half a million. In no other masonry work has the true principle of rubble building, the using of a cement so strong that the structure becomes practically a monolith, been so rigidly carried out.

A visitor with large experience of masonry work made this report about it:—That the

Liverpool people had in this dam a piece of masonry not surpassed for solidity by any masonry in the world.

Illustrations.

SHEFFIELD MUNICIPAL BUILDINGS. COMPETITION DESIGNS.

WE publish this week the elevations and principal plans of four of the designs sent in for the first competition for the Sheffield Municipal Buildings, all of which were specially mentioned in our review on January 27 last of the designs that were exhibited. We have others to publish at another time. We have considered it would add to the interest of the plans to publish several together for the purpose of comparison.

The first one is that by Mr. R. A. Briggs. We quote the following passages from the report which accompanied the drawings:—

"It will be seen from the plans and sections that, although the present building will be quite complete as designed, still the future extension can be added without any detriment to it.

The fall in Surrey-street has been made use of so that a lower ground floor is obtained towards that street and Norfolk-street, and the Health Office Department has been placed on that floor, the sill of the windows of that department being at least 2 ft. above the level of the street.

No lower has been shown on the accompanying design, as the author desires it to be distinctly understood that the building as designed can be built well within the sum mentioned, viz., 80,000l., but he desires to point out that a tower could be easily added without any detriment to the plan, but rather with a considerable enhancement to the building. It may be mentioned that a design for such a tower has been prepared, and the arrangement of the plan will allow of its being added over the grand staircase at an additional cost of 7,000l., without any alteration to the plan being necessary.

The principal entrance leading to the hall has been placed as suggested toward Pinstone-street, having three entrance floors, inside of which swing doors will also be placed to prevent draught. The height of this hall will be 17 ft., with steps up to main ground-floor, this arrangement giving a very imposing effect, and at the same time obtaining greater height for the hall.

The entrance hall gives immediate access to the vestibule where the two grand staircases are placed for the Mayor's apartments and a council-chamber.

Two general entrances have been placed, one in Norfolk-street and one in Surrey-street. There is also an entrance in Cheney-row, with a service staircase for the kitchens and workmen. It is proposed that a roadway be made to this entrance from Pinstone-street.

The council-chamber on the first-floor has been placed with windows looking into the street, being the position most favourable to the essential condition of quietness for the room. The author believes that ample light will be obtained through the windows looking into court, but a ceiling light is also provided. A gallery, reached by the general staircase towards Surrey-street, is provided, and there is also a small subsidiary iron staircase inside the room.

The ante-room, with circular glass dome, gives access to the council-chamber, and a side passage is also provided, in order that Councillors may not be obliged to enter always through the ante-room.

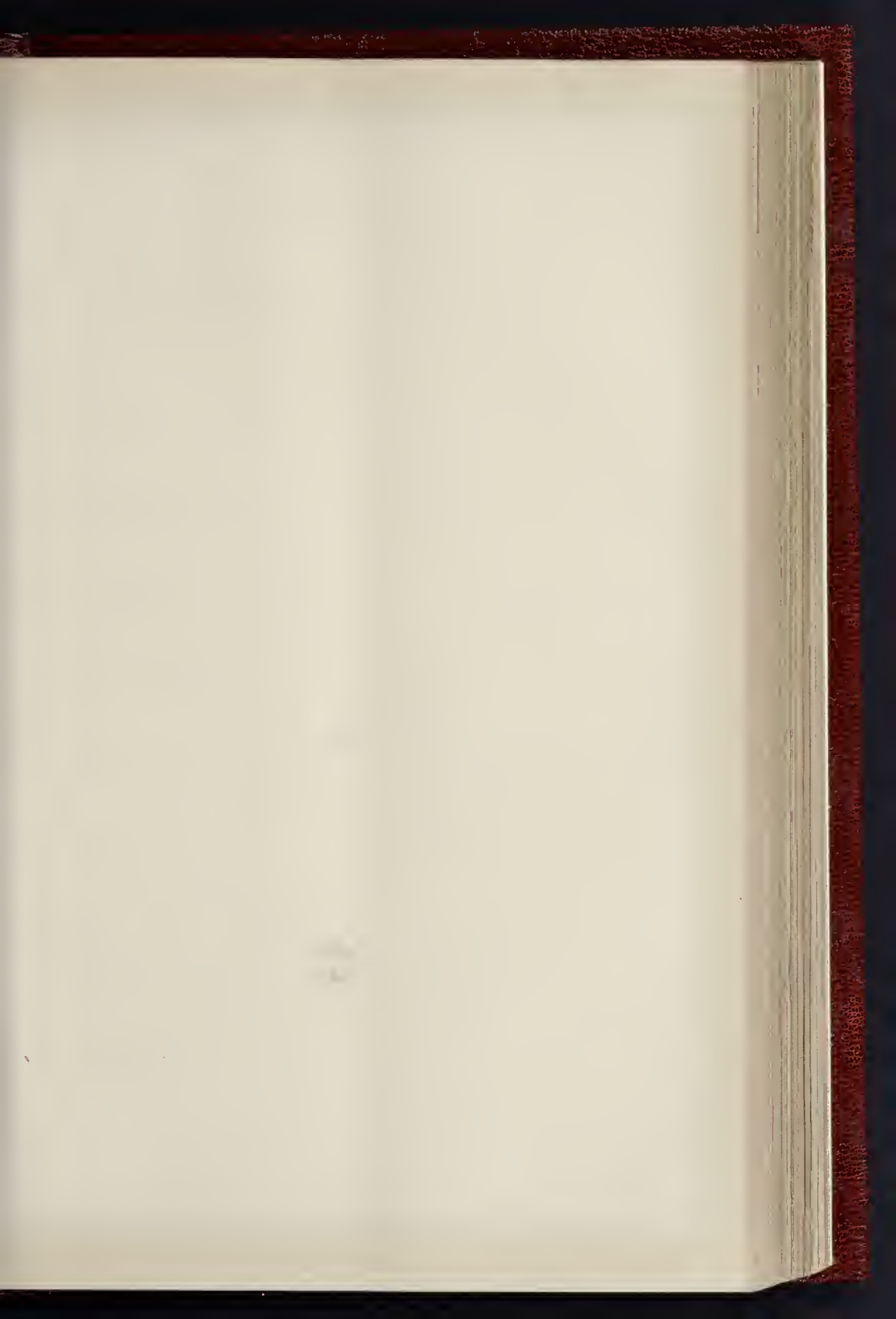
Two cloak-rooms are placed next the rooms above mentioned, being easy of approach to the council-chamber and the Mayor's apartments. Lavatories are provided in these cloak-rooms, and urinals might also be placed in one of them if desired. A small cloak-room, with lavatory and w.c., is also provided for the private use of the Mayor.

The reception hall, dining room, and Mayor's parlour are placed *en suite* with the Pinstone-street, so that they may be used together if desired, and patent sliding doors, 4 in. thick, and filled with slag-wool as a non-conductor of sound and heat, will divide them into three separate rooms when necessary.

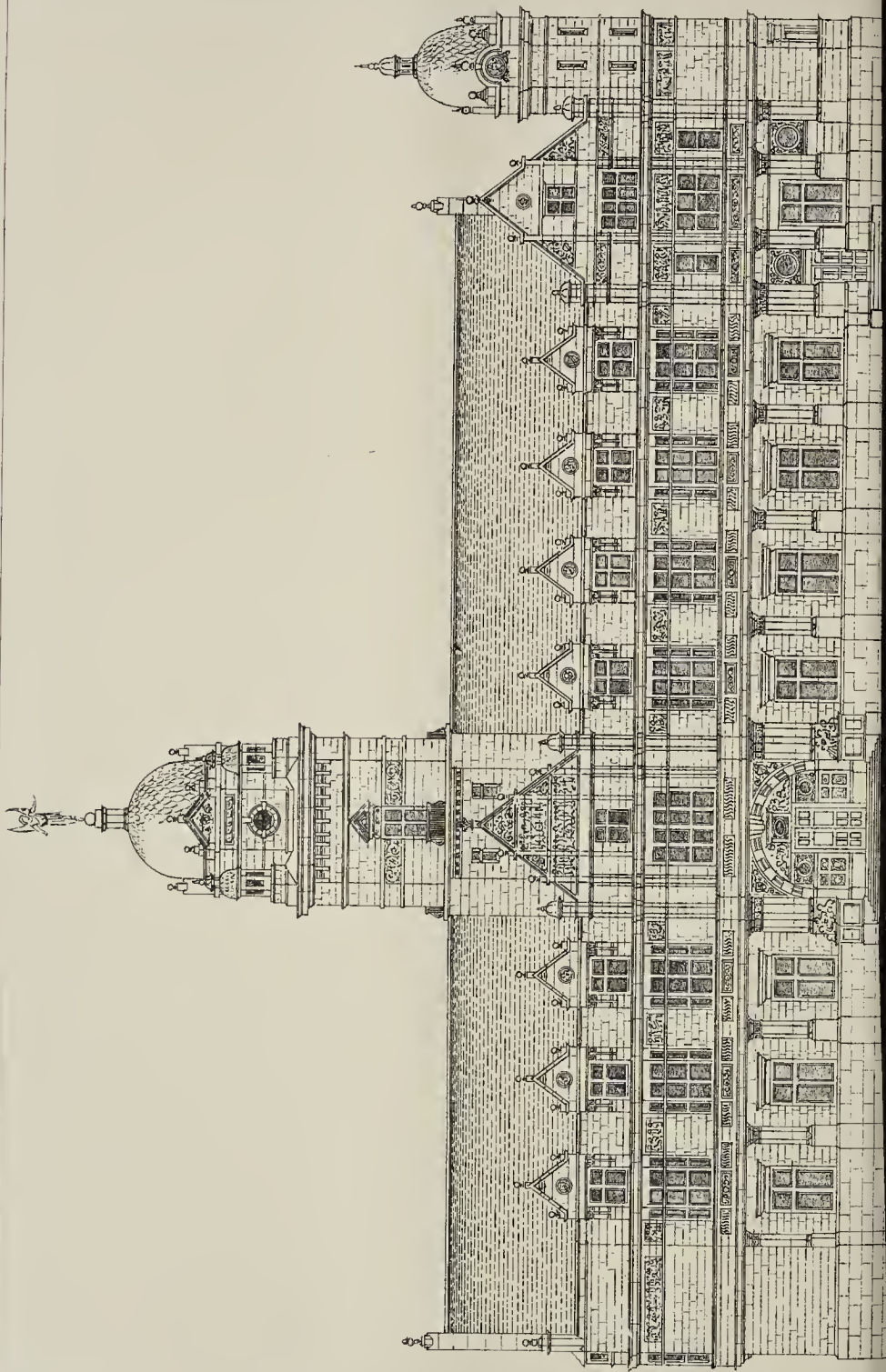
The Borough Accountant's office is placed in the position which is most easy of access and central in position, corridors giving easy approach from any entrance. The staircase (towards Cheney-row) gives ready access to the wago-room on the basement.

The two large public lavatories, being well lighted, have been placed at the corners of the front towards Pinstone-street, with entrances direct from the Surrey-street and Cheney-row, these being considered the most convenient positions. This arrangement will in no way interfere with the appearance of the building.

The arrangement of the plan has been studied so that every department may be separate and complete in itself, but at the same time convenient to the other departments; as, for instance, folding doors could easily be placed to shut off the Mayor's apartments from the Council Chamber and likewise these rooms from the Town Clerk's offices.



THE BUILDER, MARCH 29, 1890.





— FIRST FLOOR PLAN —



— GROUND FLOOR PLAN —

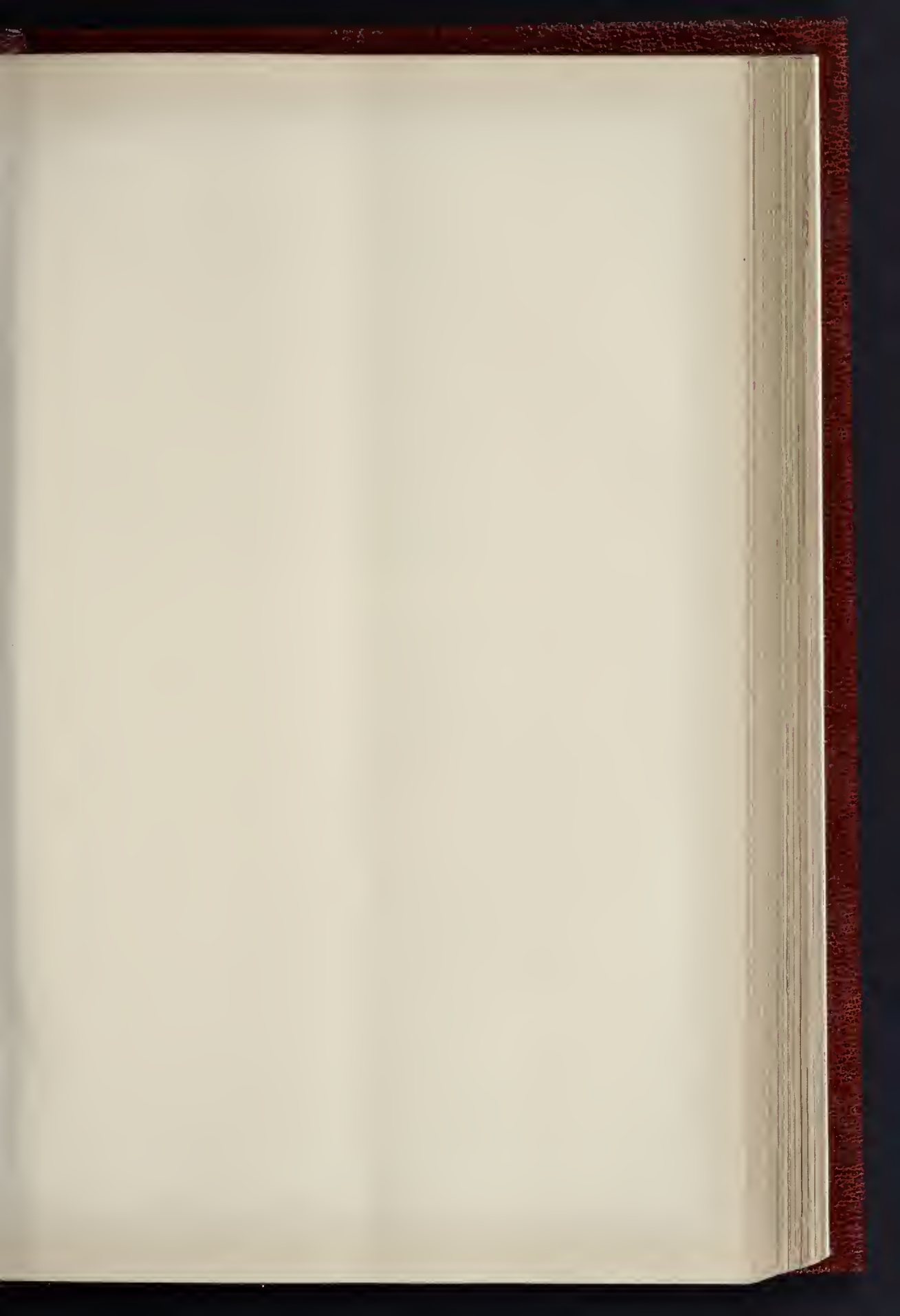
SCALE OF FEET

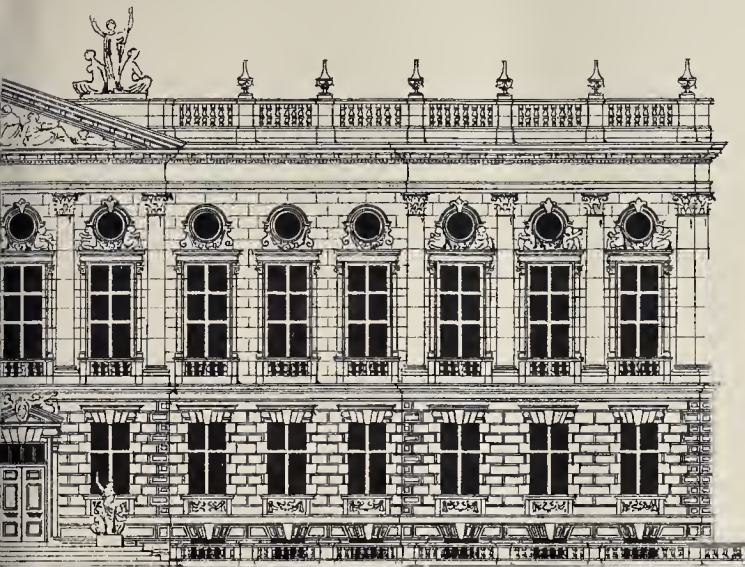


PHOTO LITHO SPRINGER & CO. 22, N. AVONDALE CHAMBERS, ST. LOUIS, U.S.A.

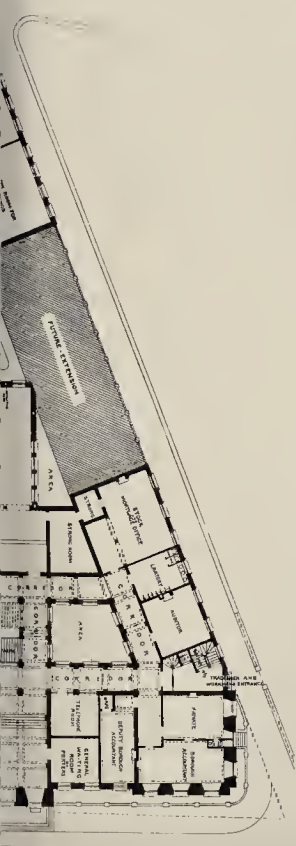
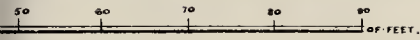
SHEFFIELD MUNICIPAL BUILDINGS COMPETITION; DESIGN SUBMITTED BY MR. W. CAMPBELL JONES, A.R.I.B.A.







STONE STREET.



FIRST FLOOR PLAN.

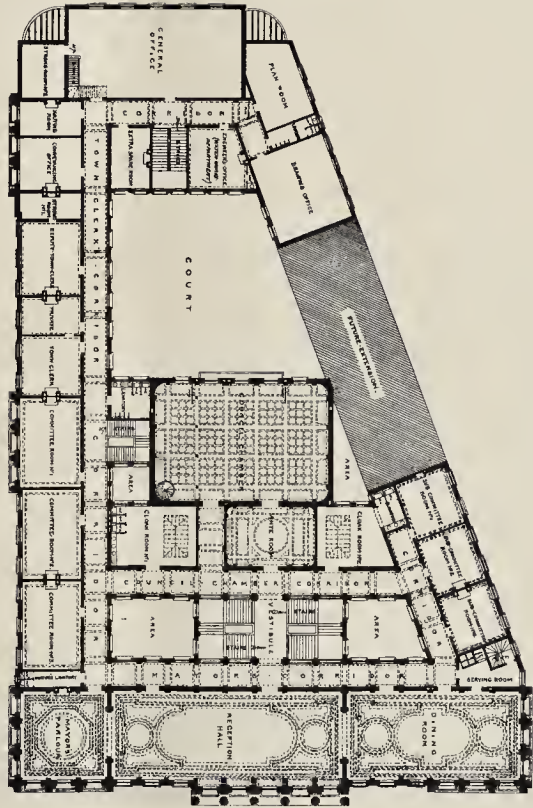
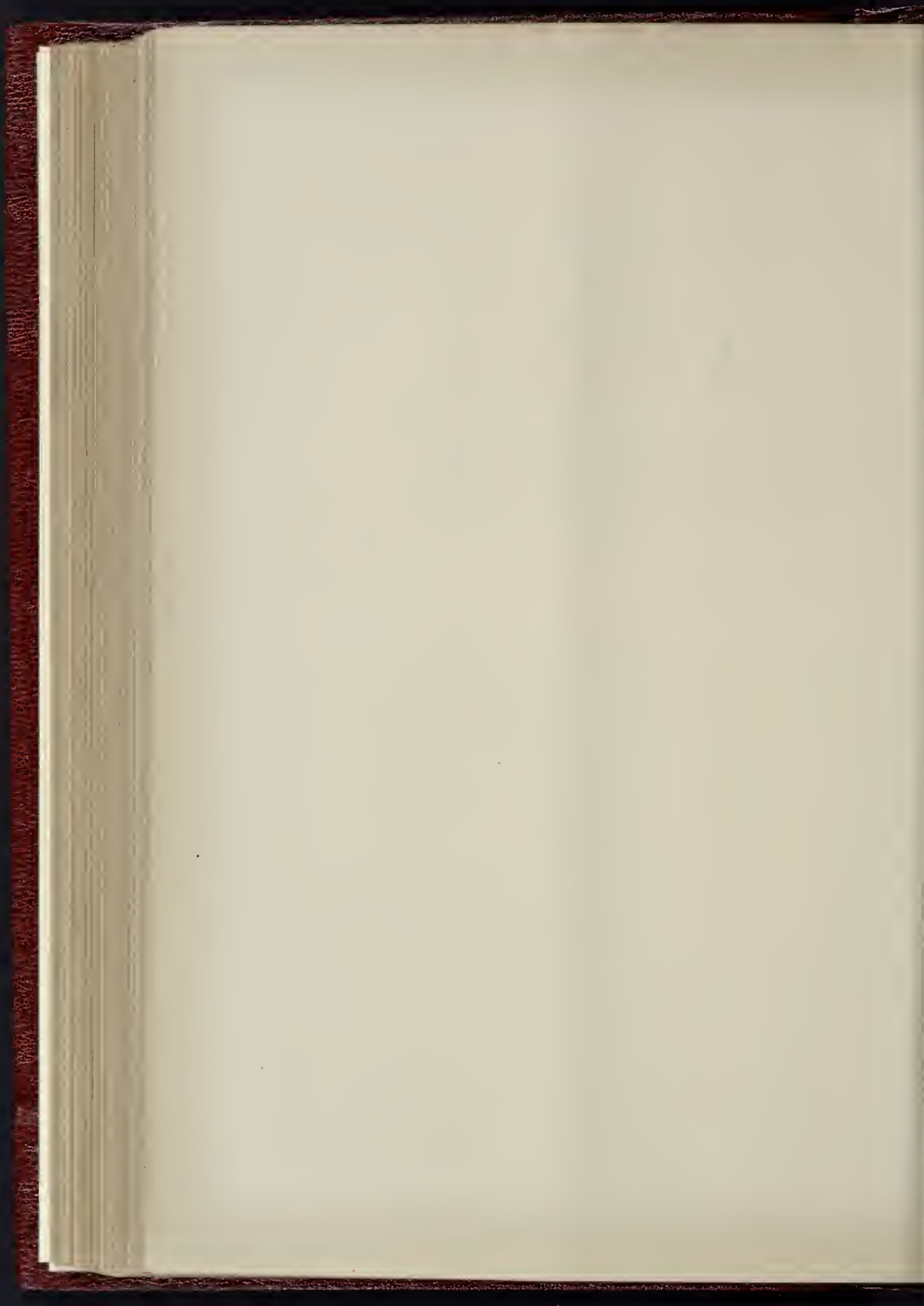


PHOTO LITND SPRAGUE & CO 22 MARKING LANE CANTON 5 LONDON E.C.



the warming and ventilation has been specially considered in this design. Fireplaces have been provided in all the offices except the large general offices, which, together with all the corridors and offices where fireplaces are not shown, will be heated by hot water, although open fireplaces may be introduced as features in dining-room and reception-hall if considered desirable. It is proposed to provide inlet ventilators to all offices and corridors heated by hot water, and there to be extract ventilating flues to all the large offices. The Mayor's apartments and the Council Chamber will have extract flues or shafts in roofs, Boyle's extractors will be fitted to same. The offices will have 9 in. by 6 in. inlet and outlet flues, and outlet ventilators will also be placed in all corridors, &c. It is proposed to light the interior of the building by the electric light, space heating apparatus being provided in the basement. The building will be built of brick and faced with the best local stone.

The design next in order is that by Mr. W. Appell Jones, who, like Mr. Briggs, makes his plan follow the lines of the site almost entirely. In his report he says:—

In order that the best possible arrangement of giving facility of access to the various departments might be obtained, it has been considered desirable to cover the whole site with buildings, leaving, however, spacious courts for light and air between the blocks.

A portion of the building at the south-eastern end of the site is shown as being raised up to the level of the first-floor ceiling only, and would be covered by a roof with a balustrade towards Cheney-row. It is, however, future extensions become desirable, this portion can be raised for one or two stories without any detriment to the appearance or comfort of the existing buildings.

The disposition of the rooms upon the various floors suggested by the Corporation, has been carried out with the following variations:—

Second Floor.—A portion of the Health Office has been placed here in preference to the first or second floor, viz., the Cleansing Inspector's room, his assistant, and four rooms for clerks, as it is considered desirable that the second floor should extend the whole length of Surrey-street for structural purposes.

First Floor.—Every room required on this floor has been provided, except the rooms mentioned above, but no rooms asked for on other floors have been put upon this floor.

Ground Floor.—Every room asked for on this floor has been provided, in addition to these, a strong room belonging to the Surveyor's department, the pay room and the wages counting room of the Borough Accountant's department, and two rooms in the Engineer's department, all suggested in your particulars to be in the basement, have found a place upon this floor.

Upper Lower Ground Floor.—Every room asked for has been provided here, except the abovementioned ones, moved to ground floor. The cubical contents of the building, calculated in the bottom of the footings, and including all eaves, projections, &c., is 1,937,400 cubic ft.

The entrance to the Council Chamber for the first time is from Surrey-street, and by the use of lifts is practically cut off from the rest of the building.

Over the Mayor's parlour on the first floor is a mezzanine gallery, which would be very useful for a band gallery or for the use of ladies, and would be an effective feature in the rooms.

The public lavatories on the lower ground floor have been carefully arranged to secure good ventilation, and a window is given to each w.c.

The warming of the offices of principal officials should be by open fireplaces; for the clerks' and other offices a system of low-pressure hot water is suggested, circulating from the boiler-room to the W. angle.

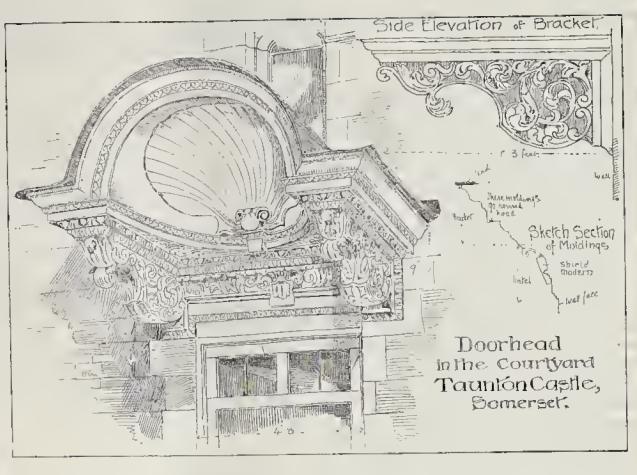
For ventilation of Council Chamber a special table is provided, 4 ft. in diameter, and in the reception-rooms the foul air would be collected into the roof and got rid of generally over the building. Fresh inlets would be provided about 5 ft. 6 in. above floor.

No principal offices would be provided with open-air stoves.

Materials: Exterior.—All walls visible from street to be faced with Ancaster stone from Messrs. Hey's quarries,—a stone well qualified to withstand a smoky atmosphere. The base or plinth of building towards the principal streets to be in Portland granite, but not polished. The interior walls to have facings of a hard white pressed brick, but dressings to be in stone. Roofs to be covered with best Westmoreland green slates. The design has been specially designed with a view to the judicious introduction of groups of sculpture in bas-reliefs, as roughly indicated upon the elevation.

The domes to be covered with copper and the figures on the summit to be in bronzes.

The next design, by Mr. John Robinson, makes some departure from the lines of the site, leaving out a corner next the church-yard in order to get a rectangular return to the



principal front—a point not without importance where dignity of effect is desired.

As the author did not forward his report we must leave the design and plans to speak for themselves. The design is the one which we characterized as looking a little too much like a theatre; but it is an effective façade nevertheless. The author adopts the central position with top-light for the Council Chamber, a very good position for that purpose, but which involves the difficulty, not we think sufficiently recognised by Mr. Waterhouse in his address to students at the Institute recently (in which he went largely into the subject of this competition), of dealing with the space under such central room on the lower floor. The author has put the accountants' office there,—a central position, certainly, but somewhat too far within the building for convenient access for an office of this kind.

Mr. R. Stark Wilkinson's design shows, as we remarked at the time of the exhibition, a bold and original treatment of the plan by taking a centre line down the site and placing the plan symmetrically on either side of it. This makes a fine plan, but it has the defect of throwing away a good deal of ground on the front of the site, and throwing the Pinstone-street front back behind the line of the church-yard wall. The following particulars are given from the report:—

"A symmetrical arrangement of the site has been adopted by the author as most suitable for what is to be the dominant building in Sheffield, especially as by this a more extensive space is obtained in front of the principal façade; and the church is better brought into the perspective grouping with the new building, instead of being somewhat blocked out if the Pinstone-street line of frontage, shown on the block plan, were built up to, and also the front is now more parallel with Pinstone-street.

A continuous corridor is carried quite round the plan on each floor, giving access to all the offices from the Grand Staircase and from secondary staircases and entrances from Surrey-street, Norfolk-street, and Cheney-row, which are sufficient for official use when the Grand Staircase is required for receptions.

Large areas give sufficient light to the corridors and to the Council-chamber and central general offices, which are thus placed away from all noises arising from street traffic.

The general water-closets and lavatories are kept in isolated blocks, with good cross-ventilation, in the centre position on each floor; and all drains will have well-ventilated inspection manholes, to enable every portion to be reached for examination and cleansing purposes.

The Reception rooms are conveniently approached from the Grand Staircase, with the Cloak-rooms adjacent to them, and to the Council Chamber, the ante-room of which could be brought into use for reception purposes if needed. Movable divisions to be provided to keep the Dining-room and Mayor's Parlour distinct from the Reception-room.

The present proposed buildings finish with a good elevation towards Norfolk-street, and the spare space next this street can be built over, in the future as shown by dotted lines, in proper continuation of the main features of the design, and for the present can be laid out as a garden or court-space, with advantage to the Norfolk-street elevation.

The public waiting-rooms and lavatories for ladies

and gentlemen are placed on the Mezzanine ground-floor level, at the corner of Pinstone and Surrey streets, as most convenient for bus and tram traffic, and have a distinct and spacious approach from the street level.

The plans now sent in competition are essentially sketches only, to be modified as to thickness of walls, spacing of windows and doors, and arrangement of pilaster columns and other ornamental features, both internally and externally, as may be necessary in the working out of further detailed plans and elevations.

All rooms not having open fireplaces to be warmed and ventilated under the general ventilation and heating scheme, the boilers being placed in a sub-basement in the centre block; but if more convenient they could be placed in a sub-basement at the Norfolk-street end.

The upcast-shafts are placed on either side of the large internal areas, and over the Council-chamber, the lobbies of the gallery stairs, and in the spaces adjoining the Reception-rooms and Grand Staircase.

The plan is generally compact, and the departments are kept together on five floors, to avoid a straggling plan, and to obtain a useful space for future extensions in Norfolk-street.

The fronts to be executed in stone of similar quality to the School Board Offices or the Yorkshire Penny Bank, with slate roofs and lead flats, gutters, and downes.

The elevations in the areas to be in stone and white glazed brick facings.

The floors generally to be of fire-proof construction, of coke breeze concrete and rolled iron joists, laid over with wood block, tile, mosaic, or cement flooring, as the case may require.

The staircases to be of stone, and the Grand Staircase of marble.

Heating and Ventilation.—Two main upcast-shafts are provided in a central position, for the extraction of the vitiated air, and to them the several offices, rooms, stairs, and corridors will be in communication by upcast-shafts provided from each of them. A special extraction-shaft is provided for the Council-chamber and also for the Mayor's Reception-rooms. The boilers are fixed in a central position, and it is proposed that the heating be by low-pressure steam, with the heating mains arranged in circuits for each department. Ventilating radiators will be used, so as to ensure in all seasons the renewal of the atmosphere of the spaces warmed and ventilated at least three or four times in the hour."

DOOR-HEAD, TAUNTON CASTLE.

THE door-head forms the entrance to a building of late date on the south side of the courtyard of Taunton Castle, and facing the great hall in which Jeffreys held the Bloody Assize. It is a fine example of its kind, the carving, although somewhat spoiled by repeated coats of paint, still retaining much of its original delicacy. The sides of the brackets are particularly good.

The Professorship of Building Construction and Architecture at King's College.—We are informed that Mr. Banister Fletcher, J.P., F.R.I.B.A., D.L., has been appointed to the Professorship of Building Construction and Architecture at King's College, London, in the place of Professor Kerr, F.R.I.B.A., who retires in July.

THE NEW "KAISER WILHELM" BRIDGE AT BERLIN.

The new bridge, which may certainly be called an exceedingly monumental one, and which, besides being in close proximity to the Imperial "Schloss," and holding the name of the founder of the new German Empire, has the practical advantage of being the chief connecting link between the old and the new town, or rather between "Unter den Linden" and the new extension of this well-known thoroughfare, was thrown open for public traffic last November, and (except some sculpture over the keystones) may now be considered complete. The erection of the bridge,—which, by the bye, looks far too monumental and solid in comparison to the small breadth of river it crosses,—has taken many a long year, far too many indeed, owing partly to the multitude of red-tape hindrances which cropped up even when the project was a mere project, and partly owing to difficulties in foundation and construction as well as in the river regulations which had to be got over.

The river police not having permitted the water to be dammed at that point where the "Kaiser Wilhelm" Bridge crosses, whilst at the same time the non-erection of piers or even pilasters would have prevented the bridge from having any claim to be an architectural feature (which latter point was required by the authorities), the architect was bound to encroach on the embankments for the necessary room for the stream to pass through, and by doing this has been able to give the bridge three spans (one of 22.20 metres, and two of 8.20 metres), and two piers (of each 5.10 metres), to a normal width of river of 38.50 metres. Owing to the bridge not crossing at right angles, and owing to the fronts showing curvilinear lines, much time was spent in projecting the stereometrical forms of the different stones, and after this theoretical work had been completed, the very laborious practical part of cutting the material as required had to be gone through. This material,—which, by the way, was often very scarce, the quarries from which it came not having an over-abundant supply of good stones,—was of two kinds: black granite from the Odenwald, and grey granite from the Bavarian Hills, the former being used for the fronts and all architectural features, the latter for such parts as were not visible. As to the measurements of the erection itself, the wood-paved thoroughfare shows a width of 26 metres, with two footways (paved with granite slabs) of 5.50 metres each, 30 centimetres being given on the outer sides for the balusters. The surface of the wood-pavement of the roadway is 1.33 metres over the intrados of the keystone of the central span, or 8.52 metres over river bottom. The architecture of the bridge is of the sternest kind, four monumental candelabra (with eight electric arc-lights) of red granite with bronze mounting, and four tripods at the corners of the bridge giving the whole a finish, whilst the somewhat superfluous sculpture over the keystones, although effective in itself, stands in too great a contrast to the other parts of the design. Whatever faults the new bridge may have from the artistic point of view, the construction of the arches and the costliness of the material used will alone make the erection a remarkable one.

THE ARCHITECTURAL ASSOCIATION VISITS:

NEW HEADQUARTERS FOR THE POLICE.

The large pile of buildings which will shortly accommodate the administrative department of the Metropolitan Police, now located at Scotland-yard, was visited on Saturday afternoon by a large party of members of the Architectural Association, who were received and conducted over the building by Mr. Norman Shaw, R.A., the architect.

The requirements of the department call for a large number of comparatively small rooms, and the convenient arrangement of these, with easy access for the public and between the different departments, formed the problem which has been successfully treated in the plan adopted by the architect.

The buildings entirely surround a square, open courtyard, and may be said to cover a square. Corridors run from end to end of each side of the square.

The interior fittings of the building will be simple and of a utilitarian character. Fire-proof construction has been adopted in all the floors, with the usual combination of concrete

and rolled iron joists. The stairs, in some cases of concrete, in others of Portland stone, will be faced with slabs of Craigleith stone, the excellent wearing qualities of which are so well known.

The treatment of the elevations calls for more attention than the simplicity of the interior. The quiet tone of the red brick facings, relieved by bands of Portland stone, is in pleasant contrast with the dulness of the lower portion executed in granite. The angle turrets, the most prominent and graceful features of the design, are in close contrast with the gables, lack of grace being singularly apparent in their treatment.

The treatment of the eaves is somewhat unusual, the deep cornice is provided with a gutter above, but it is doubtful whether the drippings from the eaves, some 4 ft. or 5 ft. above, will find their way direct, in stormy weather, into the gutter below.

The chimneys, which pierce the roof at the ridges in most cases, have been carried across frequently from the exterior walls by means of concrete flues, strengthened with iron.

The building will be illuminated by electric light.

"MODERNISM IN ART."

In the course of the discussion which followed Mr. Henry Holiday's paper* at the last meeting of the Architectural Association,

The Chairman (Mr. Leonard Stokes, President), said it had not often been his good fortune to listen to such an admirable paper as Mr. Holiday had given them.

Mr. E. C. Robins, F.S.A., said he was quite sure they all agreed with the chairman's estimate of the lecture, which was a very interesting one, although he, the speaker, had hoped that it would have dealt a little more with art, and a little less with political economy. But there was no questioning the fact that there was a close connexion between the two. Social questions were now coming to the fore, and, after all, it was nothing very unusual for men like Mr. Morris and Mr. Holiday to show broad sympathies with the well-being of the people; and as artists they of course believed in the elevating influences of art, and desired to witness its enjoyment by the people. Whether or not they thought Mr. Holiday's views were at all practicable, and whether the present generation would witness the realisation of a better state of things than now prevailed, they could not but admit that the ends aimed at, and the goal looked forward to by Mr. Holiday, were most desirable. In listening to Mr. Holiday's paper, he had been reminded of the pretty picture which Dr. Richardson had drawn some years ago of an ideal city of Hygeia. We had not yet seen that city of Hygeia constructed; indeed, in spite of much good work that had been done by sanitarians, there were parts of the country and many towns which were still in a very low sanitary condition. But he thought there was no ground for despondency as to the future of either sanitation or art, nor as to the amelioration of the lot of the poor. He had read the "Fabian Essays" which had been referred to, and he had also read in *Macmillan* a criticism upon them. It should be remembered that the wages of the working classes, according to no less an authority than Giffen, had increased by from 75 to 100 per cent. during the last fifty years. As far as money was concerned, the larger amount of it went into the pockets of the people, but they did not all make the best use of it. He quite admitted that it would be a desirable thing to give workmen a direct interest in the success of their employers, and he thought that where it had been attempted to effect that object under proper conditions the results had been satisfactory as in the case of M. Leclaire. He had been reading an account of M. Leclaire's experiment in industrial co-operation by Professor Sedley Taylor in the *Nineteenth Century*. M. Leclaire was a decorator who, although he treated his men well, found that they took no interest in preventing the waste of material. He conceived the idea of making his own interests identical with those of the men, and devised a system by which he shared his profits with his men. The scheme was very successful. When he died, not having any children he left his establishment to the chiefs of his business, which

was still being carried on and the profit divided amongst the men. Another well-known instance of individual co-operation in France was that which was carried on under the auspices of M. Godin. That scheme was a very successful, so much so that it was recognized that on one occasion when losses had been incurred the men came forward and volunteered to share the loss with their employer. On the other hand, one or two schemes of industrial co-operation which had been tried in this country had failed, notably in one case, that of a colliery. In this case, however, the experiment failed owing to breach of faith on the part of the colliery owners. Turning to the art side of the question, he admitted that it was undesirable that the people should acquire an increased love of art. But he could not admit that things were in so hopeless a condition as would be inferred from Mr. Holiday's remarks. Art, and especially the industrial art, of the present day, was not in its lowest stage. It was nothing nearly so bad as that of the time of the Georges. Ever since the 1851 Exhibition there had been a gradual rise in the level of art work. Good art could be produced now, but only, as in all ages, as a result of patient labour and long study. He had very great pleasure in moving a vote of thanks to Mr. Holiday for his interesting paper.

Mr. H. H. Stannus, in seconding the motion said that, while thanking Mr. Holiday for his able paper, he certainly must express his agreement with Mr. Robins in the view he took of it. We certainly produced finer buildings and pictures than were produced in the time of the Georges, although the Academy pictures and our buildings of the better kind were not taken as criteria of the whole mass of the art and dwellings of the people. He thought that Mr. Holiday's remarks as to the reasons for poverty in artistic ideas were very suggestive. He had very truly said that Giotto was modern in the best sense of the word, and that his was the best art of his time. With regard to architecture, he would commend to the members a passage in Garbett's book, in which speaks about richness in architecture, the author laid it down as a canon that richness was not one of the necessary elements of beauty in architecture; that there might be beauty without richness. He referred beauty rather to proportion and to the evidence of consideration for one's neighbours' buildings.

Mr. H. O. Cresswell, in supporting the vote of thanks, said that there was no doubt a great deal of force in what Mr. Holiday had said with regard to the pedantry of ecypsim, but nevertheless ecypsim had served to make us acquainted with the architecture of the past. We had certainly progressed very greatly since the time of the Georges, and he thought the outlook for the future was not altogether gloomy as some might suppose.

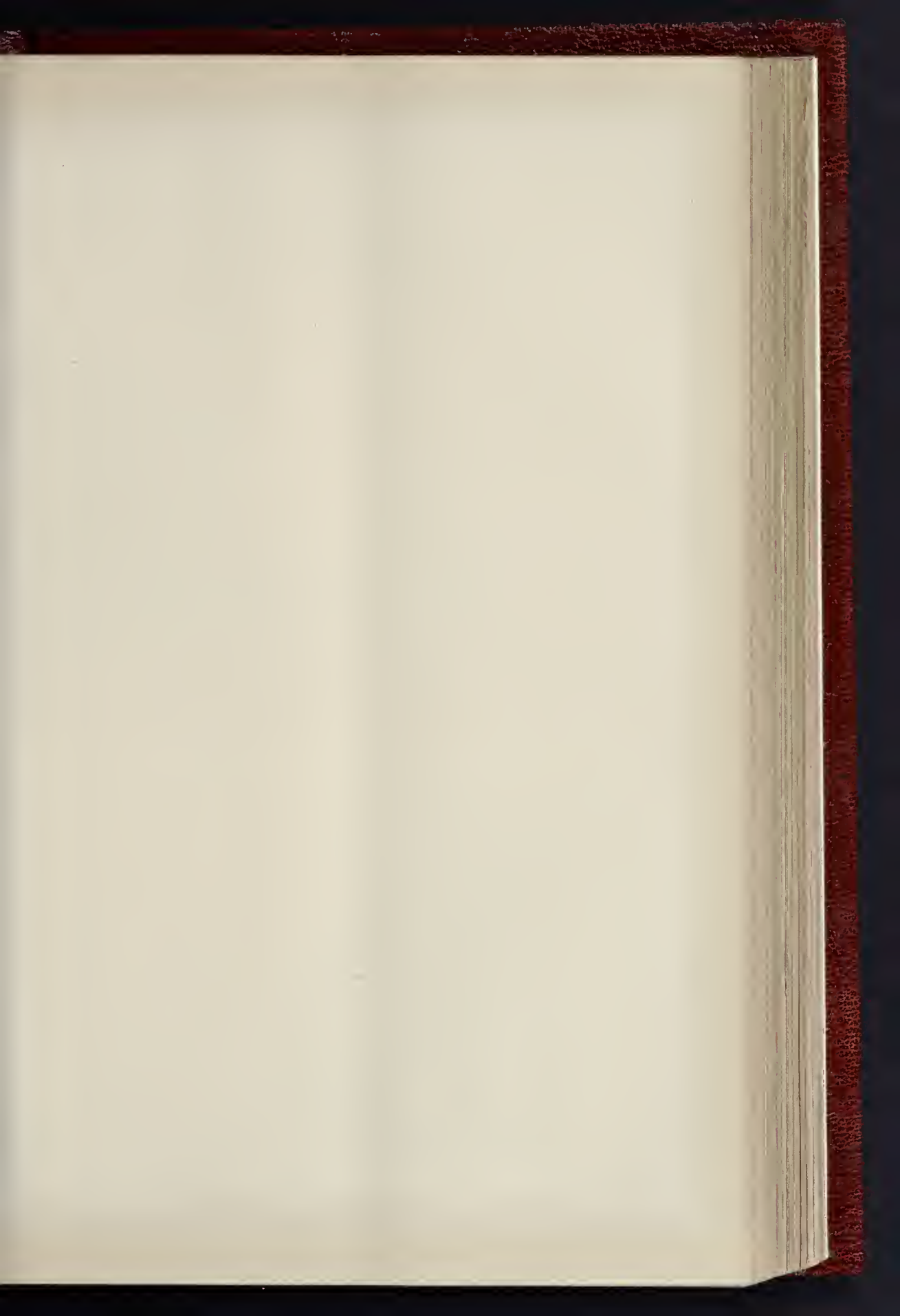
Mr. A. W. Earle having made a few remarks,

Mr. F. R. Farrow said he was not inclined to take so pessimistic a view of the art of the nineteenth century as Mr. Holiday had taken. He thought that there were many evidences of a real awakening of interest in art. Even in the houses built by speculative builders there was a distinct effort after some kind of artistic embellishment. True enough it was generally art of a very poor character, but the fact that it was supplied at all was evidence of the fact that speculative builders recognised that there was a demand for something more than bare walls. As to the panacea which Mr. Edward Belle had put forth in his hook, he did not think that any endeavour to exalt labour at the expense of capital would be successful.

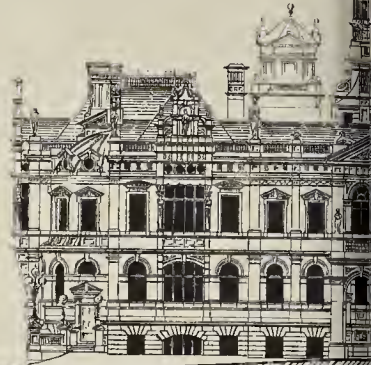
The Chairman having made some observations, in the course of which he said that his sympathies were very largely with the view of the lecturer, the vote of thanks was put and carried, and Mr. Holiday having replied to some points raised in the course of the discussion, the meeting terminated.

Ventilation.—Alterations are being made at St. John's Church, Carlisle, including the installation of Baird, Thompson, & Co.'s exhaust ventilator being adopted for the extraction of vitiated air, and their air-inlet "panel ventilator" being used for the introduction of fresh air. The firm have opened new offices at 165, Queen Victoria-street, E.C.

* Printed in extenso in last week's *Builder*.



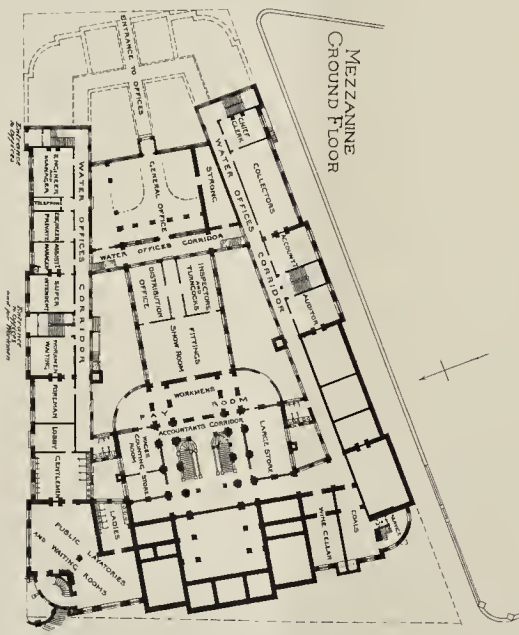
SHEFFIELD MUNICIPAL BUILDINGS COMPETITION.
DESIGN SUBMITTED BY MR. R. STARK WILKINSON, A.R.I.B.A.



277.00 8th floor
222.00 1st floor
112.00 0th floor
24.00 Mass of floor
112.00 Base
230.00 Datum Line

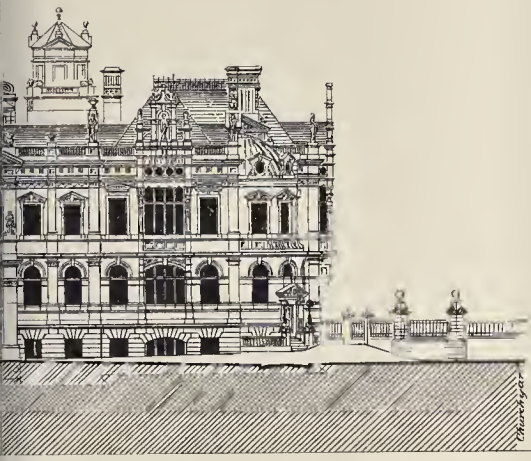


PINSTONE



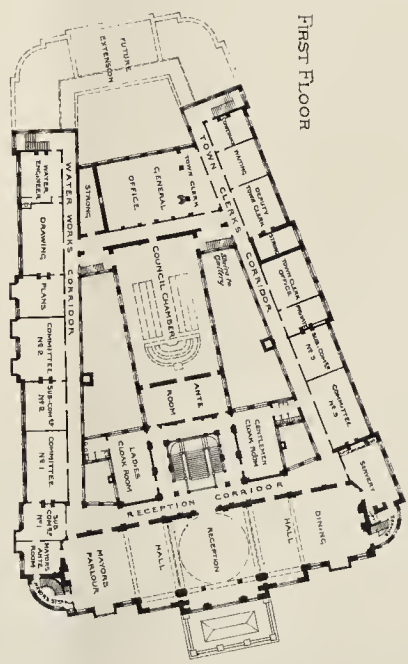
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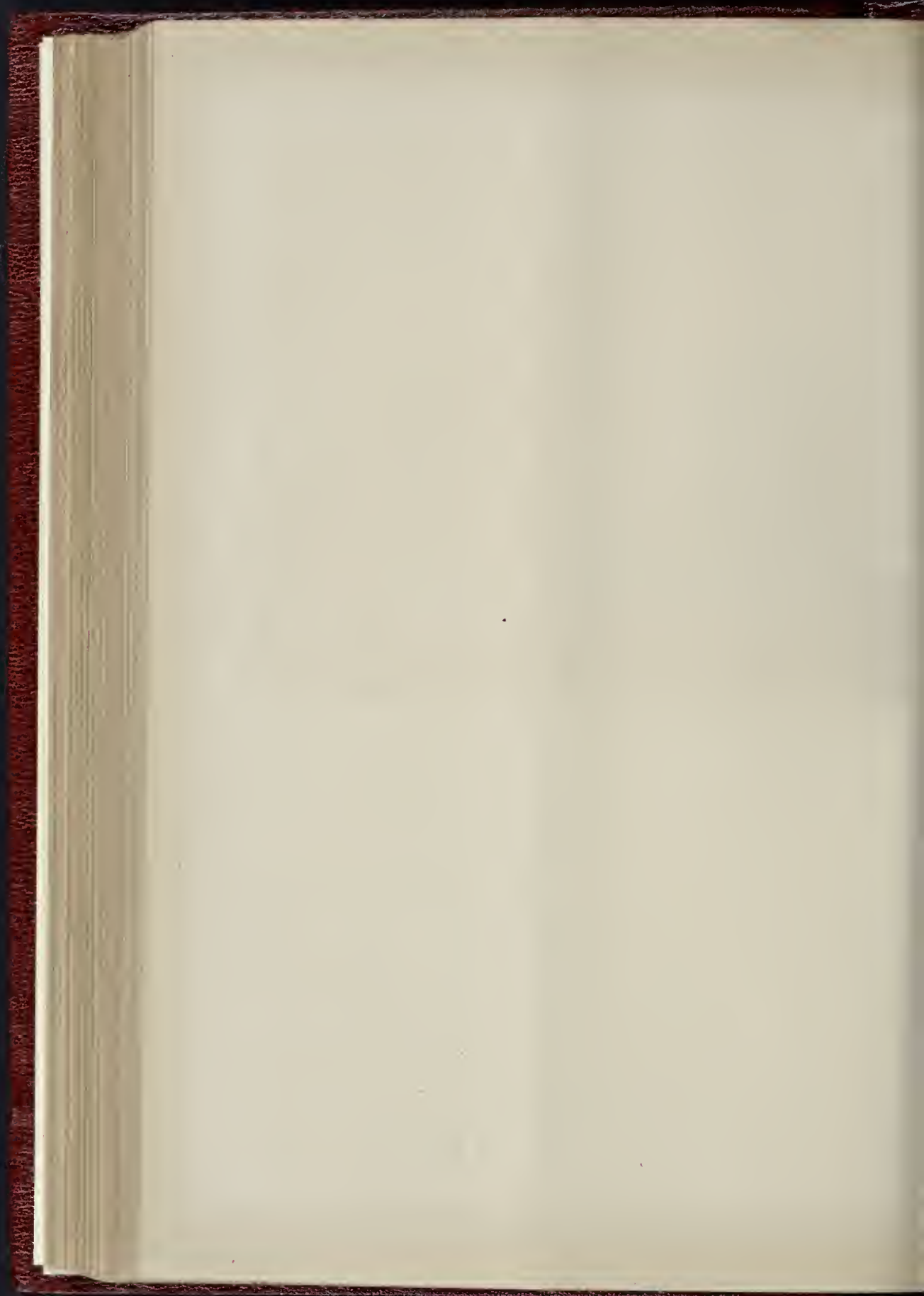


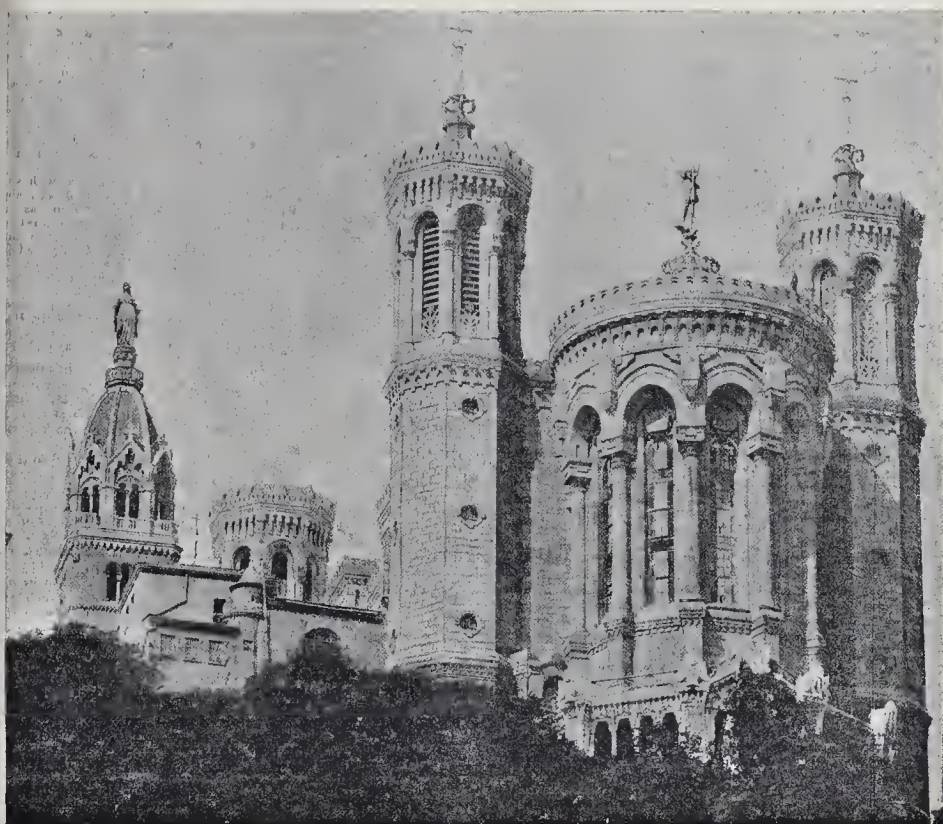


247.00 2nd Floor —
 228.00 1st Floor —
 220.00 0th Floor —
 208.00 Mess 0th Floor —
 207.00 Basement —
 250.00 Natural Level

SECTION.







Notre Dame de Fourvière, Lyons. The late M. Bossan, Architect.

NOTRE DAME DE FOURVIÈRE, LYONS.

WE give an illustration of this modern French church, from a photograph, as the architect who designed it, the late M. Bossan, a native of Lyons, was held in great esteem among the profession in France, and in the course of a eulogy pronounced upon him at the time of his death, a few months since, that church was instanced as one of his most successful works.

The view unfortunately gives only a portion of the building, but sufficient to show its peculiar style, which to English eyes will probably seem odd and unsuitable enough, regarded as church architecture.

The church stands on a hill overlooking the Faubourg de Vaise, at Lyons, on the right bank of the Saône. There is a rope railway to ascend the hill, as well as various ordinary roads. This is said to have been the site of the ancient town of Lyons.

In 839 there still remained on the summit of the hill the ruins of a Roman Forum, which served for the construction of a little chapel of "Notre Dame du Bon Conseil"; but the name of its origin, "de Foro Vetere," has clung to the site up to the present day.

"Notre Dame de Fourvière" has been the object of pilgrimages for a thousand years back. After having been abandoned for some time in this sense, the shrine regained its popularity in the seventeenth century in consequence of a pestilence under which it was regarded as a place of refuge; and at the present time there are an immense number of devotees annually visiting the church for prayer and to suspend their votive offerings there.

The ancient chapel having been found insufficient, was replaced by the present one, begun in 1872 and completed in 1881.

The principal façade does not offer much of interest; but the apse with its flanking turrets is a striking and conspicuous object above the

town. At the other end of the church is the main tower, the upper part of which is seen in the view, and which is terminated by a figure of the Virgin in bronze gilt, five and a half mètres high, modelled by a Lyonsais artist, M. Fabisch.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held in the Council Chamber of the Corporation of London, Guildhall, on Tuesday last, Lord Rosebery in the chair.

The Architect's Department.—The Standing Committee's report contained the following paragraph:—

"We have received a report from the Architect, calling attention to the need, in his department, of an official to check accounts. This need has arisen in consequence of the resolution of the Council of December 3 requiring that in future the prices of articles supplied under contract shall be doubly checked, first by the department by which the orders are given, and afterwards by the Comptroller, and that the prices of articles not included in any contract shall be checked by the department giving the order. The Architect states that he has endeavoured to have the accounts checked in the manner prescribed by the Council, but that, as the practice is quite new, and he has no assistant who could be regularly employed upon the work, he has been unable to carry out the order satisfactorily. The result is that there are several accounts for work done during last year which have not yet been examined and put forward for payment. Having carefully considered the matter, we have arrived at the conclusion that if accounts for works and for articles supplied are in future to undergo a double check, a person possessing a knowledge of this kind of work should be appointed to examine bills, to whatever department they may relate, before they are certified

by the head of the department having charge of the work, and passed on to the Comptroller. We recommend—

"That an official for the purpose above stated be appointed, that he be placed in the first class at a commencing salary of 200*l.* a year, and that it be referred back to us to take the necessary steps."

This recommendation was agreed to, after some discussion.

The Blackwall Tunnel.—The discussion of this question was then resumed, and occupied nearly the whole of the sitting.

The Vice-Chairman, Sir John Lubbock, by way of giving effect to the suggestion made by the Chairman when the subject was last under discussion by the Council, moved the following amendment to the report of the Bridges Committee:—

"That it be an instruction to the Bridges Committee to proceed provisionally with the tunnel at Blackwall under the Act of 1887, subject to the advice of an engineer of experience in subaqueous tunneling, and under such advice to sink shafts to ascertain the nature and difficulties of the soil, and then to report to the Council for further instructions."

Mr. Saunders, in seconding the amendment, spoke in favour of a tunnel extending only under the bed of the river, and with lifts in lieu of inclined approaches.

The amendment was opposed by Sir Thomas Farrer, Mr. Charles Harrison, and other prominent members, but was carried on a division by 57 votes to 48,—a majority of 9.

Sir John Lubbock's amendment having thus become the substantive motion, Mr. Corbett moved, and Mr. Beachcroft seconded, the following rider to it:—

"But that beyond the question of these provisional works the Council does not at present commit itself."

This was accepted by Sir John Lubbock and carried, after which, by 41 votes against 39, the Council approved the following further rider, moved by Lord Langton:—

"And that the engineer conducting the experiments do report monthly to the Bridges Committee the nature

of the information obtained, and the progress of the expenditure.

Mr. Costelloe then moved, as a further amendment—

"And that it be referred to the Bridges Committee and the Parliamentary Committee, acting jointly, to consider and report upon the expediency of obtaining an amending Bill, containing such modifications of the existing powers as to works as may be found desirable, and such provisions as to the method of providing for the future expense of the undertaking as may seem to be just."

Other amendments, seeking to make the execution of the work contingent upon the Council's obtaining powers to apply the principle of "betterment" to the property benefited by the construction of the tunnel, having been lost, it was resolved, by 47 votes against 42, that the following words should be added to the motion:—

"Provided the expenditure thereon shall not exceed 10,000."

The resolution as amended was then formally approved.

Tramway Legislation.—The Highways Committee reported as follows:—"Your Committee have had before them a letter from Mr. T. H. Bolton, M.P., stating that he has given notice of a motion for the appointment of a Select Committee 'to inquire into the operation of the Tramways Act, 1870, and to consider as to the desirability of further legislation in the interest of the public with reference to tramways.' Mr. Bolton asks to be informed whether the Council is in favour of such an inquiry. Your Committee are of opinion that, having regard to the anomalous state of the existing legislation with regard to London tramways, an inquiry by a Select Committee of the House of Commons might be of advantage; and they therefore recommend—

"That Mr. Bolton be informed that the Council approves of the proposal for a Select Committee on tramway legislation, and will be prepared to give any assistance in its power to further the object of the inquiry."

This was agreed to.

Subways.—On this subject the Highways Committee reported as follows:—"The Council on the 19th of November last made by-laws under the Metropolitan Subways Act, 1868, and other Acts, for the regulation of the use of the subways in Garrick-street, Southwark-street, Victoria-embankment, Queen Victoria-street, and Commercial-road East. These by-laws have now been allowed by the Board of Trade, and the Home Secretary has signified his approval of the penalties specified therein. Section 202 of the Metropolitan Management Act, 1855, provides that no by-law shall be of any force or effect until the same shall have been submitted to and confirmed at a subsequent meeting. Your committee therefore recommend—

"That the Council do confirm the by-laws made on November 19, 1889, for regulating the use of the subways in Garrick-street, Southwark-street, Victoria-embankment, Queen Victoria-street, and Commercial-road East."

This was also agreed to.

Disturbed Main Roads in the Metropolis.—On this subject the Highways Committee presented the following report:—

"The Council, on February 11 last, decided to offer to the respective Vestries and District Boards, in respect of the maintenance, during the year 1889-90, of the roads in their districts disturbed since December 31, 1870, and which by the Local Government Act became vested in the Council, equivalent sums to those paid by the Local Government Board in respect of such roads during each of the two preceding years. The sum thus offered in respect of Finsley and Edgware roads, which are in the parish of Hampstead, was £377, 17s. 4d. With respect to this the Vestry has, by resolution, expressed the opinion that the proportion hitherto paid by the Local Government Board is inapplicable to present circumstances, especially as a large proportion of the wear and tear is due to through traffic, and has suggested that as the roads have during the year ended June 30, 1889, cost 4,736l., the Council should allow the Vestry at least half that amount. This expenditure was incurred during a year with only the last quarter of which the Council is concerned. Your Committee, having fully considered the matter, recommend—

"That the Council do adhere to the offer already made to pay the sum of £377, 17s. 4d. towards the cost of maintenance of the Edgware and Finsley roads during the year 1889-90, and that the Vestry of Hampstead be so informed."

With respect to the Commercial-road East, East and West India Dock-roads, and Horseferry-road, which were also vested in the Council by the Local Government Act, the offer made by the Council was to pay £877, in respect of maintenance during the year 1889-90. The Limehouse District Board, in whose district these roads are situated, has decided not to accept this sum, which, in the opinion of the District Board, is quite inadequate; and the District Board has, moreover, determined not to undertake the maintenance of the roads after March 31 next. It appears to your Committee that the Council should in this case also adhere to the offer already made; and with respect to the future maintenance, should exercise the power given by the Local Government Act of requiring the District Board to retain the management of the roads. They therefore recommend—

"(a) That the Council do adhere to the offer already made to pay the sum of £877 towards the cost of maintenance of Commercial-road East, East and West India Dock-roads and Horseferry-road, during the year 1889-90, and that the Limehouse District Board be so informed."

"(b) That the Council, in the case of Commercial-road East, East and West India Dock-roads, and Horseferry-road (which roads have been disturbed since December 31, 1870) do exercise the rights conferred upon it by the Local Government Act, 1888, section 11 (sub-section 4), by requiring the Limehouse District Board to undertake the maintenance, &c., of the said roads, in consideration of such annual payment by the Council for the cost of the undertaking as may be determined in the manner provided by the said sub-section."

After some discussion these recommendations were agreed to.

After transacting other business the Council adjourned until Tuesday next.

THE ARCHITECTS' BENEVOLENT SOCIETY:

ANNUAL GENERAL MEETING.

The fortieth annual general meeting of the Architects' Benevolent Society was held on Wednesday, the 12th inst., at 9, Conduit-street, Mr. J. Macvicar Anderson, Vice-President of the Royal Institute of British Architects, in the Chair. The minutes of the thirty-ninth annual general meeting having been read and signed as correct, the Hon. Secretary (Mr. W. H. White) read the Report of the Council, of which the following is an extract:—

"Gentlemen,—The *Red Book* published last year contained a brief summary of the reports for the years 1884—85 to 1887—88, in addition to a report of the past year's work, in order to preserve a continuity of the history of the society; and, consequently, the present report will deal only with the work of the society during the year 1889—90.

While being again able to congratulate the Society upon a considerable increase to its invested capital, your Council regret having to state that the subscriptions have decreased in amount; and they would urge upon each and every contributor the desirability of obtaining new subscribers. At the same time, your Council have pleasure in stating that the result of a special letter in place of the usual circular, to several subscribers who were in arrears in January of this year, has been satisfactory; and as a similar appeal is being made to all subscribers whose subscriptions for 1889 have not yet been received, there is great probability that the increased amount of subscriptions obtained in 1890 will more than balance the decrease of the past year. The Income Account and Balance Sheet for the year ended December 31, 1889, are herewith submitted.

During the past twelve months six meetings have been held by your Council; 2415 has been distributed among thirty persons out of forty-four applicants; and three pensions of £25 each have been paid. The amount received by subscriptions shows a decrease of about £28, being £308, 12s. as against £335, 18s. received in 1888. The Capital Account receipts amount to £567, 6s. 4d., including a donation of £500 from Mr. Robert P. Page, joint heir of the late Mr. Palgrave, who, it may be remembered, by some, expressed his intention to leave £1,000 to this society, but who died without signing the codicil to that effect. Upon coming of age Mr. Samuel P. Page made a donation of £500, and his brother, Mr. Robert Page, has now done the same—both acts of generosity worthy of emulation. Among others, donations were received from the British Architectural Book Society, Mr. Cole Adams of the Northern Architectural Association; the Nottingham Architectural Society; Mr. John Cotton; Mr. A. S. Gover; Mr. C. H. Howell; Mr. George Inskipp, and Mr. R. St. A. Rounie. The capital of the Society, which in 1883 consisted of investments of £6,174, 17s. 8d., and Cash 100l. 2s. 6d., or a total of £6,274, 17s. 8d., at the present time amounts to almost 8,000l., viz., investments 7,871, 2s. 4d., and Cash 53l. 18s. 8d., or a total of 7,925l. 18s. 8d.

Your Council regret to have to announce the

decease of Mr. John Turner, who held the office of Hon. Secretary to the Society for a period of more than a quarter of a century, resigning in 1871, when the Council tendered their cordial thanks and acknowledgment for the able and zealous manner in which he had performed the various duties entrusted to him, and also for 'the care and untiring energy evinced by him in carrying out the principles laid down for the guidance and distribution of the benefits afforded by the Society.' Mr. John Turner was one of the founders of the Society, and had remained a subscriber to the present year.

Your Council have also to record with sincere regret the decease of Mr. George J. J. Mair, for twelve years the Hon. Treasurer, who was one of the first Life Members, and a Member of the Council for eighteen years. Mr. Mair resigned the office of Hon. Treasurer in 1885, in which year your Council referred with gratitude to the long services rendered by the genial Honorary Treasurer, then giving up that office.

In consequence of the retirement of Professor J. Hayer Lewis, who succeeded the late Mr. Mair as Hon. Treasurer in 1885, the duty of electing a new Treasurer devolves upon the contributors."

The Chairman having moved the adoption of the report, Mr. E. A. Gruning seconded the motion; after which Mr. T. M. Rickman, F.S.A., and Mr. John Hebb made some remarks, and the adoption of the report was agreed to.

A vote of thanks was then passed to the outgoing Members of Council, viz.,—Messrs. Arthur Cates, Edward A. Gruning, Herbert D. Appleton, C. Forster Hayward, F.S.A., and W. Hilted Nash; and the Council for the year of office 1890-91 was elected as follows:—Mr. Alfred Waterhouse, R.A., President; Messrs. G. R. Raggett, George Inskipp, R. H. Carpenter, F.S.A., E. Blakey l'Anson, M.A., J. Alfred Gotch, Samuel Hill, R. St. A. Rounie, George Scamell, F.G.S., Lewis Solomon, Thomas Verity, William Emerson, H. L. Florence, Professor J. Hayer Lewis, F.S.A., Thomas M. Rickman, F.S.A., and Aston Webb. A vote of thanks having been passed to the auditors for the past year, namely, Mr. Charles Fowler and Mr. T. M. Rickman, F.S.A.—Mr. W. Hilton Nash and Mr. John Hebb were elected auditors for the ensuing year of office. Mr. Arthur Cates was elected Hon. Treasurer, and the Hon. Secretary was re-elected.

ARCHITECTURAL SOCIETIES.

Sheffield Society of Architects and Surveyors.—The usual monthly meeting of this Society was held in the School of Art on the 21st inst. Mr. F. Fowler, President, in the chair, and a large number of members were present, including Messrs. C. J. Innocent, Vice-President, C. Haedfield, E. M. Gibbs, W. F. Hemsoll, J. B. Mitchell, Withers, Frank Massie, W. C. Fenton, J. I. Simpson, H. W. Lockwood, and many others. Mr. C. F. Wike, C.E., the Borough Surveyor, read an interesting paper entitled "Municipal and Sanitary Engineering." He presented statistics showing the relative sizes of Sheffield and other towns, and pointed out that Sheffield and Leeds had the largest areas of any English boroughs, each having an area of 20,000 acres. The next town in size was Bradford, with 10,776 acres. He also stated that Sheffield had an area equal to the areas of Manchester, Liverpool, Bristol, and Salford combined. He next dealt with the construction of roads, described the different kinds of granite, gritstone, and other materials used, gave particulars as to the manufacture of tar and concrete pavement, and as to the cost of maintenance. He also gave statistics as to the comparative cost of granite and gritstone paving, showing that at the end of twenty-five years the latter would have cost 50 per cent more than the former. He then referred to the sections and gradients of roads, giving the formulae of the most experienced engineers for cross sections. The second part of the paper dealt with sewerage and house drainage. The most modern methods of sewer construction were described, and particulars given as to the different forms of sewers, and the volume of sewage and amount of rainfall to be provided for. The question of sewer ventilation was also discussed, and various systems in work in other towns were described. Drawings were exhibited showing how engine chimney shafts could be utilised for ventilating purposes, and the results of numerous experiments made with different sewer ventilators were given. The question of house drainage was then thoroughly gone into, and different methods of drain disconnection and ventilation were ex-

lained. The use of rain-water pipes as sewer ventilators, and the use of soil-pipes as rain-water pipes, were condemned. The paper was illustrated with a large number of models, diagrams, &c., and excited considerable interest amongst the members of the Society, and an exhaustive discussion took place. A hearty vote of thanks to Mr. Wilke was accorded on the motion of Mr. J. B. Mitchell-Withers, supported by Messrs. Frank Massie, C. Hadfield, V. C. Fenton, and H. W. Lockwood. The hon. secretary announced that next month Mr. T. M. Dickman, of London, would read a paper on "The Present State of Questions relating to Sanities."

Edinburgh Architectural Association.—At a meeting of this Association held in the Heriot-Watt College, on the 21st inst., Professor Baldwin Brown, residing, Principal Grant Ogilvie delivered a lecture on "Electric Lighting of interiors." He began by explaining the terms used in describing electric currents, and showed the effect of the current on the conductor through which it passed, pointing out the application of the heating effect in the use of visible "cut-outs," where a thin wire is used as part of the circuit, so as to cut off the current from a section where it might be becoming too strong for safety. He further explained the construction of incandescent lamps, and showed the high lighting efficiency now attained by some of these of 200-candle power and upwards. The arrangements for distributing the current to the various lamps in a house, the use of storage cells, and the distribution of electricity from central stations by high-tension alternating currents and transformers, were also discussed in the lecture. At the close Principal Ogilvie received a cordial vote of thanks.

PARTY-WALL CASES.

FOOT v. HODGSON.

In the City of London Court on Saturday last, Mr. Commissioner Kerr gave judgment in the case of Foot v. Hodgson, which had been before him on two previous occasions and which involved a question of considerable importance to architects, builders, and building-owners. The action was brought by Mr. George E. Foot, of 15, Little Trinity-lane, E.C., against Mr. James Hodgson, of 1, Queenbith, E.C., by way of an appeal against an award made by two out of three arbitrators, which directed that the party-wall between Nos. 16 and 17, Little Trinity-lane, E.C., should be pulled down and rebuilt in accordance with the provisions of the Metropolitan Building Act.

Mr. Fullerton was counsel for the appellant and Mr. A. H. Spokes for the respondent. It seemed that in April last a fire occurred on the premises of the respondent, and now that the premises were cleared, it was urged on his behalf that the party-wall was so far defective and out of repair to render it both necessary and desirable to pull down and rebuild the wall. The respondent, on the other hand, the arbitrators being Mr. T. M. Deacon, the respondent, and Mr. Stenning for the appellant, Professor Roger Smith being appointed third surveyor. In their award they ordered that the wall should be pulled down, but this decision is appealed against.

Mr. Stenning, Mr. H. H. Bridgman, Mr. Collins, Mr. Fullerton, and Mr. Spokes were in sufficient good pair as not to render it necessary to pull it down. On the other hand, Professor Roger Smith, Mr. Deacon, and others said the wall was not strong enough. They said that as there was a sloping roof they were justified in measuring the party-wall in the way as to show that its breadth of two bricks was insufficient, and that it should consist of one and a half bricks. Mr. Spokes said the mode of measurement was very important, as some District Surveyors in London were measuring one way, and others the other. Mr. Commissioner Kerr now gave judgment, and he said the question had received the very careful attention not only of himself but of the assessors who had sat with him. He said it was represented to the Court that the building intended to be built was of the same height and in every respect similar to that which had been burned down; but it came out in the evidence at the end of the case at the building under consideration, if he could obtain the assent of the persons interested in preventing his raising the building, really to make his building a story higher by having what he called a rafter instead of a sloping side to the upper story; or other words, instead of laying his rafters on a wall of the same height as that which had been burned down, he intended, if possible, to raise that wall a story in height. It further appeared that an alteration was made in the building five years ago which had made the sloping roof to consist of two stories instead of one, and the result, it was contended, was to add a flat, if not a story, to the height of the building. Much contradictory evidence was

adduced on the question of measurement, and there was great controversy as to what constituted a "story" within the meaning of the Act, the appellant contending that a story must mean a flat enclosed by four walls, the respondents urging that a story might be, and was, a story, although it might be what was ordinarily termed an attic or a flat in the roof. He (the learned Judge) agreed with the appellant, and considered that the roof began from the stonework on which the rafters of the roof rested; that all above the story enclosed by four walls was roof, and must, therefore, uphold the appeal.

Appeal allowed with costs.

MESSENGER v. LOADER.—GROOM v. LOADER.

THESE actions have been tried together in the Court of Chancery, before Mr. Justice Ford North. The plaintiffs are respectively lessor and lessee of the "Highlander" beehouse, High-road, Loe, and the defendant is a builder, who, after serving the usual party-wall notice, proceeded to build a separate external wall to his premises adjoining the party-wall.

The plaintiffs, for whom Mr. Cozens Hardy and Mr. Moyses appeared, claimed damages for trespass and for damage to the wall, calling the managers of the house, and Messrs. Pountney and Roberts, surveyors.

The defendant called Mr. Chas. Bell, F.R.I.B.A., and Mr. H. Lovgrove, F.S.I., to prove that the old wall was a party-wall, and that the alleged damage could be made good for a few pounds.

The Judge decided to dismiss the action by the freeholder (Messenger), each party to pay his own costs; and in the other action he awarded 25*l.* damages for the trespass, with costs on that part of the action only, as he dismissed that part relating to ancient lights.

CASE UNDER THE EMPLOYERS' LIABILITY ACT.

PUGH v. THE HORSLEY ENGINEERING CO., LIMITED.

In the Westminster County Court, on Monday, the case of Pugh v. The Horsley Engineering Company, Limited, was before his Honour Judge Bayley and a jury. The action was brought by the plaintiff to recover damages by way of compensation for personal injuries sustained owing to an alleged defect in the defendants' plant.

Mr. Moyses was counsel for the plaintiff, and Mr. Tatlock for the defendant company.

The plaintiff, Thomas Pugh, was called, and said he entered into the service of the defendants in November last year, at which time they had a large contract in hand for the construction of a railway at Liverpool-street. On the day of the accident, November 6, he was ordered by the foreman to assist a number of other workmen in moving a massive iron girder, weighing some 8 or 9 tons. The method adopted to move the girder was to get a bar of old railway line and lay under either end, and having well greased it, to slide the girder along. That operation proved very successful until the girder reached the end of the rails, when, owing to the upward projection of a head, or what is technically known as a "burr," the girder refused to go any further, and it then became necessary to prise it up with crowbars in order to get it over the "burr." He (the plaintiff) was ordered by the foreman to assist with others in bearing upon the crowbar, and the result was that when the girder got over the obstacle it came down with very great force, and buried the crowbar round in such a manner that it struck him violently in the chest, with the result that he was first thrown up into the air, and then precipitated into a cutting beneath, a distance of something like 15 or 20 ft. He remembered no more until he found himself in the hospital. There was no proper staging erected for the men to work upon, but only a few feet of platform composed of old sleepers laid side by side.

Cross-examined: He was compelled to obey the orders of the foreman, or he would have been discharged. He was acting under the instructions of the foreman when the accident happened.

A house-surgeon from the London Hospital was called, and gave evidence as to the nature of the injuries which the plaintiff had sustained. In his opinion the plaintiff would never again be fit to do laborious work.

That being the case for the plaintiff, Mr. Tatlock submitted that there was no case to go to the jury, as he contended that neither negligence nor defect had been proved against his clients, and therefore he was entitled to a non-suit. He did not propose to call any evidence.

His Honour said he did not think that the plaintiff had made out a case, but he (the Judge) thought he had better take the opinion of the jury on the matter.

Mr. Tatlock then addressed the jury at some length, and contended that the plaintiff was not entitled to recover any damages.

His Honour then summed up the evidence, and told the jury that if they were of opinion that there was negligence or defect, then they ought to give the plaintiff damages, but otherwise he was not entitled to anything.

The jury, after a brief consultation, gave a ver-

dict for the plaintiff, and assessed the damages at £50.

Mr. Tatlock said that in spite of the finding of the jury, he should ask his Honour to enter judgment for the defendants.

His Honour said he should not adopt that course, but the defendants could have leave to appeal.

THE BRITISH COMMISSION AT THE PARIS EXHIBITION.

SIR.—As there is no wrong without a remedy, there must be a remedy for being slandered in *Truth*, but it is hard to find.

May I try and discover one by appealing to the fairness of the press in general to correct some mis-statements by one of their number, but which he has not had the generosity to withdraw?

It was stated in a paragraph in *Truth* that exhibitors at the Paris Exhibition were being dunned for a testimonial to the British Commission, and various comments were made on the fact.

May I ask you to state: 1. That no testimonial has ever been proposed to the Commission, Committee, or Council. 2. That I myself some months ago declined to accept any testimonial whatever, when on two several occasions the flattering suggestion was made. 3. That some of the exhibitors, acting entirely on their own initiative, are subscribing to make a gift to the members of the staff, who did the work and got none of the credit.

The question is one entirely without public interest, but it is hard, after trying to do one's best honestly, that one should be accused of petty meanness. I would not have troubled you had the editor of *Truth* published even the substance of the disclaimer I sent him, instead of absolutely distorting it. A copy of my letter to him is enclosed.

H. TRUEMAN WOOD,

Secretary, British Committee,

Paris Exhibition.

Society of Arts, John-street, Adelphi.

March 26.

PROVINCIAL NEWS.

Newcastle-on-Tyne.—A special meeting of the Newcastle Town-hall and Municipal Offices Committee was held on the 18th inst., under the presidency of Mr. W. Temple. Plans were presented by the City Engineer (Mr. Laws), showing the five sites retained, namely, No. 1, Singleton House; No. 2, Eldon-square; No. 3, ground between Clayton-street and *Journal* Office, including the Assembly-rooms; Nos. 4 and 5, two sites in Pilgrim-street, from Worswick-street to Manor Chare. Considerable discussion followed, and the two latter sites were struck out of the list as impracticable and unfavourable. It was then agreed that the City Engineer should prepare an estimate of the cost of the ground of each of the remaining sites, to be ready for presentation at the next meeting of the committee. Fresh plans were also presented by the City Engineer showing amended arrangements for dealing with the present Town-hall, and the conversion of the same into municipal offices, a concert-room, and an art gallery to be provided elsewhere in the city. This plan shows the whole ground-floor in the front portion of the building, to be adequate for the purpose of the treasury department; the first-floor for the Town Clerk's department, and the upper floor for the City Engineer. An elaborate plan for converting the present concert room into a Council Chamber with a public gallery. Mayor's chamber, and other offices were also put in.—The Chairman stated that these alterations, if agreed to by the Council, would supply the wants and requirements of the city for the next fifty or hundred years.—A further scheme, combining the sale of a portion of the present Town Hall buildings, and leaving the concert room and Corn Market as at present, was also presented.—It was agreed that the entire schemes, when completed and put into order, should be submitted to the Council before any final decision was arrived at.

Sunderland.—On the 19th inst. a special meeting of the Sunderland Town Council, called by Alderman Fairless, Vice-Chairman of the Municipal Buildings Committee, was held in the Council Chamber of the new Town Hall, Fawcett-street, under the presidency of the Mayor (Councillor Shadforth). The Mayor congratulated the Council on meeting for the first time in the new Council Chamber.—Mr.

Brightwen Binyon, the architect, spoke in reply to the criticisms of Councillor Ranken at the last Council meeting. He had gone carefully into the figures, and he could not see how it was possible to make such a large reduction in the estimate as was proposed. £3,000 was inadequate to furnish the buildings.—The Mayor then suggested that the buildings should be furnished in such a manner as would not lead them to reflect afterwards on having furnished them inadequately.—Mr. Kirtley asked if Mr. Binyon was aware that £3,000 had first been put down for the furnishing of the building, and if he was also aware that such a sum would be totally inadequate, and that it was simply put down with a view of keeping the estimate within a sum which would pass the Council? Was Mr. Binyon aware of this, or a party to it?—Mr. Binyon replied that the estimate was made a long time before he was thought of.—Mr. Rickaby said that the general opinion of the Council at the last meeting was that the price put down for furnishing and decorating was too much. They desired to know if Mr. Binyon could see his way clear to having the building furnished for less, still maintaining the respectable character of the place.—In reply to Mr. Annison, Mr. Binyon said that the specification he had drawn up did not provide for the furnishing of the Town Hall in anything like the handsome manner some Town Halls in small Yorkshire towns were furnished. If the Council desired him to make another plan for furnishing he would do so.—The Council adjourned without coming to any decision beyond the general expression of a hope that economy would be effected wherever possible in the estimates.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—XIII.

DYNAMO-ELECTRIC MACHINES.—(Continued). RING ARMATURE.

THE greater the flux through the armature of a machine, by so much the greater will be its possible output. For this reason iron is used in the construction of armatures, which, by reducing the magnetic resistance, enables the magneto-motive force of the field magnets to send a larger number of lines of force through the coils than they would through air. Another function of the iron is to direct the lines where they are most needed, as well as to increase their number.

In the armature described in the last article the drum should be built up of thin discs, insulated from one another, as, were a solid iron drum used, current would be set up in it, for the same reason that current is set up in the parts of the coils which lie along its periphery. The iron should be continuous along lines of force and divided at right angles to them, as it is in this direction that the E.M.F. is set up; unless this is carefully done, currents are produced in the iron core, which not only absorb power uselessly, but produce heat to a dangerous degree. Even when laminated to the utmost extent practicable, the iron has still certain disadvantages; little local eddy currents, sometimes called Foucault currents, are formed in the solid portions, however thin, which require a small amount of power for their unavoidable production, and which cause a corresponding amount of mischievous heating. Again, as the iron revolves the magnetisation changes its direction, involving a constant movement of its molecules (see article II.) and since there is a certain amount of friction between the molecules, heat is also generated from this cause. Hysteresis is a word lately introduced to explain this and other phenomena observable in the magnetisation of iron.

Although it is difficult to separate the effects of Foucault currents and hysteresis, yet there is every reason to believe that, even if Foucault currents could be entirely eliminated, hysteresis would remain. In certain forms of armature, then, it becomes a question as to whether the advantages of reduced magnetic resistance are not more than counterbalanced by the introduction of the disadvantages just named, for although such substances as air or wood have a relatively high specific magnetic resistance, Foucault currents and hysteresis are absent from them.

A form of armature in which the iron is designed to direct the field as well as lower the

magnetic resistance is the "ring armature," or "Gramme ring," shown in fig. 32. The iron core is entirely covered with bobbins connected in series. In the figure six skeleton bobbins are shown with their ends connected through the segments of the commutator.

In order to understand clearly the exact functions of the iron in the Gramme ring, suppose, in the first instance, that the ring itself in fig. 32 is made of wood or some non-magnetic substance, and that lines of force pass straight across the armature between the faces N and S of the field magnets. Remembering the diagram or rule for the direction of the E.M.F. set up in a conductor when it cuts a line of force, it will be seen that the directions of the electro-motive forces set up in the turns of the bobbins inside and outside the ring are such as to oppose each other. But all the lines between N₁S₁ and N₂S₂ are cut as many times in a complete revolution in passing through the interior of the ring as they are cut at the sides of the ring facing the field magnets; so that the whole field between N₁S₁ and N₂S₂ is absolutely useless, and the only parts of the field in which unbalanced E.M.F. is produced are those which lie, in the figure, above and below these lines. Assuming the field to be uniform, it is easy to measure, with a pair of dividers, what proportion of the total amount of the wire on the armature is of any use at one time.

In the case of the drum armature, no such opposing E.M.F. would be set up, as there are no interior parts to the turns of the bobbins; absence of iron in this case, therefore, would merely result in a lessening of the flux across the armature, not in making one part of a hobbin oppose the E.M.F. set up in it to that set up in another part.

Now, however, suppose the wooden core exchanged for a soft iron one. A line of force starting at N₁ will, on entering the iron, pass through the core, owing to its low magnetic resistance as compared to the air-path through the interior of the ring, and emerge opposite the point S₂, where it enters the other field face. It will be seen from this that the iron core diverts the lines, and screens the wire on the interior surface of the ring from them, so that the opposing E.M.F., which is set up without the iron, is not produced at all in this latter case. The connections shown in fig. 33

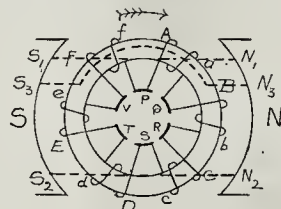


Fig 33.

are so extremely simple that it does not seem necessary to draw a supplementary diagram in order to show the action of the commutator, but a diagram to show its action may be drawn for fig. 33, just in the same way that fig. 32 was drawn to help the explanation of fig. 30. Figures 30 and 33 should, however, be compared. In fig. 33 electro-motive force is set up in the portions of the conductors on the outer surface of the ring, in precisely the same way that electro-motive force is set up at the surface of the drum. As the inner portions of the bobbins on the ring are screened from lines of force, they need not be considered from this point of view. In both figures P and S are the segments of the commutator between which there is the greatest difference of potential, and on them should press the brushes.

In both armatures the bobbins are always divided into two groups, those in each group being connected in series, and the two groups thus formed put abreast. As the brushes of a machine are fixed, and the segments of the commutator on which they press are in connexion with two points in the armature, they may be regarded as being fixed in space when the armature revolves, although they do in reality oscillate backwards and forwards through a small angle when the segments slip under the brushes. The brushes have the potentials of these points, and if there is an external circuit, current is always being drawn between these

points. A line joining them is called the "diameter of commutation." With the brushes placed on P and S the diameter of commutation would be a vertical line passing through the axis of the armature. It does not follow that a line joining the points of contact of the brushes will be the diameter of commutation, for the commutator may be bodily shifted round the spindle of the machine, provided that the connexions are kept intact.

We have hitherto supposed the armatures to revolve, open-circuited, in a field produced either by permanent steel magnets or by separately-excited electro-magnets, and the diameter of commutation, chosen so as to get the greatest difference of potential between the brushes, has been a line at right angles to the direction of the field. It will be shown in the next article that, when the armature is producing the current for which it has been designed, this is not the best diameter of commutation, but that it has to be slightly shifted forward. The angle which a diameter of commutation makes with the direction of the field produced by the field magnets is called the "angle of lead" of the brushes.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

2,388, Chimney-pots. R. Fox.

To prevent smoky chimneys, according to this invention a pot is made with the body cylindrical and the lower portion square or oblong on plan, with a flange at bottom. Near the top of the body and to the outside of it there are soldered two pieces of metal, one in the form of a hollow truncated cone, and the other of a similar shape, but inverted. The two pieces of metal at the edge of their larger diameters are soldered together, and at their smaller ones they are soldered into the body of the pot. In the lower of these two cones holes are formed for the entry of air. Three cones are placed one above the other on the pot, the whole surmounted by a dwarf cylinder, in which also are holes protected by wind guards. The wind entering the holes in the lower cone, passes through the small spaces, and issues in a cylindrical stream into the body of the pot from the space left between the inner and outer cones.

5,748, Fixing Letters to Fascias. J. Willmott. This invention consists in applying holding devices to support the letters in such a way that the device is not visible in front of the letter.

5,790, Drain-pipe Joints. W. S. Emden. The socket of the pipe which is the subject of this patent is made with an inwardly projecting lip at its mouth, the lip nearly fitting the outer periphery of the inserted pipe, or a collar is fitted for a similar purpose. To make the joint, a lateral hole is made through the wall of the socket on its upper side, and after the pipe is inserted and luted round the narrow mouth of the socket, liquid cement is poured through this hole to fill the annular space within the socket.

5,806, Casement Windows. G. Prince and G. Clough.

A pinion wheel is fixed on a stud plate fixed to the casement window. Two brackets are fixed on the window frame, and the worm on a rod. This rod works in the brackets by means of a wheel or bands, which, when it is turned, opens or shuts the window at any required distance.

915, Paint Cans. E. Norton.

In order to provide a paint can of cheap and simple construction, which may be securely closed without the use of solder after the can is filled, a seam is by this invention folded or formed upon the top of the can, so that an ordinary slip cover may fit snugly over the same.

19,288, Blower for Grates. G. Lake.

The blower is a sheet of metal fitting close about the open front of the grate above the bars, and adapted to make a practically air-tight contact to prevent access of air above the fire. It is simply fixed by resting on the top bar of the grate, the difference in atmospheric pressure keeping it in position.

NEW APPLICATIONS FOR PATENTS.

March 10.—3,763, H. Horesey, Glazing, Withaws, &c.—3,774, S. Ingram, Sash Fastener.

March 11.—3,793, S. Flavel, Cooking-ranges and Fire-grates.—3,798, E. Cammish, Brick Moulds and Dies.

March 12.—3,882, T. Birtwistle and S. Bardsley, Safety Hinge for Folding Ladders.—3,883, C. Whitfield, Open Fire-places.—3,887, W. Thompson, Ventilators.

March 13.—3,942, G. Smith and B. Cooper, Joining Head-pipes.—3,974, J. Hart, Nails.—3,985, G. Moller, Kilns for bricks, tiles, &c.

March 14.—3,994, J. Anderson, Mortar-cutting Machines.

March 15.—4,066, J. Tracy, Heating Buildings, &c.—4,069, H. Conway, Brick for building pu

Lead and Lead-workers.—A lecture on "Lead and Lead-workers" was delivered in the Lecture Hall of the Philosophical Institution, Edinburgh, a few days ago, under the auspices of the National Registration of Plumbers District Council for East Scotland. There was a large attendance of members of the plumbing trade and the public. The lecturer, Mr. James Macdonald, R.P.C., said it was during the Middle Ages that lead first began to assume that important character with regard to architecture which it still maintained. There could be no doubt that leaden roofs were known as far back as the gardens of Nebuchadnezzar and the porches of the Latin basilica, but it was to the magnificent roofs of the French and English cathedrals that they must look for the best possible type of its architectural value and importance. After referring to the frequent mention of lead in Scripture, the lecturer stated that the first gravitation supply of water to the city of Edinburgh was by means of a leaden pipe which in 1681 was laid from the Couiston Springs to a reservoir on Castle Hill. He inveighed against the modern plumber for consigning everything in the shape of lead to the melting-pot, and expressed his opinion that it was not creditable to the Edinburgh National Museum that it contained so few and meagre specimens of old lead-work. He particularly urged that a scientific knowledge of the properties of lead was essential to plumbers to enable them to so manipulate it as to secure the greatest durability and the most satisfactory results generally. Scottish plumbers were to be found in all parts of the globe, and, generally speaking, they took a distinguished position; but they, and all other plumbers, must improve themselves by earnest study in order to keep themselves abreast of the exacting demands and varying conditions of modern house sanitation. In conclusion, he strongly advised his hearers to take advantage of the facilities offered by the Plumbers' Laboratory in connexion with the Heriot Watt College.

The English Iron Trade.—The English iron market continues quiet, and reports as to its tendency vary greatly. The process of buying pig-iron is still a slow one, consumers only purchasing for immediate requirements, and this of merchants, as makers are out of the market at present, owing to the great difference of prices quoted by second-hand holders and producers. Although the Glasgow warrant-market has been firmer, not much business has been done during the week. Scotch makers' iron is also quiet, and prices quoted are irregular. Middlesbrough iron has gone up from 1s. to 1s. 6d. per ton. Bessemer iron in the north-west is unchanged with makers, while hematite warrants are advancing. In other districts prices are still weak. The trade done in finished iron is small, and values have not recovered strength. The demand for steel is dull, and as orders are not coming forward very readily, prices are going down. There is no further decline in rails in the north-west, but no orders can be obtained for blooms, billets, and slabs at 5s. 5s. to 5s. 10s., which is quite 10s. a ton lower than last week. Plates are likewise falling away in price. Shipbuilders are not booking any new orders, and engineers also report themselves quieter.—*Iron.*

Selby New Town-hall.—The Leeds Mercury reports that in a limited competition, plans submitted by Mr. H. Thorp, of Leeds, have been accepted by the Selby Local Board for a new Town-hall, to be erected on a corner site at the junction of Gowthorpe-street and New-lane. The building is intended to take the place of the existing inconvenient Local Board offices, which will be pulled down to make way for the new structure. The accommodation to be provided will comprise a large Board-room, committee-room, Clerk's and Surveyor's offices, and a fire-engine station. The building is designed in the Tudor-Gothic style. It will have gables to each street, mullioned windows, and an angle oriel, with a steep pitched roof. Externally it will be faced with brickwork of a deep red colour, contrast being obtained by the use of cream-coloured Ancaster stone for the door and window dressings, and other architectural features.

Assistant Surveyorships, Staffordshire County Council.—We are informed that the successful applicants for the five assistant surveyorships under this Council are Mr. J. Percy Gates, Worthing; Mr. J. Howarth, Liverpool; Mr. Alex. Kinnison, Eassie, Forfarshire; Mr. Chas. S. Morris, Bury St. Edmunds; and Mr. James Wylie, Linlithgow.

Madagascar Timber.—Strenuous efforts are being made to introduce timber from Madagascar into the English market. Hitherto the "Great African island" has exported but little in this direction, and most of what has arrived, chiefly smuggled ebony, seems to command good prices. Until quite recently the Malagasy Government prohibited the export of timber from the island, but at length a concession was granted to an Englishman, and a company has been formed to work it. This, the "Madagascar Forests Company, Limited," entertained a large number of timber merchants and others at luncheon at the Cannon-street Hotel, on Thursday, the 20th inst., Mr. J. W. Shepherd (of Messrs. Seccion & Shepherd) in the chair, to inspect samples of the wood. Amongst those present who referred to the timber resources of the country were Mr. S. Procter (Consul for Madagascar) and Mr. T. Roe, M.P. The principal varieties exhibited were a kind of rosewood, yellow teak, mahogany, and a remarkable species of the last-mentioned called "matte." All were peculiar in being very heavy, and, at the same time, not difficult to work. Subsequently the party went to the docks and viewed the materials in bulk. Judging from inquiries already made by merchants, it seems tolerably certain that Madagascar wood will soon become a conspicuous feature in the timber trade.

PRICES CURRENT OF MATERIALS.

TIMBER.		£.	s.	d.	£.	s.	d.
Greenheart, B.G.	ton	6	15	0	7	5	0
Teak, E.I.	load	11	0	0	14	0	0
Sesuvial, Cuba	do	3	0	0	3	0	0
Ash, Canada	load	3	0	0	4	0	0
Birch	do	3	0	0	5	0	0
Elm	do	3	10	0	4	15	0
Fir, Danzig	do	2	0	0	3	10	0
Oak	do	2	10	0	4	10	0
Canada	do	5	10	0	6	10	0
Pine, Canada	do	2	10	0	3	10	0
" "	yellow	2	0	0	5	0	0
Lath, Danzig	fathom	5	0	0	6	0	0
St. Petersburg	do	5	0	0	7	10	0
Walrusot, Riga, &c.	do	0	0	0	0	0	0
Deals, Finland, 2nd and 1st. std.	do	8	0	0	11	0	0
100	do	0	0	0	7	10	0
" "	4th and 3rd	7	0	0	7	10	0

TIMBER (continued).		£.	s.	d.	£.	s.	d.
Deal—Riga	do	7	0	0	8	10	0
St. Petersburg, 1st yellow	do	10	0	0	14	0	0
" "	2nd	8	0	0	10	0	0
Swedish " "	white	6	10	0	10	0	0
White Sea	do	8	0	0	17	0	0
Canada, Pine, 1st	do	15	0	0	26	0	0
" "	2nd	10	10	0	17	0	0
" "	3rd &c.	7	10	0	15	0	0
" "	Spruce, 1st	8	15	0	11	0	0
" "	3rd and 2nd	6	15	0	8	10	0
New Brunswick, &c.	do	6	0	0	8	10	0
Battens, all kinds	do	6	0	0	16	0	0
Flooring Boards, sq., 1 in., prepared, First	do	0	11	0	0	14	0
Second	do	0	8	0	0	10	0
Other qualities	do	0	0	0	0	0	0
Cedar, Cuba	foot	0	4	0	0	0	0
Honduras, &c.	do	0	4	0	0	0	0
Mahogany, Cuba	do	0	0	0	4	0	0
St. Domingo, cargo average	do	0	0	0	0	0	0
Mexican, cargo average	do	0	0	0	4	0	0
Tobacco	do	0	0	0	5	0	0
Honduras	do	0	13	0	0	0	0
Box, Turkey	ton	4	0	0	13	0	0
Rosa, Rio	do	15	0	0	20	0	0
Bahia	do	14	0	0	18	0	0
Salin, St. Domingo	foot	10	0	0	9	1	0
Porto Rico	do	0	10	0	0	1	0
Walnut, Italian	do	0	0	0	4	0	0

METALS.

METALS.		£.	s.	d.	£.	s.	d.
Bar, Welsh, in London	ton	7	15	0	8	0	0
" "	at works in Wales	7	15	0	8	0	0
" "	Staffordshire, in London	8	10	0	9	10	0
Copper—British, cake and ingot	63	0	0	63	10	0	
Best selected	do	55	0	56	0	0	
Sheets, strong	do	62	0	0	0	0	
Chili, bars	do	48	10	0	0	0	
Yellow Metal	lb.	0	0	5	4	0	
LEAD—Pig, Spanish	ton	12	12	0	13	0	
English, com. brands	do	12	12	0	13	0	
Sheet, English	do	14	10	0	0	0	
Tin	do	15	0	0	0	0	
Strait	do	90	15	0	0	0	
Australian	do	90	10	0	0	0	
English Ingots	do	95	0	0	0	0	
OILS.		£.	s.	d.	£.	s.	d.
Liaised	ton	23	5	0	23	12	0
Coconut	do	27	15	0	28	0	0
Cocunut, Ceylon	do	25	5	0	0	0	
Palm, Lagos	do	24	10	0	0	0	
Rapeseed, English pale	do	32	10	0	0	0	
" "	brown	31	0	0	31	0	
Cottonseed, refined	do	22	5	0	0	0	
Tallow and Oleine	do	21	0	0	40	0	
Lubricating, U.S.	do	5	10	0	6	10	
" "	refined	7	0	0	12	0	
TAR—Stockholm	barrel	1	6	0	0	0	
Archangel	do	0	17	3	0	0	

COMPETITION, CONTRACTS, & PUBLIC APPOINTMENTS

Epitome of Advertisements in this Number.

COMPETITION.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
Laying-out Cemetery	Crumpsall Local Board	20s. and 10s.	May 10th	ii.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Iron Fencing, &c.	Beckenham Local Bd.	J. G. B. Carlton	Mar. 31st	ii.
Improvements to Road, &c.	do	do	do	ii.
Paving Works	Brentford Local Board	J. H. Strachan	April 1st	xiii.
Brick Sewer	E. Barnet Valley L. B.	G. W. Brunell	do	ii.
Roadmaking Works	Ealing Local Board	C. Jones	April 3rd	ii.
Supply of Flints	West Sussex County Council	do	do	ii.
Works at Liverpool and Birmingham	Midland Ry. Co.	C. Adecock	do	xiii.
Cleaning, &c., Works at Cheltenham, &c.	do	Official	do	xiii.
Broken Blue Guernsey Granite	St. Matthew (Bethnal Green) Vestry	F. W. Barratt	do	xiv.
Broken Flints	Kingston-on-Thames Corporation	Official	do	xiii.
Supplying and Fixing Waterpipes, Plymouth	Royal Agricultural Soc. of England	do	do	xiii.
Alteration and Repairs to Hackney College	Bethnal Green Guardians	A. & C. Harston	April 5th	ii.
Gravel Paving	Swansea Harb. Trustees	A. J. Schenk	April 7th	ii.
Well Sinking	Gainsborough L. B.	D. G. Macdonald	April 8th	ii.
Additional Workshop Accommodation	Hackney Union	W. Barrow	April 9th	ii.
Alterations at Schools	Westminster Union	J. Waldron	April 11th	xiv.
Extension of Lending Department Buildings	Sheffield Gas Light Co.	F. W. Stevenson	April 14th	ii.
Outfall Sewers	Working Pier Co. Lim.	Jas. Mansergh	do	xiii.
Works, Electric Testing Station	West Ham Council	Lewis Angell	April 15th	ii.
Alterations to Nuneaton Post-Office	London County Council	Official	April 16th	xiii.
Wood Block Paving	Com. of H.M. Works	do	do	xiii.
Cast-iron Water Mains	Bournemouth Commrs.	F. W. Lacey	do	xiv.
Painting, &c., Works, S.E. Hospital	Hastings R.S.A.	Jeffery & Skilling	do	xiv.
Telegraph Factory, Clerkenwell	Metro. Asylum Board	Jarvis & Son	April 17th	ii.
Additions to General Post-Office, East, &c.	Com. of H.M. Works	Official	do	xiii.
Mission Buildings, Kensal-road, W.	do	do	do	xiii.
		A. R. Pite & Son	Not stated.	

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Road Foreman	Birmingham Twn Coun.	Not stated	April 2nd	xviii.
District Surveyor	Sheffield Corporation	do	April 5th	xviii.
Borough Engineer's Assistant	Salford Corporation	120l.	April 7th	xviii.

TENDERS.

** Next week, communications for insertion under this heading must reach as not later than 12 noon on Wednesday, as we go to press a day earlier than usual.

BEXHILL-ON-SEA.—For completion of the Marine Mansions Hotel. Mr. J. B. Wall, architect, Walbrook, R. Cooper.....£3,138 4 8
H. L. Holloway.....2,714 0 0
P. Jenkins.....2,709 0 0
Eldridge & Crutenden.....2,682 0 0
J. King.....2,479 0 0
J. W. Webb.....2,369 16 0
J. G. Nicolls, Cañford (accepted).....2,335 15 0

DARVAL (Ayrshire).—For the erection of a house at Darval, Ayrshire, for Mr. A. Jamieson. Mr. T. H. Smith, architect, 17 and 18, Basinghall-street, E.C. :—
Anderson.....£1,250 0 0

EALING.—For additions to St. Mary's Boys' School, Ealing. W. Mr. Robert Willey, architect, 66, Ludgate Hill, E.C. :—
Grover, Ealing.....£430 0 0
Down, Ealing.....424 0 0
Jobbins, Ealing.....410 0 0
Jones, Ealing.....405 0 0
Sills, Ealing.....390 15 0
Nye, Ealing (accepted).....388 10 0

FAREHAM (Hants).—For the erection of an engine-house, coal-store, chimneys, &c., cottages, and other works, at the Knowle Asylum Waterworks, or the Hampshire County Council. Mr. Edward T. Hoed, engineer, Southampton. Quantities by Mr. John H. Gait, architect, Waterbury-lane :—
R. E. Faasy, Tanton, Somerset.....£1,970 0 0
J. Plimmer, Fareham.....1,055 0 0
W. H. Simonds, South-street, Reading.....1,490 0 0
Jas. Crockerell, Milford-road, Fareham port, Hants.....1,445 16 0
Claridge & Bloxham, Banbury, Oxon.....1,360 0 0
M. S. Hill, Belford-road, Fow. E.....1,330 0 0
W. Franklin, Portsmouth, Southampton.....1,290 0 0
Morgan, Iseld, & Morgan, Newport.....1,286 0 0
P. T. Hall, Belford-road, Southsea*.....1,202 0 0
* Accepted.

FAREHAM (Hants).—For supply, laying, or fixing in, water mains and castings, sluice-valves, &c., rough-iron service-pipes and fittings, erecting iron tank, supplying and erecting engine and pumps, building engine-room, &c., at the Southampton Waterworks, Fareham, for Mr. Montague H. Foster. Mr. W. P. Hill, engineer, Southampton, Middlesex :—
H. Clark, Fareham.....£516 0 0
W. Leamouth, Ensworth-road, Portsmouth.....768 6 6
The Water Fittings and Sanitary Engineering Co., Portsmouth.....763 5 2
G. Holdaway, Gosport-road, Fareham.....725 0 0
Jas. Crockerell, Milford-road, Landport.....714 0 0
A. J. Gould, Fareham.....690 0 0
Geo. G. Warby, Fareham.....688 7 8
T. P. Hall, Belford-road, Southsea.....651 0 0
Wm. Jenkins & Son, 36, The Parade, Leamington Spa (accepted).....632 13 6

HASTINGS.—For alterations and additions at "The Hermitage," Silverhill Park, Hastings. Mr. Arthur Collins, architect, 25, Havelock-road, Hastings :—
Taylor Bros., Hastings.....£550 0 0
Thos. Salter, St. Leonard's.....530 0 0
Eldridge & Crutenden, St. Leonard's.....530 0 0

HIGH WYCOMBE (Bucks).—For new saw sheds and machinery shops, &c., for the High Wycombe Timber and Cabinet Manufacturing Company, Limited. Mr. Thos. Thurlow, architect, High Wycombe :—
Hunt, C. H.....£636 0 0
Woodbridge, G. J.....613 0 0
Lacey, J.....559 3 6
Myrton, A. H.....558 0 0
Harris, H.....555 18 0
Pliat and Maudford.....579 0 0
Gibson, G. F.....572 12 0
Bond, J. (accepted).....547 10 0
Nash & Sons.....537 10 0
* B.—Company supplying timber.
† Withdrawn.

HIGH WYCOMBE (Bucks).—For new business premises, 81 and 85, Easton-street. Mr. Thos. Thurlow, architect, High Wycombe :—
G. J. Woodbridge.....£205 0 0
G. H. Gibson.....833 0 0
C. H. Hunt.....727 0 0
Pliat & Maudford.....696 0 0
W. E. Loosley.....677 17 0
Nash & Sons (accepted).....659 10 0

HIGH WYCOMBE (Bucks).—For new business premises and cottages, Oakdam, for Mr. G. Pictou. Mr. Thos. Thurlow, architect, High Wycombe :—
J. Bond.....£1,039 10 0
G. H. Gibson.....1,028 13 4
C. H. Hunt.....980 0 0
Nash & Sons.....946 0 0
W. R. Loosley (accepted).....917 0 0

LEICESTER.—For alterations and additions to premises (allowing for old materials), Gallowtree-gate, Leicester, for the Northamptonshire Union Bank, Limited. Mr. A. T. Draper, architect, Leicester :—
Hutchinson & Son.....£1,668 0 0
H. Black.....1,474 0 0
C. Wright.....1,425 0 0
J. O. Jewsbury.....1,365 0 0
G. Hewitt.....1,335 0 0
H. Bond (accepted).....1,253 0 0

LONDON.—For the enlargement of the Duncombe-road School, Upper Holloway, by 400 places, for the School Board for London. Mr. T. J. Bailey, architect :—
If Brickwork is built in cement.
Kilby & Gayford.....£14,020£14,150
J. Grover & Son.....13,64013,730
Peto Bros.....13,62213,796
Dove Bros.....13,49313,695
G. S. Williams & Son.....13,40013,599
W. Goodman.....13,34813,502
B. E. Nightingale.....13,23013,335
E. Lawrence & Sons.....12,91313,023
* Recommended by the Works Committee for acceptance.

LONDON.—For the enlargement of the West-square School by 400 places, for the School Board for London. Mr. T. J. Bailey, architect :—
If brickwork is built in cement.
B. E. Nightingale.....£9,423£9,525
Dove Bros.....8,2808,365
Patman & Fotheringham.....8,1918,271
Colls & Son.....8,1538,239
Peto Bros.....8,0528,136
Stephens, Bastow & Co.....7,8997,979
W. H. Lorden & Son.....7,8797,967
J. M. Macey & Sons.....7,8077,921
D. Charteris.....7,6387,738
Lathey Bros.....7,4507,570
* Recommended by the Works Committee for acceptance.

LONDON.—For the enlargement of the Gravel-lane School, Houndsditch, by 210 places, for the School Board for London. Mr. T. J. Bailey, architect :—
If brickwork is built in cement.
Staines & Son.....£2,944 0 0£2,974 0 0
W. L. Kellaway.....1,972 16 61,992 17 10
B. E. Nightingale.....1,995 0 01,945 0 0
Kilby & Gayford.....1,920 0 01,965 0 0
Atherton & Latta.....1,913 0 01,950 0 0
J. Greenwood & Son.....1,889 0 01,913 0 0
Colls & Son.....1,801 0 01,822 10 0
J. Mansland.....1,757 0 01,777 0 0
* Recommended by the Works Committee for acceptance.

LONDON.—For the enlargement of the Flora-gardens School, Hemerton, by 200 places, for the School Board for London. Mr. T. J. Bailey, architect :—
If brickwork is built in cement.
Peto Bros.....£1,459 0 0£1,459 0 0
E. Lawrence & Sons.....1,345 0 01,345 0 0
Lathey Bros.....1,336 0 01,336 0 0
T. Droye.....1,315 0 0£1,340
J. Mansland.....1,188 0 01,206
Colls & Sons.....1,180 0 01,206
* Recommended by the Works Committee for acceptance.

LONDON.—For the provision of a new class-room to accommodate fifty children at the Upton House Truant School, Hemerton, for the School Board for London. Mr. T. J. Bailey, architect :—
Atherton & Latta.....£348 0 0
C. Cox.....337 0 0
J. Grover & Son.....330 0 0
W. L. Kellaway*.....297 10 0
Staines & Son.....296 0 0
* Recommended by the Works Committee for acceptance.

LONDON.—For new premises, Long-lane, Bernouisey, for Messrs. Margaret, Welch & Co. Mr. W. Newton Dunn, architect :—
Hall, Beddall, & Co.....£22,926 0 0
Rider & Son.....22,778 0 0
Oulhwaite.....21,950 0 0
Morter.....20,710 0 0
Williams.....20,400 0 0
Ashby & Horner.....20,410 0 0
Colls & Sons.....20,290 0 0
Holliday & Greenwood.....20,200 0 0
John Greenwood.....20,080 0 0
Stimpson.....20,000 0 0
Downs.....19,662 0 0

LONDON.—For rebuilding Nos. 43, 44, 45, 46, and 47, Threadneedle-street, and Nos. 1, 2, 3, and 4, Crown-court, E.C. Mr. T. H. Smith, architect, 17 and 18, Basinghall-street, E.C. :—
W. Brass & Son.....£19,577 0 0

LONDON.—For painting, &c., at Kennington Park, for the London County Council :—
Grooves.....£474 0 0
Gillingham.....343 0 0
Stammers.....313 0 0
Blandford.....297 0 0
G. Barker.....295 0 0
Akers.....274 0 0
Read.....245 15 0
Rhodes.....245 10 0
Lapthorne.....239 0 0
King Bros.....211 0 0
Arthur.....210 0 0

LONDON.—For alterations to "The Old Red Cow," Long-lane, Smithfield, for Messrs. Fleck & Son. Mr. Wm. West, architect, 19, Craven-street, W.C. :—
G. Barker (accepted).....£163 0 0

LONDON.—For alterations at the "Bell Tavern," High-street, Shoreditch, for Messrs. Gower & Levy. Mr. J. G. Needham, architect, 11, Powerscroft-road, Lower Clapton, N.E. :—
A. Hood (accepted).....£225 0 0

LONDON.—For repairing, painting, and decorating at "Hetherst," Leigham Court-road, Streatham Hill, for Mr. B. Smith. Mr. T. Phillips Figgis, architect :—
John Greenwood (accepted).....£215 0 0
[No competition.]

LONDON.—For building public free library at Notting Hill, for the Commissioners. Messrs. Figgis & Wilson, 5, Abchurch-lane, London-bridge, architects. Quantities by Mr. R. C. Gleed :—
Jolliffe.....£5,495 0 0
Simpson & Son.....4,929 0 0
Toten & Sons.....4,850 0 0
Fulman & Fotheringham.....4,729 0 0
Colls & Son.....4,771 0 0
Lawrence & Sons.....4,730 0 0
Servivener & Co.....4,713 0 0
Godson & Sons.....4,578 0 0
Sealey.....4,460 0 0
Greenwood (accepted).....4,399 0 0
Hayden (withdrawn).....3,903 0 0

LONDON.—For new house and stabling, Rycroft-road, Streatham Common, for Mr. Geo. Farron. Messrs. Notley & Rich, architects :—
Laurence & Son.....£5,224 0 0
S. J. Scott.....5,100 0 0
Mason.....4,968 0 0
C. Cox.....4,968 0 0
Candler.....4,900 0 0
John Greenwood.....4,777 0 0
J. C. Bowyer.....4,671 0 0
Coulsett.....4,642 0 0

LONDON.—For erection of band-stand at Clapham common, for the London County Council :—
Parham.....£1,280 0 0
Smith.....1,150 0 0
Laphorne.....997 0 0
Macey.....964 0 0
John Greenwood.....869 0 0
J. Martin.....857 0 0

LONDON.—For the erection of new studios, Oakley-street, Chelsea, for Mr. W. Douglas. Mr. Elton Hawkins, architect, 19, York-buildings, Adelphi, W.C. Quantities by Mr. C. G. Saunders, 5, Agar-street, Strand, W.C. :—
S. G. Bird.....£4,098 0 0
T. L. Green.....3,959 0 0
W. H. Smith.....3,853 0 0
T. Gregory & Co.....3,857 0 0
W. Johnson.....3,630 0 0

LONDON.—For rebuilding No. 69, Wood-street, E.C. Mr. T. H. Smith, architect, 17 and 18, Basinghall-street, E.C. :—
W. Brass & Son.....£2,026 0 0

LONDON.—For the erection of a warehouse, &c., at rear of premises in Richmond-street, St. Luke's, for Mrs. Martha Emms. Mr. W. Smith, architect, 62, Chancery-lane :—
Wilkinson.....£1,085 0 0
Langham.....1,049 0 0
Larke & Son.....1,044 0 0
Larke & Launb.....973 0 0
Stephens.....948 0 0
Mottock Bros.....933 0 0
Dearing & Son.....860 0 0
Baylis.....776 0 0

LONDON.—For pulling down and re-erecting No. 32, Hanbury-street, Spitalfields, E., for Mr. G. A. Vignus. Mr. John Hudson, architect, 80, Leman-street, E. :—
Zinc Roof, Asphalted Roof.
F. W. Horey, Whitechapel.....£1,029£1,047
Eaton & Co., Whitechapel.....9971,022
T. Little, Whitechapel.....9971,022
S. W. Hawkins, Old Ford.....873904
R. G. Battley, Old Kent-road.....844850
Cousell Bros., Bethnal Green.....842874
W. Gladding, Mile End*.....806711
* Accepted.

LONDON.—For the forming of a new party-wall and other alterations, to 14 and 15, Cockspar-street, S.W. Messrs. Glasier & Sons, surveyors :—
T. Rider & Son.....£1,138 0 0
F. G. Davis.....1,134 7 6

LONDON.—For pulling down and re-erecting Nos. 70, 72, and 74, Upper Mall, Hammersmith, for Mr. Wm. Mussard. Mr. Geo. Saunders, architect, 111, King-street, Hammersmith. No quantities :—
Blackburn.....£908 0 0
Nye.....675 0 0
Atkinson Bros.....654 0 0
H. G. Heywood.....647 0 0
Beaven.....625 0 0
Webb & Rossi.....395 0 0

LONDON.—For alterations, repairs, &c., at 5, Buckingham-street, W., for Mrs. Fisher. Mr. John H. Martin, surveyor, 33, Albany-road, S.E. :—
Longland (accepted).....£370 0 0

LONDON.—For alterations and repairs to 200, Great Titchfield-street, for Mr. Briggs. Mr. John H. Martin, surveyor, 33, Albany-road, S.E. :—
Cordwell.....£369 10 0
Longland.....366 0 0
Phelps & Son.....352 0 0
J. Derry (accepted).....337 0 0

LONDON.—For alterations to the "Royal Oak" public-house, Whitechapel-road, E., for Mr. Samuel D. Isaacs. Mr. Joseph G. Needham, architect, 11, Powerscroft-road, Lower Clapton, N.E. :—
J. & F. Banc.....£244 10 0
Walker Bros.....327 0 0
G. Lusk.....325 0 0
A. Hood.....312 0 0
G. Barker.....299 0 0
A. & F. Wilson (accepted).....248 0 0
Gasfittings.
Unzar & Co. (accepted).....33 15 0

LONDON.—For new shop front and back addition at 65, High-street, Deptford, for Messrs. Bland & Phillips. Messrs. Searle & Hayes, architects. No quantities.—
 Barber 335 0 0
 Barker 300 0 0
 Worsley & Co. 357 0 0
 John Greenwood 333 0 0
 Schofield 336 0 0

LONDON.—For alteration and additions to No. 1, University-street, Tottenham Court-road, W.C., for Messrs. T. W. Thompson & Co. Messrs. Bray, Young, & Co., architects. Quantities supplied by Mr. A. Johnson:—
 Hall, Beddall, & Co. £800
 Patman & Fotheringham 845
 Scrivener & Co. 763
 Scharian & Co. (accepted) 678

LONDON.—For alterations, &c., at the City Arms, Blomfield-street, London Wall, E.C., for Messrs. Jones Bros.:—
 R. H. Bax, Mountgrove-road, Highbury (accepted) £110
 No competition.

LONDON.—For additions and repairs to two houses, Hampstead-lane, N., for Mr. Wm. Piper. Mr. Edward J. Paine, architect, 11, Great James-street, W.C. Quantities supplied:—
 Stimpson & Co. £466 0 0
 Bailey 454 0 0
 Southcott & Co. 433 0 0
 Oliver & Richardson 415 0 0

MALTING (Kent).—For the erection of a new brewery, stabling boundary wall, &c., for Mr. W. Mercer. Mr. Arthur Kinder, architect, Suffolk House, Laurence Pountney-hill, Cannon-street, London, E.C. Quantities by Mr. Alexander H. Kinder, 34, Clements-lane, E.C.:—
 Brewery. Stabling.
 Geo. Hodges, West £3,978 19 3
 W. H. Archer, Gravesend 2,657 0 0
 H. Stiff, Dover 2,685 0 0
 G. E. Wallis & Sons, Maidstone (accepted) 2,420 0 0
 556 0 0

ROMFORD.—For erecting the new Church of St. Alban. Mr. J. Kennedy, architect, 31, Great James-street, Bloomsbury, W.C. No quantities supplied:—
 Dupout, Colchester £1,805 0 0
 Booth, Romford 1,489 0 0
 Hammond & Son, Romford 1,338 0 0
 Watson, Ilford 1,312 10 0
 Ivory, London 1,249 0 0
 Downing & Dairs, Romford 1,210 10 5

ROMFORD.—For enlarging the Albert-road Schools, for the Romford School Board. Mr. John Hudson, architect, 80, Leman-street, E. Quantities supplied:—
 D. Argent, Barking £1,175 0 0
 T. Bray, Hornchurch 1,150 0 0
 W. Watson, Ilford 1,137 0 0
 W. Gladding, Mile End 1,038 0 0
 Consell Bros., Rednal Green 1,033 0 0
 C. Barnes, Ilford 996 0 0
 Hammond & Son, Romford* 917 0 0
 * Accepted.

STRATFORD.—For the erection of shop and warehouse in Burford-road, Stratford, E., for Mr. Samuel Clapp. Mr. John Hudson, architect, 80, Leman-street, E.:—
 W. R. Boney, Forest Gate £785 0 0
 A. Reed, Stratford 711 0 0
 Norton & Son, Stratford (accepted) 706 0 0

WOBURN SANDS.—For building "Wavendon Towers," at Wavendon. Mr. Charles Granville Baker, architect, 5, Bloomsbury-square, London, W.C.:—
 S. Foster £4,805 0 0
 [No competition.]

Lists of Tenders for works at Southwark, Mitcham, and Loughton, received without senders' names, are ineligible for insertion.

* * Next week, communications for insertion under this heading must reach us not later than 12 noon on Wednesday, as we go to press a day earlier than usual.

SUBSCRIBERS IN LONDON and the SUBURBS, by prepaying at the Publishing Office, 19s. per annum (or 4s. 6d. per quarter), can ensure receiving "The Builder" by Friday Morning's post.

TO CORRESPONDENTS.
 J. F. L. (the statement is practically an advertisement).—P. D.—A. H. (too late).—W. A. H. (we will inquire).—G. V. (we do not care for such local).—A. S. (for space).—All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, and 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 newsworthy) which have been duplicated for other journals, are NOT DESIRED. All communications regarding editorial 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.

PUBLISHER'S NOTICES.
 Registered Telegraphic Address, "THE BUILDER, LONDON."

GOOD FRIDAY.—THE BUILDER for the Week ending THURSDAY, APRIL 5th, will be issued on THURSDAY, the 3rd. Advertisements for insertion in that issue must therefore reach the Office before THREE p.m. on WEDNESDAY, the 2nd. Alterations in Standing Advertisements, or ORDERS to DISCONTINUE the same, must be at the Office by TEN o'clock on TUESDAY Morning.

CHARGES FOR ADVERTISEMENTS.
 SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS.
 Six lines (about fifty words) or under 4s. 6d.
 Each additional line (about ten words) 6s. 6d.
 Terms for Series of Trade Advertisements, also for Special Advertisements on front page, Competitions, Contracts, Sales by Auction &c. may be obtained on application to the Publisher.

SITUATIONS WANTED.
 Four Lines (about thirty words) or under 2s. 6d.
 Each additional line (about ten words) 6s. 6d.
 PREPAYMENT IS ABSOLUTELY NECESSARY.
 * * Stamps must not be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, Covent-garden, W.C. to DOUGLAS FOUNDRINER, Publisher.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY, but those intended for the front Page should be in by the same hour WEDNESDAY.

SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS to DISCONTINUE the same must reach the Office before TEN 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 of the latter COPIES ONLY should be sent.

PERSONS Advertising in "The Builder" may have Replies addressed to the Office, 46, Colindale-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 EDITION Printed on TRIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

BEADING CASES, New ready, NINEPENCE EACH. [By post (carefully packed), 1s.]

W. H. Lascelles & Co.
 121, BUNHILL ROW, LONDON, E.C.

Telephone No. 270.

HIGH-CLASS JOINERY.

LASCELLES' CONCRETE.

Architects' Designs are carried out with the greatest care.

CONSERVATORIES GREENHOUSES, WOODEN BUILDINGS,

Bank, Office, & Shop Fittings

CHURCH BENCHES & PULPITS

ESTIMATES GIVEN ON APPLICATION.

TERMS OF SUBSCRIPTION.
 "THE BUILDER" is supplied in strict from the Office to reside in any part of the United Kingdom at the rate of 19s. per annum. Foreign, To all parts of Europe, America, Australia, and New Zealand, 30s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittances payable to DOUGLAS FOUNDRINER, Publisher, No. 46, Catherine-street, W.C.

BEST BATH STONE.

COBSHAM DOWN. FARLEIGH DOWN. BOX GROUND. COMBE DOWN. WESTWOOD GROUND. STOKE GROUND. THE BATH STONE FIRMS, Limited. HEAD OFFICES: BATH.

DOULTING FREESTONE.

The stone from these quarries is known as the "Wesley Bed," and is of a crystalline nature, and is doubtfully one of the most durable stones in England. It is of the same crystalline nature as the Cheltenham Stone, but finer in texture, and most suitable for monumental work.

THE OBELYNOH STONE.

THE BBAMBLEDITH STONE.

Prices, and every information given, in application to CHARLES TRASK & SON, Doultling, Shepton Mallet.

London Agent—Mr. E. A. WILLIAMS, 16, Craven-street, Strand, W.C. [ADV.]

HAM HILL STONE.

The attention of Architects is specially invited to the durability and beautiful colour of this material. Quarries well opened. Quick despatch guaranteed. Stonework delivered and fixed complete. Samples and estimates free. The Ham Hill Stone Co., Norton, Stone, under Ham, Somerset. London Agent: Mr. E. A. Williams, 16, Craven-st., Strand, W.C. [ADV.]

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, A. Poultry, E.C.—The best and cheapest material for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and mill-rails, graneries, tun-rooms, and terraces. [ADV.]

STATIONERS, &c., Keep a Special Stock of Sundries for Professional Offices.

22, Martin's-lane, Cannon-street, E.C. [ADV.]

QUANTITIES, &c., LITHOGRAPHED accurately and with despatch.

METCHIN & SON, (Estab. 1841) 20, Parliament-street, S.W.

"Quantity Surveyors' Diary and Tables," 6d. [ADV.]

DRY MAHOGANY,

WAINSCOT, WALNUT, TEAK, &c.

EXTENSIVE AND VARIED STOCK

WILLIAM BLOORE,

80 to 90, BOND STREET, VAUXHALL, and 57 to 67, SOUTH LAMBETH ROAD, S.W.

TWELVE GOLD AND SILVER MEDALS AWARDED.

ZINC AND COPPER ROOFING.

F. BRAY & CO.

LONDON. ** LIVERPOOL. ** GLASGOW

352 to 362, Euston-road. 6 and 8, Hatton Garden. 47 and 49, St. Enoch-square.

VEILLE MONTAGNE SOLE MANUFACTURING AGENTS.

NO SOLDER. NO EXTERNAL FASTENINGS.

Particulars on Application Chief Offices:—Fitzroy Works, EUSTON ROAD, LONDON, N.W.

The Builder.

VOL. LVIII. No. 240.

SATURDAY, APRIL 5, 1890.

ILLUSTRATIONS.

Church of St. Victor, Xanten, Germany: View from the Cloisters.—Drawn by H. W. Brewer	Double-Page Photo-Litho.
St. Alban's Cathedral: Four Interior Views.....	Two Double-Page Photo-Litho's.
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Safety in Theatres and Places of Public Amusement.



MUCH has been done of late by the lessees and owners of London places of amusement to secure the safety and comfort of the public. New theatres and halls have risen to take

the place of dangerous structures; old theatres have been rebuilt and remodelled; thousands of pounds have been spent by our managers to meet the requisitions of the late Board of Works and the London County Council; houses and lands adjoining their premises, mostly in our busiest thoroughfares, have been purchased at great outlay; staircases have been widened, and additional exits provided to benefit a public knowing little or nothing of all that has been done for their security.

Not only have structural alterations been executed under the Metropolis Management and Building Act Amendment Act, but other important changes have been carried on voluntarily by the lessees. The advance of science has brought a valuable aid to them in the form of the electric light, which has been installed in many theatres and halls at considerable outlay. In some cases "power" has had to be specially provided, and the scenery repainted to adapt it to the varied quality of the new light. The installation of the new fittings, both to auditorium and stage, and the extra nightly cost over and above that of gas, have all been additional expenses borne by lessees for the good of the public.

Where electric light is used, we can now go to a theatre without experiencing a feeling of suffocation; the risk of getting overheated, and catching cold after hy going into the night air, is avoided. Even a much more important object than this is attained—the reduction of fire risk. The old gas system was and is a bad one in every way. The proximity of gas, too often unprotected, to inflammable material, and the escape from the joints of the temporary pipes which connect up the border and ground rows, are dangers that occur in the best supervised theatres. Where the electric light is used all this danger is avoided.

In dealing with places of public amusement,

one must ever bear in mind that one great object is to prevent panic; in order to do this avoid fire risk, narrow passages, winding staircases, insufficient exits, crowded seating, and an unsuitable site. Theatres, and all public buildings of this class, should be entirely fire-resisting, having nothing in their construction that will readily ignite; hy this means the ordinary methods of fire extinction, along with strict supervision and adequate appliances, will be found sufficient for the protection of the building. By giving careful consideration to the planning and disposition of the various parts, and judicious choice of the materials for construction, a theatre can, in spite of its being such a heavy fire risk, be made as safe as any other building, and the business of the house can be carried on with perfect security to both life and property.

The first thing, however, for the architect to learn is, what is wanted in a theatre, and how a house should be arranged in every detail; until this is ascertained it is useless to try and plan a "safe" theatre. It is a *sine qua non* that there must be a place for everything, and everything in its place; it is necessary to know what this everything is before the place for it can be provided, and it is only by becoming thoroughly acquainted with the *modus operandi* of "show" business that provision can be made to minimise and avoid the risks that follow.

The first point is to provide, in planning a house, that the audience and staff should be able to get out of the building in the shortest possible time, at the slightest warning. Avoid all risks of panic. Panic has more victims than fire. Many deaths occur where there is not a spark of fire in the building, and literally no danger whatever, this being in most cases due entirely to an ill-constructed and badly-planned house, unfit for the reception of numbers of people. Create confidence in the audience, and half the battle is won; show to them their safety is in their own hands, and that everything possible has been done to secure it for them by erecting a building from which they can find their way out with ease, by using materials of fire-resisting qualities, by dividing the house into many risks, and by providing separate departments for all the trades and businesses of the house.

If the public were better acquainted with the means of getting out of places of amusement, there is no doubt they would feel safer when visiting them. A great number enter

with the idea that they could never find their way out if they wanted. This is not to be wondered at considering what some of the entrances are, that the entrances are not always the exits, and the exits not always in nightly use. What are commonly labelled "emergency" doors are too often found locked and bolted—they are therefore worse than useless.

Such notices as "In case of need," "Exit in case of fire," "In case of panic," "Emergency," "Alarm exit," should never be seen; they only suggest the presence of danger, which should never be brought to the minds of the audience. Above all, the architect should study to obtain simplicity and uniformity of design in the plan. Let both sides of the house be as similar as possible.

Where there is a pit entrance on one side, let there be a corresponding one on the other; where there is a gallery staircase on the right let there be a similar staircase on the left. Place all entrances and exits where they can easily be found, and have them all used nightly every time the house is open to the public. All seats should be numbered, and the house licensed to hold that number, and no more admitted under penalty of heavy fines,—then the gangways would be left unobstructed. Until the manager is fined passages will continue to be blocked up, and the weak-minded man will be found who is willing to part with a sixpence to the obliging attendant for a camp-stool or loose chair for his own personal convenience but to the danger of his fellow-visitors.*

Judgment in the choice of materials with which to construct the building requires such great care and study that too much importance cannot be placed upon this branch of the subject. The materials employed for the erection of places for the assembly of the public, whether for amusement, instruction, or devotion, must be in every sense of the words "the best of their several kinds." The scantlings, or thicknesses, must be far in excess of what would appear to be necessary for the actual and present work which they have to perform, so that they may resist any shock or pressure that may from any cause be brought to bear upon them. In short, a

* The public themselves are greatly to blame for the way in which they enter places of amusement. They are, however, easily led, and it is a pity other managers do not follow the example of the managers of the Shaftesbury and Savoy, and compel the adoption of the queue system; then many, who cannot afford the dearer seats of the house, would be able to visit the cheaper parts in comfort and safety.

theatre, or any building of public resort, must of necessity, in comparison with other buildings, be exceedingly costly. In this we refer only to the structural part, leaving out of consideration the decoration and fittings.

As long as there are cheap buildings, danger will be rife. Sometimes, where a place of amusement is in a leading thoroughfare, the ground-floor is set aside for shops. This cannot be too strongly protested against; the reason that it is done is, of course, to get the rent of the shops, and thereby lessen the cost of the premises: but it robs the house of the very means of providing good entrances and exits, which it would otherwise glory in. We may say "glory in" advisedly, for every manager glories in his exits, and will tell you his house has better and more numerous exits than any other building in the town. Business or trade premises within the same block of buildings should never be allowed: it is only adding the risks of such trade to that of the theatre or hall. The dangers accruing from the surrounding property are often as great as from a theatre itself. In no case should persons be allowed to live or sleep, as is often done, in or about this class of building: it only increases the danger, through the carelessness of the class of people who are likely to occupy the position of caretakers. The house should be left at night to a proper fire-watch, not to persons who have been occupied in other callings all day, and who therefore are in want of sleep at night.

In enlarging theatres and halls, adjacent premises are often taken in by knocking openings in party-walls, perhaps for an extra scene-dock or additional dressing-rooms. The house next door is taken, and though never designed or built for the purposes of a public building, it is brought into the same "risk." A building, or part of a building, not specially erected for "show" business, should never be used for such purposes, as it is nearly sure to be unfit for them.

In regard to choosing a site for a theatre, it may be said that no house should be permitted to exist that is hemmed in on all sides, with only a narrow entrance as a frontage in a public thoroughfare. We too often thrust our places of amusement into cramped and crowded spaces, not caring as long as they are in the right quarter of the town for a paying concern. This, more frequently than not, is the first thought, and it is not considered if the site adapts itself to the requirements of a public building. True, it is difficult to obtain a building isolated on all four sides, and it is of course no use building a house where it will not pay; but never ought a place of public resort to be permitted where there are not wide streets running past three sides of the building, with the fourth side cut off from adjacent premises by a high party-wall, many feet higher than the buildings on either side of it.

One of the most important points to be borne in mind in planning may be called the "party-wall system;" have as many party-walls in the building as possible, making thereby every division of the house a separate fire risk. Do not be content by merely dividing the stage from the auditorium, but isolate the workshops from the main building, the dressing-rooms from the stage, the stage from the auditorium, the auditorium from the offices, cloak-rooms, saloons, corridors, passages, &c., &c. Divide each and every one of these and other sections of the house from all others vertically by strong brick walls, filling the openings with fire-resisting doors, and horizontally by fire-resisting floors. Should a fire occur in any section it would be localised, and if not extinguished, left to burn itself out where it originated, without danger to other parts of the building. The position of the workshops should be such as to ensure an entirely separate building, connected with the rest of the house by one opening only, which should be closed by a double fire-resisting door, a door which should on no account be allowed to be opened during the time of a performance. Should space permit, an open area should be left between the workshop and the theatre

proper, but where no area can be obtained, a thick brick party-wall, passing through and above the roof, should divide the workshops from all other parts of the house. Provision should be made in the workshop section for paint room, carpenter's shop, property-making room, and docks for scenery and property not in nightly use.

The painting gallery should be placed where a top studio light could be obtained, which lights should be protected from falling materials, timbers and sparks by strong wire guards. There is no special danger from scene painting, as is sometimes supposed; oil is not the medium employed except when scenes are wanted for out-door use, to resist the weather; as in the cases of open-air plays and scenic decorations such as are used in exhibition grounds.

The stage is too often used as a carpenter's shop—a custom which should never be allowed; the many dangers thus incurred need no pointing out, yet it is strange, that seldom is a special room provided for the carpenter: this work in some houses used to be carried on over the auditorium ceiling, but at any rate in London this has been stopped. A special workshop for each trade should always be provided. The gasman, the electricians, the bill-poster, the needle-women, the cleaners, should all have their respective rooms.

Many theatres still have dressing-rooms which are little better than dark holes under the stage, over-heated boxes, made of match-boarded partitions, on flies or stage floor, devoid of ventilation and light. It should be remembered that too often dressing-rooms are overcrowded, and that the heat from the glaring gas-lights over each looking-glass, where the actor "makes up," renders the room unfit for occupation. The remedy is in the hands of the architect, and is, complete ventilation; not only should as much window-space as possible be provided, but also inlets and outlets for fresh air at the floor and ceiling levels, since, unfortunately, one cannot depend upon the occupants of the room to open the windows. Every dressing-room should have a separate washing-basin for each performer, with water laid on and waste-pipes properly trapped; this would avoid the slopping about of water, and also encourage cleanliness among the poorer classes, who are engaged as supers and extras in such large numbers at many places of entertainment. Gas or electric light should be placed over each looking-glass, otherwise the artists will provide candles for their own convenience, and add greatly to the risk of fire.

Dressing-rooms might be with convenience placed to the right and left of the stage, on one side for men, and the other for women, each block separated horizontally and vertically from the stage and the rest of the building by brick-walls and fire-resisting floors. There should be separate staircases, and direct exit into the street from each section; the construction throughout should be fire-resisting, no more wood being used than is actually necessary for the provision of drawers and hanging cupboards for the disposal of the costumes in constant use. For the stock of costumes a special wardrobe should be provided. There should be no fireplaces in dressing-rooms; hot water or hot air should be used for heating purposes. The stage floor and sliders must of necessity be of wood, on which to set the scenes with ease, but much of the machinery might be well made in iron, and answer the purpose much better than the present clumsy bridges and traps, in which no alteration or advance has been made for many a long day.

On a level with the stage there should be scene-docks and property-docks, for the stowage of the scenes and properties in constant use; all other scenes and properties should be placed in the workshop section above described. The mezzanine and cellars below the stage should be used for the purpose of the machinery only, and on no account should rubbish and scenes be allowed to accumulate under the stage. Here too often the band-room is situated, and other

the building has left the hands of the architect. There should be a separate passage to the orchestra, so that the band need never approach the precincts of the stage or pass through the auditorium. Proper accommodation must be supplied for band, band-master, stage-manager, firemen, property-master, and all other sections of the staff employed behind the scenes.

The gridiron above the stage must be made sufficiently strong to carry the weight of the cloths, &c. Cases have been known where it has given way under the weight of the scenery, and let everything down in dangerous confusion on to the stage. The construction of the gridiron, flies, and fly-rails, should be of iron. Proper staircases should be provided, to enable the flymen to escape in case of danger; and direct exit into the street should not be forgotten for the stagemen and any who may be employed on the stage.

The stage should be divided from the auditorium, as is now generally recognised, by a thick, solid brick proscenium wall; this should be arched over the opening, passing through and for some height,—not less than 3ft. 6in.—above the highest part of the roofs of stage and auditorium. There need only be one opening in this wall in addition to the large or proscenium opening: namely, one pass door, from the stage to the front, for the acting manager. This opening should be protected on both sides of the walls by fire-resisting, self-closing doors. The stage should undoubtedly be cut off from the auditorium by some sort of fire-resisting or smoke-proof curtain. The failure of some of the iron curtains used on the Continent and in America has shown that they are not always to be relied on, and it is not so long ago that one stuck in a London house, and the audience had to depart without seeing the play. Thin iron curtains are really useless to retard fire, although for a time they would keep back the smoke, and allow the auditorium to be cleared. Asbestos curtains have been advocated, and seem far more fire-resisting in character than the iron curtains generally adopted. Water curtains have been proposed, but as these could not be periodically tested, on account of the destruction of property that would ensue, they cannot be recommended. Whatever is adopted must be in constant use, for anything designed to act only in case of need or in the outbreak of fire, is liable to be found wanting at the very moment it is needed. The fire curtain must be used nightly and between every act, to ensure its being in working order, and to let the audience know that it exists, helping thereby to strengthen that confidence of safety which is the cure of all fear and panic: for an "emergency" curtain coming down unexpectedly would be but the signal for a stampede.

Everything in and about a theatre, to be of any good, must be in constant use. Automatic water-sprays, and appliances that depend upon the solder melting when a certain heat is attained, and all such-like arrangements, are of very doubtful value. The system is altogether wrong. You depend upon the existence of the very danger you are trying to overcome; and where automatic appliances are provided people are apt to put such reliance in them that they ignore the ordinary precautions and become careless in their false security.

In regard to lighting, no precaution should be left untried to mitigate the dangers arising on the stage, for it is here we have to contend with the great risk. The use of the electric light has reduced the danger more than any other step that has yet been taken, but there are still hundreds of houses where an immense amount of gas is used nightly, too often in a careless manner. As the pipes are being constantly connected and disconnected during the performance, small escapes occur near naked lights, which makes one wonder that accidents happen as seldom as they do. All gas lights should be protected by wire-guards throughout the whole house.

The gas or electric light should be under the control of an expert, with a sufficient staff

of assistants. This man, during the whole time the house is open, should be stationed at the indicating plate fixed on one side of the stage near the curtain, on which plate every cock should be distinctly labelled, naming the section of the lighting system it governs, so that no error can possibly be made, and the lights lowered or put out in the wrong part of the house. A mistake like this, slight in itself, might lead to dire consequences. It takes little to start a panic—once started it is hard to stop, and prevention is better than cure.

Gas-meters should be placed in a specially-prepared and ventilated vault; the supply-pipes should be of hard metal, left visible, and coated to prevent corrosion. There should be a stop-cock on the main in the street, near the stage door, at which entrance the key should be kept, to cut off the gas from the house in case of fire. Separate meters should be fixed for each section of the house, and the gas supply made distinct, and where frequented by the public a dual system of supply should exist.

Sun-burners are preferable to gaseliers, as they greatly assist the ventilation of the house by the up draught they create; but they should be periodically cleansed, and accumulated carbon removed. This also applies to all other gas-fittings; a foul gas-burner may at any time drop a spark on inflammable materials in dressing-rooms or elsewhere.

Although the electric light is so much better than gas for lighting public buildings, it is not without its attending dangers. Recently it was reported at the Royal Opera House, Madrid, that an unusual stir was noticed on the stage, and the stage-manager requested the audience to disperse, as an accident had occurred in the electric-lighting machinery, which made it impossible to go on with the performance. Much excitement and alarm is said to have been created behind the scenes among the employes, for two of their number had been injured by the electric wires. With electricity, as with gas, safety depends on having everything in proper order. The principal danger from fire arises from over-charged wires.

It is advisable not to depend entirely upon the gas or the electric system of lighting. The electric light is sometimes apt to fail, perhaps only for a moment, from such accidents as an over-heated hearing, a broken belt, or other unforeseen cause. Although it may leave the house in darkness but for a few minutes, panic will prevail. To avoid all this, oil lamps should be placed about the building, in all sections, "in front" and "behind." These lamps should, like the notices on the walls, indicate the direction of the exits, with white lettering on red glass ground. They should be fed with oil, not spirit, and be lit before the admission of the audience.

Provision for plenty of window space should be made in all parts. This would admit of the use of artificial light being discontinued during the day, avoiding one of the great risks in such building as the careless handling of lamps, candles, and matches. Many people are in the habit after striking a match of throwing down the semi-burnt incandescent end. Firemen say that this is the origin of a large number of fires. For other reasons it is a mistake. It is a great blunder to make a place of public resort dark. In a house flooded by day with as much light as our varying climate will allow the women whose duty it is to clean the "front" of the house would not have the opportunities of scamping their work as they now do. Darkness means the accumulation of dirt and rubbish in all odd corners, ready to flare up on coming in contact with the slightest spark. A theatre or hall, for everybody's comfort and safety, should be kept clean, but as long as it is a dark hole it will not be.

There should be access from any one part of the roof to any other, with escape-ladders leading to the ground. This is of the greatest value to the firemen. The construction of the roofs throughout should be of iron embedded in concrete, finished on the outside with asphalt or other weather-resisting material. It has been found with wooden roofs over the stage

that the excessive heat and constant changes of temperature to which the roof is subject desiccates the trusses and rafters, and converts them into something little better than touchwood. For this reason the gridiron floor should be of iron. Parapet walls should divide each "risk" in a similar manner to all party-wall structures.

The several divisions of the auditorium should each have their separate entrances, exits, passages, corridors, staircases, saloons, lavatories, &c. Each section of the audience should have two exits, used also as entrances, in corresponding and relative positions on the plan, on either side of the house, placed so as each to take half of the people accommodated in such section. All exits and their approaches should lead directly into the street, and should be used only by that division of the audience for which they are designated. There should be no pass-doors, or emergency exits, leading from one part of the house to another. A door known as an "emergency door" is often only a trap, for when opened it too frequently leads into a passage, or staircase, already crowded to its utmost.

The number of tiers depends upon the class of entertainment for which the house is built. An opera-house must of necessity differ from a theatre for the drama, and a music-hall from a theatre for grand spectacle. It is a good thing, however, to reduce the number of tiers where the business will allow. A high building is a mistake for seeing, if not for hearing, as well as for safety. The arrangement of seats should be such as to allow a 3 ft. 6 in. gangway at either end of every ten to twelve seats. This would avoid that disagreeable pushing-by of the late-comer, who has a seat in the centre of a row, and who enters with no feeling of regret for the disturbance and discomfort he produces. The widths of the seats depend upon the parts of the house in which they are placed; but by the By-laws of the late Metropolitan Board of Works each person should be allowed 1 ft. 6 in. by 2 ft. 3 in. This would, however, scarcely do for the occupant of a half-guinea stall, although the 6d. gallery might be contented with it. Every seat should be divided and numbered, and the house licensed to contain that number only. Seats should be made to tip up automatically on the occupant rising, so as to widen the distance between the rows for the convenience of people getting in and out. All seats should be securely screwed to the floor, and be constructed of iron frames to reduce the inflammable contents of the house. There need not be anything combustible in the auditorium beyond the seat-stuffing, the curtains to the boxes, and the carpets, and even these latter might be done away with, and wood block or parquet floors substituted.

Staircases and passage-ways should be from 4 ft. 6 in. to 5 ft. wide, such width being only sufficient for 500 people. Where the division of the audience is in excess of this, additional staircases and passage-ways should be provided, rather than the width of the original staircase increased. By this means every 500 people would have a separate and distinct way to the street. Staircases should consist of flights of not more than eight or ten steps, intersected by wide landings to break the possibility of stumbling and falling over one another, that long flights entail. There should, of course, be no winders or steps at half-landings. The steps and landings should be of concrete with bearings on solid brick walls at both ends; brick arches should be turned at intervals to support long passage-ways or landings; these are better than iron joists, as brickwork will stand changes of temperature where iron will not. A square staircase is perhaps the best form, having six to eight steps to every one of the four flights, with a square landing at the bottom of every flight; the inner, or newel wall, should be built of solid brickwork, with the steps and landings securely bedded on it. This wall should be carried to the same height as the outer wall, and the whole staircase roofed in with a solid fire-resisting ceiling.

Strong handrails, on brackets built into the

walls, should be fixed to both sides of all flights of steps and landings, leaving a space of 3 in. clear between the wall and the handrail, to allow room for a firm grip. So as not to lessen the width of the staircase by the projection of the handrail, a chase could be cut in the wall parallel with the handrail, thus allowing room for hand between the rail and the wall. This, however, tends to weaken the wall.

Slopes should always be adopted where only a slight difference in the levels exist; never should single steps or flights of three or four steps be allowed.

The corridors behind each tier of seating should be of such superficial area that the whole of the occupants of each tier could easily be accommodated therein without crushing. The corridors should be divided, on the party-wall system, from the auditorium by brick walls and self-closing fire-resisting doors, so that immediately the audience left their seats and reached the corridor, they would be in perfect security from any fire or smoke that might be filling the auditorium.

Fire-resisting doors in the "party-walls" should be hung to close automatically, in duplicate, one on each side of the wall, and fixed into iron frames built into the walls. The material of which to construct fire-resisting doors is difficult to decide upon; if of iron, to be of any real service to retard the progress of the fire, the metal would have to be used in such thickness that the weight of the door would be very great. Thinner metal doors are serviceable to keep back the flames for a time, but are useless to stop the fire. Concrete doors in iron frames on wire netting have been tried, but they are heavy and liable to fracture. Perhaps there is nothing better than a good solid thick oak door, and these, at any rate, could be used in the minor divisions of the auditorium. Thick wooden doors lined with iron would be better than thin iron doors.

A fire-resisting door, as nearly perfect as possible, could be made upon the same model as safe doors, having an inner case of iron packed with sawdust and alum, surrounded by a strong well-hound and well-hung outer case; these would be heavy and expensive, and as all fire-resisting doors should be self-closing, in some degree dangerous, but they should be used to divide the larger risks of the house, such as workshops from stage, stage from auditorium, where the doors are not in frequent use.

The question of what fastenings should be used seems a small one, till one remembers the terrible disaster which occurred some years back in Sunderland, only because the wrong kind of bolt was used on a door. In this case, if we remember right, a common barrel-bolt caught in a hole in the floor, and the door remained only partly opened, while hundreds of poor children were crushing each other to death in their struggle to get out. One cannot lay too much stress on the fact that it is from these insignificant and minor details, which are not thought of sufficient consequence to receive the attention that experience afterwards teaches they require, that the death-list is swelled. Bolts, when used, should be of such a nature that, if lifted, they will not be in danger of falling and catching in the floor.

Locks are bad, padlocks worse; keys are seldom to be found when required in a hurry; for instance, in the recent disaster at Forest Gate, we hear of a key that was not forthcoming when wanted; a door barred and padlocked is hard to burst open, and never should such fastening be allowed in a public building. What is required is a fastening which will enable those who are inside to let themselves out at will, and with ease, while it acts as an effectual barrier to those outside. This we know can now be had, and it is a question whether its use should not be made compulsory.

The hooking of all parts of the house would do away with the necessity for barriers at the pay-boxes. Where these are used they should be hung to open outwards, and not made so as to depend upon the memory and intelli-

gence of some attendant to remove or unship them.

The pay-boxes and box-office should be made a permanent part of the building, so arranged as to be in proximity to the treasurer's office, and under his supervision. Pay-boxes may be so placed that they may serve for more than one division of the house, by having pay-windows from the same box in two different passages, thereby saving the expense of one money-taker nightly, and helping to provide a house cheap to work. Some theatres are much more profitable to work than others, on account of such details as these having been observed, whereby the working staff can be reduced. The treasurer's office should be planned with regard to the fact that therefrom the whole of the staff, actors and actresses, are paid weekly, and assemble there in large numbers. There should, therefore, be a waiting-room, pay-office, and private-room, with the safes built into the walls. The offices for the acting-manager, and his staff of clerks, should be on a similar scale in the same suite.

Every means should be taken to keep places of public resort at an even temperature, thus adding to the health, comfort, and safety of all. The stage must be well ventilated, and, at the same time, there must be no draught to cause the scenery to flap about. Shafts immediately over the "gridiron," with gas-jets burning in them to cause an up draught,—on the same principle as the sun burner in the auditorium,—would carry off all that foul, heated air which hangs about a theatre for hours and hours after the performance is over. The up-draught caused by the shafts would serve another valuable purpose. Should a fire break out on the stage, the smoke would immediately find an escape, instead of rushing, as it would otherwise do, into the auditorium, and up towards the sun-burner. The gas jets in the shafts could be regulated by the gasman at his indicator-plate on the stage, when the up-draught should be cut off. Fresh air should be admitted to the auditorium as near the floor-level as possible; in winter it should be previously warmed; and the number of inlets should be regulated by the number of people that the house will seat. Gas-burners in corridors or passages are bad, and should be replaced by electric light; however, where they do exist they should have over them a funnel-shaped flue, by which the products of combustion could escape.

The number of deaths indirectly caused through breathing bad air in crowded buildings is probably far in excess of those caused by fire in such buildings. How frequently do we hear of colds caught through going to this play or that concert, to say nothing of the minor inconveniences of headache and lassitude next day? With regard to ventilation, buildings of this sort have been left too long to take care of themselves; it is true our new theatres and halls show great advance in the right direction, but old houses are left untouched, are still poisonous pits and little better than slow death-traps. Large sums of money have been expended in providing against contingencies which may not arise, while the fact that thousands upon thousands are nightly sowing the seed of disease and untimely death by breathing poisonous air is totally ignored, and neglect is shown in many sanitary matters in public buildings.

In regard to materials it is now almost a truism that the accepted significance of the term "fire-proof" is an erroneous one. Materials that are incombustible are not, therefore, fire-proof. Take, for instance, iron and stone, both recognised as fireproof substances, yet they are among the first materials to suffer under excessive heat or sudden changes of temperature. Wherever possible brickwork is to be preferred in preference to any other material. Every opening should be arched over, and the use of lintels of wood or stone discarded.

The floors of the various tiers should either be constructed of iron embedded in concrete, or of timber in very large balks, of the hardest description, such as elm or oak, or a

wood with qualities such as the Australian iron bark. Where wood is used it should be thoroughly protected from the action of fire by being thickly coated with gypsum or plaster of Paris. The pit and stall floors should be of concrete covered with wood blocks for warmth and comfort; all the rooms behind the scenes should be similarly treated. The floors of corridors, passages, and landings, should be constructed of concrete supported upon brick arches, abutting against the brick walls. Never use an iron joist where a brick arch can be turned.


Where iron is used to form the back-bone of the constructions it must be completely embedded in cement concrete, with no face to be exposed to a fire. The concrete should be composed of the very best Portland cement, with the aggregate of calcined material, such as broken bricks or pottery, and where it is used for light partitions of coke breeze. The staircase, as before observed, should be constructed of the same material or of some approved hard artificial stone or fire-clay, with solid steps, having a bearing both ends on brick walls. By its contraction and expansion iron adds to the danger of fire, as frequently brickwork is pulled over by the ironwork, and walls which would have stood the fire unhurt are torn down. Where iron is used it must be well bedded in cement or fire-clay, but even then avoid its use as much as possible.

Wood, when used in large balks, and of the harder sort, especially when protected with plaster, is preferable to naked ironwork. Wood is dangerous chiefly when used in thin slices.

Plaster is a valuable fire-resisting agent, it is light and resists fire for an indefinite period, it adapts itself to the entire enrichment and decoration of the auditorium, from ceiling and proscenium frame to circle fronts and private boxes.

In choosing materials for the construction of public buildings always give the preference to those that are already calcined, and have undergone the action of great heat; these will not add fuel to the fire.

NOTES.

 THE meeting of members only at the Institute on Monday, specially convened by a requisition in order to pass a vote in favour of a resolution to obtain legal powers to render it compulsory on all practising architects to pass the examination by the Institute, was largely attended, and was at all events instructive in one sense, as showing who are the people within the ranks of the Institute who are calling out for "registration" as a means of raising the profession. To have to listen to exhortations in this direction from members who "appen to know" this and that in favour of it, and who define architecture as practical work with "perhaps a little art added on to it, more or less" (a good deal less, we should imagine), is a kind of degradation which certainly gives some excuse for the position taken by several of the real artists of the profession who refuse to have any connexion with the Institute. They are at all events safe from this kind of thing. The meeting was of course called as a "move" in favour of the scheme before Parliament, at the instance of some of those interested in it. The full report will we believe be in the hands of all members of the Institute in a few days, as by another "requisition" (for which, in accordance with the By-law, six signatories were with some difficulty obtained) the sense of all the members is to be taken on the question by a general vote. We need only now observe that an amendment against the proposed resolution, put by Professor Roger Smith, was carried by a large majority, and we hope that members who vote upon it from a distance will not fail to read the arguments in favour of the amendment (now the substantive motion), and will also note the relative status and position in the profession of the speakers on both sides, bearing in mind

that those who actually spoke in favour of Professor Roger Smith's amendment represented only a very small proportion of the well-known and eminent architects who attended to give it their support.

THE proposed new Employers' Liability Bill still includes the doctrine of "common employment," so obnoxious to many working men and their Unions, but which we believe it would be found impossible to get rid of without serious risk of employers being victimised. Other modifications of existing law are in favour of the artisan, especially that which gives him a right of claim for compensation for injuries sustained in obeying the orders of any foreman or other person whom he was bound to obey, whether the latter is or is not "ordinarily engaged in manual labour." This is a step in the right direction, though it may perhaps somewhat increase the difficulty, often considerable as it is, of defining clearly wherein "superintendence," and therefore the right to give orders, consists.

IF such terrible tornadoes as that which has produced such disaster in the United States should appear to be on the increase in that part of the world, it seems almost as if those in danger of them would have to give their minds to the production of some new method of constructing buildings which would give, if not security, at least greater chance of safety and less of destruction under such a tempest. The construction of buildings which should be comparatively earthquake-proof is a question that has been seriously and practically considered; is it possible that the next step must be to endeavour to make them tornado-proof? If there is any possibility of doing so, the Americans, who are at present principally subject to this scourge, are perhaps also the most likely of all people to have the spirit and ingenuity to make some serious attempt to secure themselves against its worst consequences.

THE last number of *L'Architecture Moderne*. M. Lenoir makes an exceedingly interesting communication in the shape of a copy of an original document in his possession, consisting of an order by Louis XIV. dated October 31, 1660, for the completion of the Louvre and Tuileries and of the gallery to unite the two palaces. M. Lenoir communicated the document a week previously to the Académie des Beaux-Arts, prefacing it by a short résumé of the main points in the history of the Louvre. The order itself is of so much interest that it is worth while to reprint it for our readers:—

"31 octobre 1660.—Ordre du Roy pour faire achever son Chateau du Louvre et estre joint avec celuy des Tuileries.

Extrait des registres du greffe de la prausosté de l'hostel de sa Majesté et grande prausosté de France.

Le Roy ayant resolu, par l'aduis de Monsieur le Cardinal Mazarin, son premier ministre, de faire achever jussamment tant le bastiment de son chateau du Louvre que celuy du palais des Tuileries, pour estre joint ensemble, suivant l'ancien et magnifique dessein qui en a esté fait par les Roys ses predecesseurs, et par cet effet donné ses ordres au Surintendant ordonnateur général de ses bastimens et à l'Intendant en exercice, de faire abattre dès à present tant l'hostel de Bourbon que les autres hostels, maisons et bastimens qui se trouveront dans l'enceinte du dit bastiment suivant le dessein. A commencer par ceux dont les places doivent servir pour en faire la fondation, et de faire faire le plus grand préparatif qui sera possible tant de pierre dure, qualités des carrieres de Saint-Cloud, Mondon, Vaugirard, Arcueil, Gentilly, fauxbourg Saint-Germain, et pierre tendre de Saint-Leu, Trossy, Tinoray et autres lieux et carrieres généralement par ceux dont les places excepter, chaux, sable, bois en charpenterie et menuiserie de toutes qualités, et autres choses et matieres nécessaires pour la construction des dits ouvrages, les quels matériaux seront pris et enleués dans tous les dits lieux ou ils se trouveront, en les payant raisonnablement, et d'autant que pour la prompte perfection des dits bastimens, l'Intendant de Sa dite Majesté est d'establir et dresser quatre grands ateliers royaux pour commencer à trailler, commençant au premier jour du mois de mars de l'année prochaine mil six cent soixante un,

ou plutôt sy le temps le pouvait permettre, et qu'il serait impossible de fournir suffisamment d'ouvriers ny de matériaux, en dits ateliers, s'il était permis aux particuliers d'entreprendre aucuns nouveaux bastimens, outre que cela retardoit entièrement le service et le plaisir de sa Majesté, et quelle desire que tous les ouvriers en quelque vacation qu'ils soient, qui se trouveront à Paris et aux Environs, mesmes ceux qui viendront des provinces, soient seulement employez et reçus es dits ateliers du Louvre en ceux de Vincennes, Val de grace, et autres bastimens et maisons de sa Majesté, et payés punctuellement de leurs journées au prix courant et au taux qui sera estimé juste et raisonnable, selon le cours du temps; et pour ses considerations, Sa dite Majesté defendit très expressément à tous particuliers, en quelque qualité et considerations qu'ils soient, sans unil excepter, d'entreprendre aucun nouveaux bastimens, ny faire aucuns reparatifs de matts-reaux; tant dans sa bonne ville et faubourgs de Paris que dix lieues à la ronde, sans permission expressé de sa Majesté signée de l'un de ses secretaires d'estat et scellée de son grand sceau avec attache du dit sieur surintendant des bastimens, à peine de dix mille livres d'amande payable sans desport à l'hospital general; et aux ouvriers de prison pour la premiere fois et de galères pour la seconde; mande sa dite majesté au dit surintendant et ordonnateur d'y veuë en exercice, de tenir expressément la main à l'exécution des présentes. Enjoignons au Sieur marquis d'Aligre, premier des finances et grand prestre de France, et Lieutenant civil de Paris et tous autres ses officiers et juges qu'il appartiendra, d'y tenir la main et donner l'assistance comme en chose qui regarde son service et son plaisir particulier, et afin que nul n'en présume cause d'ignorance, elle veut et ordonne que la présente ordonnance soit mise en public par affiches et affichés en public dans tous les lieux de la ville et es faubourgs accoustumés; Fait à Paris ce dernier jour d'octobre mil six cent soixante. Signé Louis et plus bas de Gueneaud.

Collations au huitième Registres des enregistrements du greffe de la préfecture de l'Hotel de sa Majesté et grande procureur au Palais, Nos 108 V et N° et V° 109 par nous procureur chef soussigné.

DEVOIGNE."

THE District Surveyors' Association have addressed to the London County Council a short summary of their opinion, expressed in five resolutions, in regard to certain clauses of the County Council General Powers Bill which have reference to the working of the Building Acts. The following are the terms of the resolutions in question:—

"Section 63.—APPEAL AGAINST CERTIFICATE OF ARCHITECT AS TO GENERAL LINE OF BUILDINGS.—It was resolved that approval should be expressed of the tribunal provided by this section, consisting of one member appointed by the Council, one by the R.I.B.A., and one by the Institution of Surveyors, and that the members thereof should only be appointed for a limited time, and reappointed from time to time, say every session, also that the Councils of the R.I.B.A. and of the Institution of Surveyors should be empowered to make the appointments.

"Section 64.—POWER TO AUTHORISE LARGER BUILDINGS WITHOUT PERMITS.—Resolved that this power should be limited to very special cases, and where such are approved by the London County Council, the reasons for the approval should be specified in writing with the approval, but in every case where such building or division thereof exceeds 210,000 cubic feet the construction shall be specially approved by the D. S., or in the event of disagreement, by the London County Council, who shall also appoint a special fee to the D. S. for the special labour and responsibility involved. Also that it is assumed that under this section a properly constructed fireproof floor or similar party structure should be deemed to form a sufficient separation between the divisions of the building, as in section 27, clause 2, of the Building Act, 1855. Further, that in view of the difficulties which have arisen by reason of there not being any definition in the Building Act, 1855, of the meaning of the words, 'Warehouse, or other building used for the purposes of trade or manufacture,' it is very desirable that the Bill should give such definition.

"Section 65.—BY-LAWS AS TO PRESERVING, &c.—Resolved with regard to Clause 1: That the supervision of the work referred to is not such as falls within the general duties of a D. S., but if the Clause became law provision should be made in the By-laws that proper notice should be given to him of such work. Resolved also that any By-laws would be subject to the same approval by the Secretary of State as under the Act of 1875.

"Section 69.—BUILDINGS ABUTTING ON MORE THAN ONE STREET.—It was resolved that the provisions of the Section would involve, in many cases, a sacrifice of property, and great injustice where the corner plot was owned by one person and the adjoining land in the side street by another, which has objects to be obtained do not appear to justify, and that they would induce owners to bring forward

their frontages in side streets more than they otherwise would, thus tending to lessen the total width of the space between the houses by shortening the forecourts or gardens.

"Section 72.—HEIGHT OF BUILDINGS.—It was resolved that the regulations should be confined to buildings abutting on a street, and that the height should be governed by the width of the street, as in Paris and other cities; that for any other building the limit should be extended by the distance they may be set back from the street up to a total height of 100 ft., as rules for buildings of that height are given in the Building Act, 1855, that the height should be measured from the crown of the roadway opposite the centre of the building, that the regulations should not restrict existing rights in rebuilding, that the limitation of height proposed would exclude important architectural features, such as towers, gables, dormers, &c., and that the section should be modified so as to allow them."

IN regard to the subject of accommodation for our troops, especially on the hut-system, it may be of interest to know that the German Government intends quartering one of the line battalions in a camp of twelve "pasteboard" huts. These huts, each of which measures 32 metres by 7 metres, have a skeleton, or rather framework of wood, the walls and roofs being of pasteboard, double, with an insulation of compressed peat and similar materials, which will tend to keep the cold out in winter and the heat off in summer. In spite of their somewhat fragile appearance, these huts are strong and well-made, and promise to be a success.

THE new "Asyl" which is about to be erected by the Italian Alpine Club, in memory of Prince Amadeus, on one of the points of the Southern Alps, will be by far the highest inhabited abode in Europe, its altitude above the level of the sea being some 4,000 metres, whilst the St. Bernhard Hospice has only 2,472 metres, and the meteorological station on the Pic Mezzogiorno only 2,870 metres. Asia and America, however, have settlements, and even cities, at the same and even greater heights,—for instance, Potoli, in Columbia, a town with 30,000 inhabitants, lies 4,900 metres above sea-level; and the gold-searchers of Thok-Jakoune in Thibet, numbering some 6,000, have their settlement at an altitude of 5,000 metres.

THE competition for designs for a new "Arts and Science Museum," at Dusseldorf, has been decided, the first prize falling to Herr Karl Hecker, of Dusseldorf, and the second to Messrs. Lieblein & Wiegand, of Offenbach. It had been generally expected that this competition would show some interesting designs, but, on the contrary, the jury had but a very poor collection to choose from, the majority of the forty-nine designs sent in being far below the usual standard.

THE cutting of the new canal in Sweden between the Categat and Lake Wener, or rather between the towns Uddevalla and Wenersborg, will be taken in hand as soon as possible, the Government having approved of the scheme. The new connexion, some twenty-five kilometres in length, is to have a depth of seven metres, and will hence permit ships of pretty large tonnage to pass,—a great advantage to the commercial intercourse between inner Sweden and the outer world. The export of timber will be greatly facilitated, and the large iron foundries in the interior will be specially benefited by this new water-way.

THE honour of being chairman of the jury to this year's International Art Exhibition at Munich has fallen to an architect, Professor Albert Schmidt. This is the first time that a member of the profession has held this responsible post, and this fact is all the more worthy of note since the Munich artists, among whose ranks painters are in a great majority, have up till now nearly always selected a painter for this function.

AMONG the list of proposed new monumental buildings for Berlin, one, a new home for the Prussian "Landtag," has lately

again come to the foreground; but owing to practical reasons it will scarcely be possible to think of erecting this building till the members of the Reichstag have taken quarters in their new house on the Koenigsplatz. A second scheme much talked about of late, the new building for the Academy, or rather the proposed buildings for the Academy proper at Berlin and for the Academy-Schools at Charlottenburg, is as yet but in its initial stage, neither sites nor programmes having been definitely fixed. A well-known Berlin architectural firm is, however, working out a series of sketch designs for the Berlin building, which are to be laid before the Emperor for approval; and a second firm of repute is working out a design for the Schools at Charlottenburg on a site in close proximity to the buildings of the Royal Technical College.

IT is proposed, as we read in the *Daily News*, to set up a stained-glass window in the parish church of St. John the Baptist, Mersham, near to Ashford, in Kent, to commemorate the rectorship there of one who may be legitimately designated as father of the medical profession in this country. Thomas Linaere, physician, scholar, and priest, the friend of Lily and Melancthon, was born circa 1460, and it is supposed, in Canterbury. Having studied at Cambridge, Oxford, Padua, and elsewhere in Italy, he was appointed tutor to Arthur, Prince of Wales, and is said to have instructed Erasmus and More in the then "new learning," viz. Greek. Two years after he had founded at his own house, since known as "The Stone House," No. 5, over against Bell-yard, in Knightrider-street, the College of Physicians, Linaere took orders, and for awhile held preferments in Wigan, Aldington, and at York Minster. Dying on October 20, 1524, at his house in Knightrider-street, which he devised to the College, Linaere was buried in Old St. Paul's, where, near to the north middle door, Dr. John Caius erected a monument to his memory. The inscription ended thus, "Thomas Linaere, clarissimo Medico, Johannes Caius, posuit anno 1557." Mersham Church was restored in 1877, *e curis* Sir Wyndham Knatchbull, bart., and the Reverend R. Knatchbull-Hugessen, rector. It contains several memorials to the Knatchbull family, who were seised of the manor of Le Hasted, in this parish, temp. Henry VII., *vide* Hasted's "Kent," Vol. III. (1790). In Dr. William MacMichael's little work, entitled "The Gold-headed Cane" (1827) will be found a notice of Linaere's portrait, therein ascribed to Holbein, as being then at Kensington Palace*; and a wood-cut, since reproduced in Vol. I. of Walter Thornbury's "Old and New London," of the house we mention. Dr. William Monk's edition (1884) of "The Gold-headed Cane" contains an account of the silver caduceus which Caius presented to the College for its President's use.

ON Saturday last the congregation of the Great Synagogue in St. James's, formerly Duke's, place, Aldgate, celebrated the hundredth anniversary of the building of their place of worship. That community of German and Polish Jews known, we believe, as the Ashkenazim, settled here in 1692. The present building, which, by the United Synagogue Act of 1870, was thenceforth to rank as the Great Synagogue, had supplanted the building that, in 1722, was built in place of one which Moses Hart had erected for their use in Broad-court, Duke's-place. It should not be confounded with the neighbouring synagogue for Spanish and Portuguese Jews, or Sephardim, in Devis Marks, as re-built in 1701, and which is associated with the memories of the late Sir Moses Montefiore and the Disraelis. We gave an account of this letter in our columns of January 30, 1886, upon the

* It is that the portrait which, seventy years ago, used to hang in Queen Caroline's Dining-room, and has been ascribed to Q. Matsys!

occasion of the migration of a portion of the congregation to a new synagogue in Bryanstone-street, Bryanstone-square.

PERHAPS it is with a consciousness that their works are best seen and appreciated in a half light that the members of the New English Art Club have chosen to have their exhibition this year in the rooms at Humphreys' Mansions, which are almost entirely destitute of such a light as pictures are generally supposed to need, and in which half the works are seen in shadow. Thus Mr. McLachlan's evening landscape, "When the Dew Falls" (133) is in a twilight corner which perhaps materially assists the effect the painter desired, and has not been unsuccessful in producing. Other works are less assisted by these conditions, and are so lighted that it is difficult to form any judgment of what their effect might be in a proper light. In regard to some of the best works there it may be said that if the New English Art Club is supposed to consist of artists who are "in search of truth" (so we read somewhere), they seem to have stopped half way in the search. Miss Mackay's "Quiet Chat" (10) shows at a little distance a very expressive character in the attitude of the two figures: is it really any better for the fact that on a nearer view neither features nor hands can be made out? It is an unfinished sketch for a picture, that is all. Mr. Roussel's portrait of a little girl (13) is fine in colour and the expression of the head, but the hands are two lumps of dough. Mr. Sickert's portraits of Miss Fancourt and Mr. Bradlaugh (9 and 27) are powerful sketches on a large scale: nearly all the larger works are sketches on a large scale. "Is this 'terewth'?" we may ask. Or is it truth to paint a portrait of a girl with a wooden head—*vide* number 148; poor "Lily"! Truth seems to us to be realised mostly in some of the small landscapes; Mr. Paterson's "Seascale" (132); Mr. Laidlay's "French Village at Evening" (19); Mr. T. M. Dow's "A Northern Shore" (2); this latter is a study of breakers and foam on the shore on a bright and breezy summer day, which is remarkably true in the movement and lines of the water, though the foreground shallows seem rather destitute of the reflected lights which should be seen from the film of water. However, this is a very clever work. There are other landscapes or landscape and cattle-pieces which have an idyllic sentiment, towards which it seems to be thought that the omission of detail contributes. Hence the members of the club seem to lean much towards twilight scenes, which can be treated conformably with their aims. There is a cleverness in all this, combined, to our thinking, with a very pronounced affectation.

WE would commend to the attention of builders' clerks a statement made by Mr. H. H. Bartlett when presiding at the annual dinner of the Builders' Clerks' Benevolent Institution on Monday, to the effect that last year the Institution's income from invested funds and annual subscriptions did not suffice by about 120*l.* to meet the working expenses of the year, in consequence of which the Committee had to trench upon the donations given at the annual dinner last year, which they would have preferred to add to the invested fund. The Institution is doing, and has done, admirable work since its establishment, and is very economically managed. The Committee would be very glad to see a large increase in the number of members and annual subscribers. The annual subscription is but half a guinea, and there must be hundreds, if not thousands, of builders' clerks who are not members of the Institution. The offices of the Institution are at 21, New Bridge-street, Blackfriars, E.C., and Mr. H. J. Wheatley, the Secretary, would be very glad to answer inquiries. Master builders could do much to help the Institution by bringing its claims to the notice of their clerks.

THE April number of the *Art Journal* contains, under the title "An Old English Homestead," an illustrated article on that peculiarly English house, Moreton Old Hall. The illustrations are reproduced from photographs by Mr. R. Keene, the author of the article. The *Portfolio* continues Mr. Clark Russell's articles on "The British Seas," with various sketches by Mr. J. R. Wells, and a reproduction of a sea-study by Mr. Henry Moore. Mr. Armstrong contributes an article on the work of Mr. Onslow Ford (one of a series on English sculptors of the day), with illustrations, including a fine separate plate of Mr. Ford's figure "The Dance," a commission from an Indian Maharajah, along with a companion figure of "Music," of which a smaller illustration is given, and which is a very original work. At the close of the article Mr. Armstrong speaks strongly, and with reason, of the neglect of English sculptors by the Government:—

"In our English public buildings, we have niches and pedestals by the hundred, preparations made by the sanction of Government for statues which never come. The Houses of Parliament, the offices in Whitehall, the bridges, the Victoria Embankment, the Royal Courts of Justice, all these are besprinkled with empty perches, which at present are simple disfigurements. Some, of course, are waiting for statesmen or soldiers. But the vast majority belong so intimately to the architectural scheme that they could not be rightly abandoned to iconic figures. Why should not a certain number of these be filled each year?"

Why, indeed? The French Government or the Paris Municipality would have set themselves to such a work as a matter of course; but in England it would be scouted, probably, as idle extravagance.

LETTER FROM PARIS.

THE Parliamentary Committee for examination of the scheme for the maintenance of the Champ de Mars buildings did not report in a very favourable sense, and found that the maintenance of the Galerie des Machines, the central dome and its gallery, would alone involve an annual expenditure of about 160,000 francs. The Committee reported also, not without reason, against the idea of making buildings of this kind serve for another exhibition, as the novelty of decorative effect is one of the principal attractions of this kind of entertainment. This was the opinion of M. Antonin Proust and M. Georges Berger. In spite of these and other good reasons the Municipal Council, carried away by the eloquence of M. Alphand, has voted the maintenance of these structures and the transformation of the Champ de Mars into a public garden traversed by a new road connecting the Avenue Suffren with the Avenue Bourdonnais. We shall probably this summer, therefore, see the terraces and fountains illuminated by electric light as before.

The exhibition of the "Salon Meissonnier" to be held in the Palais des Beaux Arts of course gives some additional public interest to this scheme, and in order to prove to the artists that in spite of the distance they are much better off here than they would be in the Palais d'Industrie, M. Alphand is prodigal of his favours to the new society, and is disposing of the municipal conservatories in order to transform the Avenue Rapp into a great winter garden.

The Jury of Painting of the new Salon has elected M. Carolus Duran as its President and M. Galland as Vice-president. The reception of works of art, which was originally fixed for March 1 to March 8, has been postponed to April 12 for painters and the 22nd for sculptors. The old Salon does not seem to have suffered so far, at all events numerically, by the rivalry of the new one. The Jury of Painting, presided over by M. Gerôme, assisted by M.M. Dusson and Jean Paul Laurens as the Presidents, has terminated its laborious operations. It has been unusually severe, it is said, in its judgments this year, and has refused many painters who have been received in former Salons. 2,250 pictures have been admitted. The numbers offered have been nearly the same as last year, amounting to the respectable total of about 7,000.

In the meantime the Musée des Arts Décoratifs has just opened an exhibition in the Champs d'Élysées building, comprising about 400 works purchased from the universal exhibi-

tion of last year. At the same time, the exhibition of the "Artists Independents" has succeeded to that of the "Femmes Peintres et Sculpteurs" in the Pavillon of the Ville de Paris. As usual, this exhibition is an odd affair, and one finds really interesting work mixed with the oldest fancies both in pictures and frames: though on the whole, among the 800 paintings exhibited, there is less extravagance than in last year's exhibition.

While the second exhibition of "Peintres-Graveurs" is being held at M. Durand Ruel's gallery, the "Cercle Volney" is holding also its annual exhibition of about 200 works. M. Munkacsy on his part is exhibiting to the public the design for the ceiling which the Austrian Government has commissioned from him for the Museum of History and Arts at Vienna. The painting is of colossal proportions, and represents the apotheosis of the Italian Renaissance. In spite of its popular success with "tout Paris élégant," we are obliged to confess that, while exhibiting some fine decorative qualities, the artist has not altered or improved either the hardness of execution or the crudity of colour which characterise his ordinary work.

The pictures and studies of the lamented painter Protais have been dispersed at a general sale, after having been exhibited publicly for many days. We found among them the finest sketches for more of his well-known pictures among them the "Halte d'Infanterie," the "Manœuvres d'Artillerie," the "Chasseurs à pied à Saint Trivoux," the "Regiment en Marche," and other pictures well known from engravings, and which reflect the ardent patriotism of their author, who was not only a fine artist but a brave and loyal citizen.

The Committee of National Museums has now come to any definite conclusion in regard to Manet's "Olympia" picture, to which we have before referred. It has confined itself to expressing an opinion against admitting this sensational painting to the Louvre, and in favour of admitting it to the Luxembourg, but without any promise one way or the other. This undefined position will perhaps leave some room for the operation of public opinion in the matter. The attitude of the authorities is quite otherwise in regard to Courbet, once such a subject of dispute, but who now enters vigorously into the Louvre before even the regulation ten years have expired since his death. It is melancholy to add that Art has nothing to do with this decision, and that it arises from political feeling and a desire to reward Courbet for his hostility to the Empire. This is why the Louvre already possesses the famous "Enterrement d'Ornan," a picture disagreeable in colour and careless in execution, and will soon have another picture by the same artist, the "Remise des Cleverouils," which a group of admirers has combined to purchase. This work however is infinitely superior to the latter.

The Louvre has just been enriched with a fine picture by Bonington, a portrait of an old woman. There are up to this time only nineteen oil paintings of the English school, among which are four Boningtons, "Francis I. and the Duchesse d'Étampes," "Mazarin and Anne of Austria," a view of Venice, and a sketch of the Park of Versailles.

We are happy to add that, thanks to M. Guillaume, the Louvre galleries have been much improved recently in regard to comfort and that the ground-floor especially is now given up to the cold which made it in winter almost impossible for artists and students to draw. The Museum of the Renaissance was also shortly to be enlarged by two new saloons; in a few days the Tunisian collection will be open to the public, and the square built last year on the site of the Tuileries will be the object of numerous embellishments. The fine group by M. Mercié, entitled "Quand Même," will be placed a few steps from the triumphal arch of the Carrousel; numerous statues will decorate the grounds, among which will be the "Exiles" of M. Mathurin-Moreau, published in the *Beillevue* last year.

The work at Versailles is being continued under the superintendence of M. Marcel Lauxbert. The restoration of the "hassin du dragon" has just been terminated, by M. Tony Noël, in accordance with old documents which have furnished evidence as to the original intention.

The bronze casting of the monument to General Lafayette, just completed, has been on view at the foundry. It is about ten mètres high, with a granite plinth, on which is a white marble pedestal supporting the statue. On the

principal face of the monument is a bas-relief of a female figure presenting a sword to the General; on the reverse face a cartouche supported by two figures of children. Bronze statues representing Lafayette's four companions in arms are grouped, two on each side, on the lateral faces; Rochambeau, Du Portal, de Grasse and Estaing. The statues are the work of M. Falguère and M. Mercié, the pedestal is designed by the architect M. Pujol. Another memorial statue, that to Paul Bert, is exhibited temporarily on the Place de la Sorbonne, and is to be transported to Tonkin to be erected at Hanoi. This is the design of M. Paul Lenoir, author of the Berlioz statue on the Place Vintimille.

Various public works of some importance are under discussion. The rebuilding of the Mairie of the Eighth Arrondissement has been put up to competition, though it is thought by some that it would have been wiser to have adopted the design made some time since for this purpose by M. Hermant, an architect whose ability is unquestioned. Another competition has been opened for the construction in the Faubourg St. Antoine of a school of furniture design, very usefully placed in this quarter, which is almost entirely inhabited by cabinetmakers and upholsters. The works of the new hospital in the Faubourg St. Germain are also to be shortly commenced, thanks to the liberality of M^{me}. Boucaut.

The Church of the Sacré Cœur has been relieved of its great scaffoldings, and now presents an entirely new appearance. As soon as the fine weather comes the work of vaulting the nave will be commenced, a piece of work which will hardly be completed within the year.

Another question of the moment is as to the proposed removal of the École Polytechnique to St. Cloud, to the site of the Palace burned in the Franco-German war. This is not the first time the removal of the École has been mooted; and in 1871, just after the war, there was a talk of rebuilding it where the Trocadéro now stands. Probably the same reasons then given against the change will operate now. No doubt the present building is too small, too old, and in the midst of a crowded and not too sanitary neighbourhood. But these drawbacks may be corrected, while the removal will involve so much inconvenience and interruption of the work that it is probable the Government will confine itself to improving the present building, isolating it by large streets bordered by new buildings, where the amphitheatre, laboratories &c. can be commodiously arranged. Something of this kind must be done soon, for the present building, erected in 1794, and which occupies the sites of the old colleges of Navarre and Boncourt, is no doubt too restricted for present requirements.

The Académie des Beaux-Arts a few days ago proceeded to the election of a member to replace the late M. Diet in the Architecture Section. After six "tours de scrutin" M. Normand was elected by 16 votes out of 31. M. Ancelet had 8 votes, M. Pascal 5, and M. Dubet 2. The new Academician obtained the Prix de Rome in 1846, a first medal in the Exhibition of 1855, the Cross of the Legion of Honour in 1890, and a second medal in the Exhibition of 1878. It was he who designed for Prince Napoleon the pretty Pompeian house in the Avenue Montaigne.

At the Écoles des Beaux-Arts the prize founded by the American architects in favour of French architects has been awarded to M. Bauchain, pupil of M. André.

In consequence of frequent abuses, the Académie des Beaux-Arts have come to a serious decision in regard to the former pensionnaires of the Villa Medici having the enjoyment for three years after their return to Paris of the pension founded by the Comtesse de Caen. Henceforth this bounty, which amounts to 3,000 francs for architects and 4,000 for painters and sculptors, will not be accorded except to those who have executed a work worthy of a place in the museum to be founded for that purpose by the generous benefactors.

This last month has witnessed the death of two sculptors. One of them, Adolphe Leofanti, who exhibited in the last Salon a bust of M. Jules Simon, has committed suicide for reasons unknown, but supposed to be connected with family troubles. He was a conscientious and hardworking artist who unfortunately met with very little success.

The other sculptor, M. Oliva, who has died

at the age of 66, had a certain reputation under the Second Empire. He obtained medals of the third class in 1852 and 1855, and a medal of the second class in 1861, and the Cross of the Legion in 1867. Among his most remarkable works are the statues of Napoleon III. and the Empress, those of Alphonse XII. Cardinal Guibert, Marshal Macmahon, and "The Message," a work which figures in the Louvre. M. Oliva had great talent and facility in his art, and excelled especially in portrait-statues and busts. It is to him we owe the bronze statue of François Arago, exhibited in last year's Salon, and which is to be erected in Paris.

THE MEDIEVAL HOUSE.*

THE first impression which this subject makes upon any one who tries to grapple with it is its unmanageable extent. To try to indicate with anything like definite precision how our forefathers and their contemporaries lived in Europe during several centuries of constant change, would be a task impossible within the limits of an hour's lecture, even were it within my powers at all; and the first step must be to set bounds to the range of our enquiries. First, then, I propose to omit all mention of religious houses. As far as is possible, I shall also omit the castle. It is true that the castle was the home,—and the only home,—of many noble and gentle persons in the Middle Ages, and of vast numbers of retainers, and that it was at last turned into a very commodious dwelling; but still it was so much influenced in its arrangement and build by military considerations that we need hardly scruple to do this. Lastly, I propose not to travel far from home. English examples fail, I must admit, in several particulars to give a complete series of domestic Medieval buildings, or groups of buildings; and we can hardly avoid going to France to fill up gaps; but it will not be necessary to go any further afield, and, as far as possible, the subject will be treated with reference to our own country only.

In one respect,—that of time,—however, the lecturer must be allowed to overstep the limits that the title seems to prescribe. Houses of Medieval character continued to be built here for long after the real close of the Middle Ages, and these, being the most recent, are the most numerous and the best preserved, so that we shall be unable altogether to exclude sixteenth-century, and in some cases seventeenth-century, work.

Dwelling-houses have seldom been built with anything like the solidity of churches and cathedrals; consequently, they have not withstood the tooth of time so well. They are, far more than churches, exposed to damage from fire, and also to plunder and devastation in time of war or civil strife, and to so-called improvement in time of peace. Fortunately for the students of Medieval architecture, church alteration and church building practically came to a standstill in this country after the secularization of the vast revenues of the Church by Henry VIII., but it was far otherwise with houses. Every owner of a historical house has felt at liberty, and in too many instances has been rich enough, to alter, pull down, rebuild,—in short, modernize after his lights,—the dwelling of his ancestors; and this has occurred more thoroughly still with the smaller, less substantial, and often less convenient houses in towns, so that we have nothing now left but what accident or chance has preserved in the shape of scattered and often incomplete specimens of the more early Medieval house.

I propose to speak to you first about houses in towns, and then about houses in the country,—the simplest division of the theme it seems possible to introduce.

First, then, as to houses in towns.

The Middle Ages, it must not be forgotten, was a period of great and constant strife, and life and property were insecure to an extent that we cannot easily realize. Accordingly, the shelter of fortified towns was sought by persons who had anything to lose. Towns were content to dwell in small and crowded houses for the sake partly of protection and partly of the opportunities for trade which a town afforded. Of Saxon houses we have no remaining specimens, and next to no traces; but some

information can be gleaned from ancient writers and the illuminations of old manuscripts. Ordinary dwelling-houses in towns are believed to have been small, built of wood, thatched, in most cases of one story, and often consisting of only one room,—in short, huts,—and with the fire on a hearth in the middle of the floor, and the windows closed only by shutters. Representations of palaces give, however, some reason to suppose that the kings and influential thanes had, even then, houses built of masonry, and with some attempt at decoration.

In the Norman period houses seem to have been built in London and Winchester, and presumably elsewhere, of much the same material, though probably mostly of two stories. A very curious piece of documentary evidence upon this head remains in the Assize of 1189. This name is given to a formal document, the result of an inquiry by a jury of twelve citizens of London, elected in what, I suppose, would correspond to the common hall of the present day,—"*in pleno hustingo*,"—to regulate building disputes. This document arranges that two adjoining neighbours who desire to build shall erect a party-wall of some 3 ft. thick and 16 ft. high between them, each man giving up 18 in. of his ground for it to stand on, and that either party may carry bis half of the wall to a greater height if he wishes. It will be noticed that the height of such a wall would suffice for two low stories, and that the provision for heightening seems to point to the occasional habit of using three or more floors. Almost the only English examples of masonry houses of this early date occur at Lincoln, where one very well preserved small house, known as the Jews' House,* still exists. The doorway and two upper windows, of good and somewhat rich Norman architectural character, remain. There were, apparently, only two rooms in this house, and the fireplace of the upper room is curiously corbelled out over the entrance door. A peculiarity worth noting is that this house does not present a gable to the street, but has gables at the sides, so that the eaves of the roof overhang the street pavement. Remains of a larger but less perfect Norman house, also of masonry, often known as John of Gaunt's Stables, also exist at Lincoln.

Of town-houses of Medieval architecture we find far more examples remaining in France than in England, probably because the greater activity in English towns has caused more rebuilding; indeed, in our own day in some of the French towns (such, for example, as Rouen), where manufactures have gained ground, the remaining old houses have been swept away by the score. There was very frequently, especially in the wine-growing parts of France, a vaulted cellar, usually reached by steps from the road. The ground-story was often, even if it were a shop, raised a little above the level of the pavement. The house was usually narrow and deep, and very often had a gable end towards the street. Partition-walls, such as those referred to in the Assize of Stephen's reign already cited, often existed, but sometimes each house was distinct, and a very narrow space separated it from its neighbour. The front wall next the street was mostly of masonry in the ground story, and if the house were for business purposes there would be a wide window and a door besides. Above this the front was generally of what is termed half-timbered construction; and there was usually a first floor and a story of attics, though sometimes the house was carried to a greater height. Where there was not a gable end to the street there would be dormer windows to light the attics. The general disposition or plan of a small house of this sort was simple enough. There would be on the ground-floor the shop (or a room, if no shop) and a staircase, a yard behind, and a low building in that yard used as a kitchen. The best room in the house was the first-floor room, occupying all the space between the walls; it was used as a living-room, and partly a sleeping-room also, and with a fireplace—a luxury not always introduced below. The upper floor, or floors, would be divided by internal partitions into smaller rooms. Sometimes, where more space was occupied, a more ambitious programme was attempted; but the one principal living-room on the first floor was almost always a prominent feature in the arrangement of the house.†

The point in structure to which attention should be first drawn is the half-timbered con-

* A lecture delivered by Professor Roger Smith at University College, London, as part of the Course of Archaeology now being given there.

• Illustrated in Parker's "Domestic Architecture," vol. i. p. 40.
† Illustrated in Viollet-le-Duc, "Dictionnaire," art. Maison.

struction already referred to, and which was largely employed both in France and England, and in town and country alike. A very few specimens of it linger in London, the best being the upper parts of some houses on the south side of Holborn, nearly opposite Gray's Inn-road, which have recently been carefully cleaned and repaired.

What may be described as timber walls were in use through several centuries. They were thus built: on the top of the stone-walling, which served as a base, and was sometimes a mere foundation, or at other times a wall the height of a story, a strong horizontal timber was securely laid. This was what a carpenter would call a wall-plate. The ends of a series of sturdy upright timbers standing side by side are let into this plate (tenoned into it), and at the top of them a second horizontal timber is secured in the same way. The lengths of the upright timbers and thickness of the horizontal pieces are so adjusted that, including the two plates, the whole equals the height of a story. The floor-joists, which were heavy timbers, rest on this framework, and generally are made to overhang. A second series of upright timbers forms the main structure of the next story, which rests on the ends of the joists, and so on to the top. There are sundry minor variations in procedure, as, for example, in early times—say, the twelfth century—the timbers were close together, forming a wall wholly of timber, like that of a Swiss chalet. Later on, they were placed some distance apart, and the spaces filled in with plastering. At a late period panels so formed were sometimes occupied by tiles, and sometimes with wood-work. There are several modes of managing the overhanging of the upper floors, and diagonal or horizontal pieces are sometimes introduced for the sake of architectural effect. The gables are generally finished with a richly ornamented deep rafter called a barge-board or verge-board, and sometimes with carved timbers; and the dormer windows, when they occur, are often charmingly treated. Altogether, no manner of building can well be more picturesque or more thoroughly domestic in its appearance.*

Much building of this sort remains in country places in England, though most of it belongs to that group of buildings already alluded to as in quality Medieval, though built after the Middle Ages had closed. There is a group of half-timbered halls and manor houses in Lancashire and Cheshire especially worthy notice, including some answering to this description, and others genuinely Medieval. In towns a few specimens only of timber construction now survive. Tewkesbury, Coventry, Salisbury, Shrewsbury, Exeter, are among the places where examples of this work still linger. In constructing corner houses with these timber-framed walls it became usual to employ a very strong corner-post of bent timber, and to carve it richly; and in some cases (as, for example, at one or two street-corners at Colchester), where the timber-framed wall has been replaced by a modern one of brick, the post has been still retained as an ornament.

Occasionally, especially late on in the Medieval period, a dweller in a city secured a large plot of ground and erected a stately town-house. In London, Crosby Hall, in Bishopsgate-street, alone remains to show a few traces of what such houses were. It was a splendid pile erected by Sir Thomas Crosby, who died in 1475, and it was at one period the residence of the famous Sir Thomas More. This building, fortunately, escaped the fire of London, and its exterior is an interesting specimen of rich fifteenth-century domestic architecture, largely carried out in timber. Crosby Hall has fallen on evil days, and is now, alas! occupied as a great City dining-rooms, and has been varnished, painted, and done up in various ways with Modern Gothic, but still it is the best, almost the only, example of a Medieval town-house of the first-class remaining in London. Some remains of Medieval work also linger in the Deanery at Westminster and at Lambeth Palace, and some favour of Medieval character hangs about the Charterhouse.

For better, however, as a specimen of such a building is the Hôtel Cluny, at Paris, a place which every traveller goes to see, as it is the French South Kensington Museum. This is a town mansion of great beauty, kept up in a perfect state of repair, and filled with the

finest examples of Medieval furniture and curiosities.

The Hôtel Cluny* was built at the very end of the fifteenth century, and is in the French style of that period, a style often neither so dignified nor so regular as our own Perpendicular, but well and soberly treated in this example. The site is a large irregular plot, and the palace was set down so as to leave an entrance courtyard next the street, and a formal walled garden in the rear. The court is jealously shut in by a high wall, and when you pass the doorway you find facing you the principal building—three stories high, and with a rich octagonal turret staircase projecting from the front. A kind of ante-loggia on the left gives access, through an open room, to a range of four noble and very spacious rooms, opening out of each other. These, with two other adjoining ones, not *en suite* with them, form the state part of the house, and the same arrangement is repeated on the two upper floors. Detached from this block there are also a porter's lodge and a kitchen, and opening on to the garden there is a kind of vaulted open hall, over which, on the next floor, comes the chapel. Dignity, grace, and elegance combine well in this building, and the richly-carved chimney-pieces, with their fire-dogs, the panelled walls, and timber ceilings, the windows with their mullions and transoms and rich glass, and the fine floors laid in patterns, combine to give a great air of luxury to the interior. Famous as a more extensive and ambitious Medieval house is one at Bourges, known as the House of Jacques Cœur,* of which illustrations are to be found in most books on the subject.

Of Medieval towns some, in England, and a few in France, follow the lines both of the roads and walls of an earlier Roman town. The Romans always planned a fortified town (as they did their camps) four square, with a gate in the centre of each side and two main cross-roads cutting up the enclosed space into four equal squares. This description applies to Chester, to Dorchester, and to Colchester. In the first-named city the walls were rebuilt in Medieval times, and remain perfect. In the other two the Roman walls were retained, and portions of them still exist. At Colchester there is even one of the Roman gates still standing. A Medieval town was, however, usually irregular, with narrow, winding streets and many small houses crowded into the fortified enclosure whose outline had been dictated by the shape and levels of the ground rather than by convenience. The finest existing example of such a town is Carcassonne, in the South of France, where the fortifications still remain as perfect as in the fourteenth century. Not so far off from England, and but little more modernised, is Mont St. Michel, on the coast of Normandy, probably the most picturesque spot in Europe, and like Carcassonne retaining its fortifications. I do not think I can point to any English city quite parallel to these, though the older streets of several of our cathedral towns are not unlike bits of them.

Perhaps the best idea of what a Medieval town looked like which we can get in England is obtained by visiting Chester. Here the fortifications remain; most of the houses have gables to the street, and many of them have ornamental woodwork, while a most picturesque and unusual arrangement of footpaths two storeys in height gives a great air of quaintness to the streets. It is true that almost all these buildings date from a period later than the Medieval time, but they have been rebuilt one by one as necessity arose, but they retain their gables, with barge boards and overhanging upper stories, and even the most recent have been built with care and taste, so that the antique flavour has not been entirely lost.

In the Middle Ages there were also a few brand-new towns established, just as Alexander the Great set up Alexandria on an absolutely new site, and laid out with formal exactness. During the English occupation of a large part of France, Edward I. founded several such towns, as, for example, Libourne on the Gironde, not very far from Bordeaux, and Montpazier, Winchester was a new-built town, founded also by Edward I., and was extremely regular in its plan, though not quite so formal as Libourne,

Houses in the Country.

When we pass from town to country we find ourselves on more familiar ground, the examples—especially the English examples—are more numerous, in better preservation, and more in-

teresting. They chiefly, however, date from the fifteenth century or later, and as it is not possible to go very far into dates and differences, I will ask you to bear in mind generally that the later in date the example, the more complete, but also the more complicated will its arrangements be; that the earliest houses, so far as they can be found, are those that exhibit the essential features of an English country house in their bare simplicity, and that each century witnessed a large increase in domestic comfort and even luxury in the extent of the buildings erected.

The distinctive feature,—the one apartment essential to an English country house,—was the hall. In that delightful poem in prose and verse, "The Wolfings," Mr. Morris has drawn a picture of some primitive clan apparently akin to our Saxon ancestors, whose great hall was at once their pride and their place of meeting, feasting, and living, and so it was in our own land.

Probably in this country there once were houses which were literally a hall and nothing else. In very remote days, cooking took place at a fire on the hearth in the middle of the floor, and the hall was sometimes the place where it was done, while it then, and long afterwards, served as the living-room and sleeping-chamber of most of the folk. Two other rooms at least were, however, generally met with, even in remote times, and always in days of comfort. One was the kitchen, the other the solar or parlour, a room which afforded some retreat for the lord, or his family, from the noise and drunken revelry which, I fear, was only too prevalent in the hall.

The hall was always spacious and lofty in proportion to the general run of the house. It usually had an open roof, and the framework of the roof was often richly moulded and ornamented. A portion of the floor at the upper end of the room was slightly raised and was called the dais. On this was a mighty oak table with benches, at which sat the lord and his family and guests; the retainers, servants, and others dined below the dais. There was often a grand bay-window in the hall, which usually was at the end where the dais occurred. There was always a fire, either on a hearth on the floor or in a fireplace at the side of the hall. There was very often a gallery, in which at festivities musicians could be stationed. This generally crossed the lower end of the hall, and at that end there was (usually under this gallery) a passage carried from side to side, often behind a screen. Before the music gallery became common the division between the passage and the hall was usually carried up to the roof of the hall, and there was often a wide arched opening in the centre of it, the whole stoutly formed of timber. To the sides of this opening the name of "the speers" is given.

This national feature extended from private to corporate and public buildings. The halls of the principal colleges at Oxford and Cambridge, those of Hampton Court, Windsor, and Ethelham palaces, are and were fine and large structures; so are those of the Inns of Court, among which the notable Middle Temple hall is pre-eminent. All these lead us up to Westminster Hall, with its great hammer-beam roof, unrivalled in Europe.

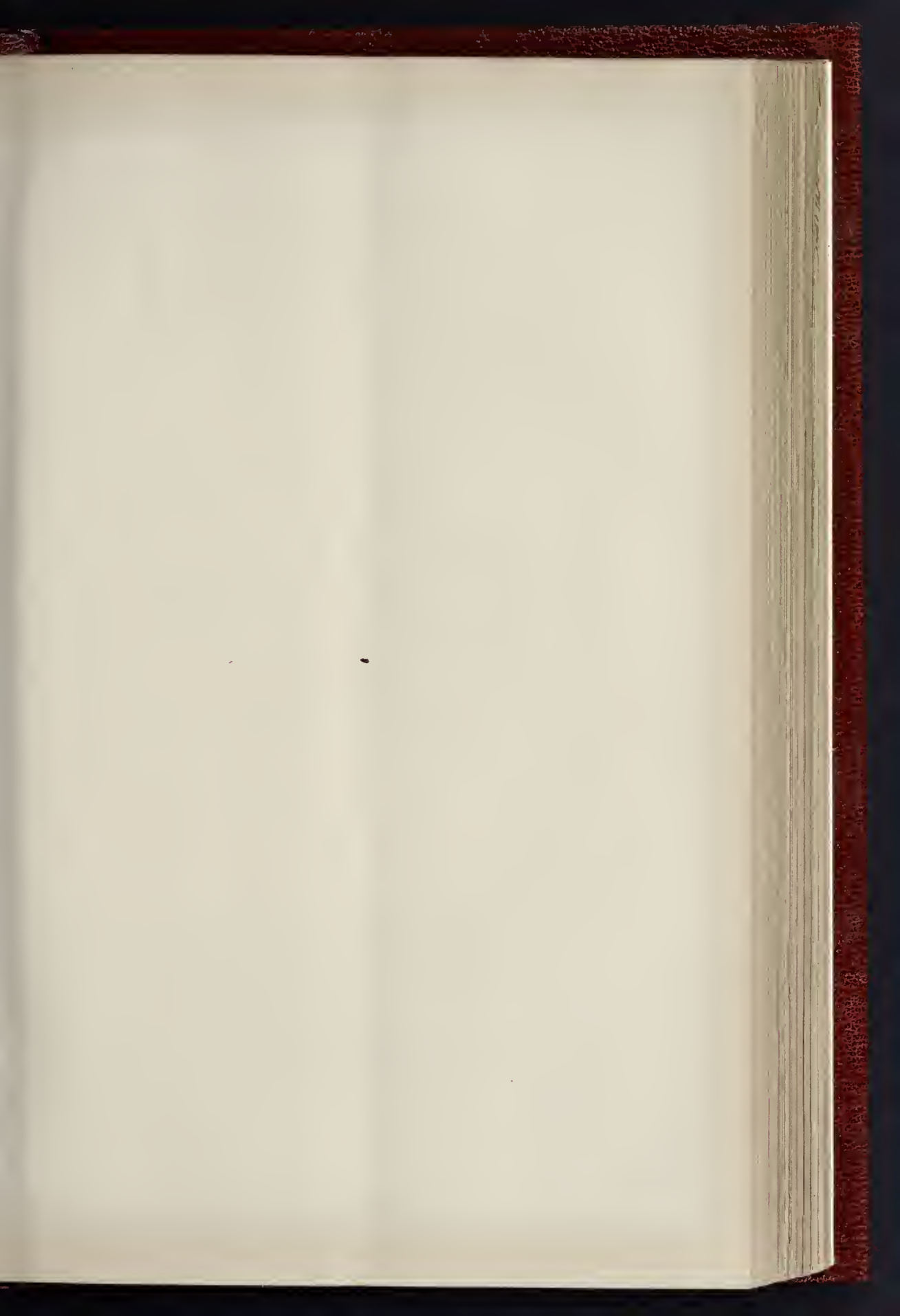
Next the dais, and usually immediately behind the hall and up a few steps, was the solar or parlour. This apartment had more comfort than the hall must often have afforded. A very fine example of the solar is the Jerusalem Chamber of the Deanery at Westminster, which is the solar—as the boys' dining hall is the hall, of the house of the Abbot of Westminster. Below the floor of the solar was usually the cellar. Near the lower end of the hall but separated from it by the passage already alluded to, was the kitchen, with, in a large house, sundry pantries, larders, and store-places, and a battery hatch, from which provisions were given out. A Medieval kitchen is often vaulted, and almost always a noble room with a vast fireplace.

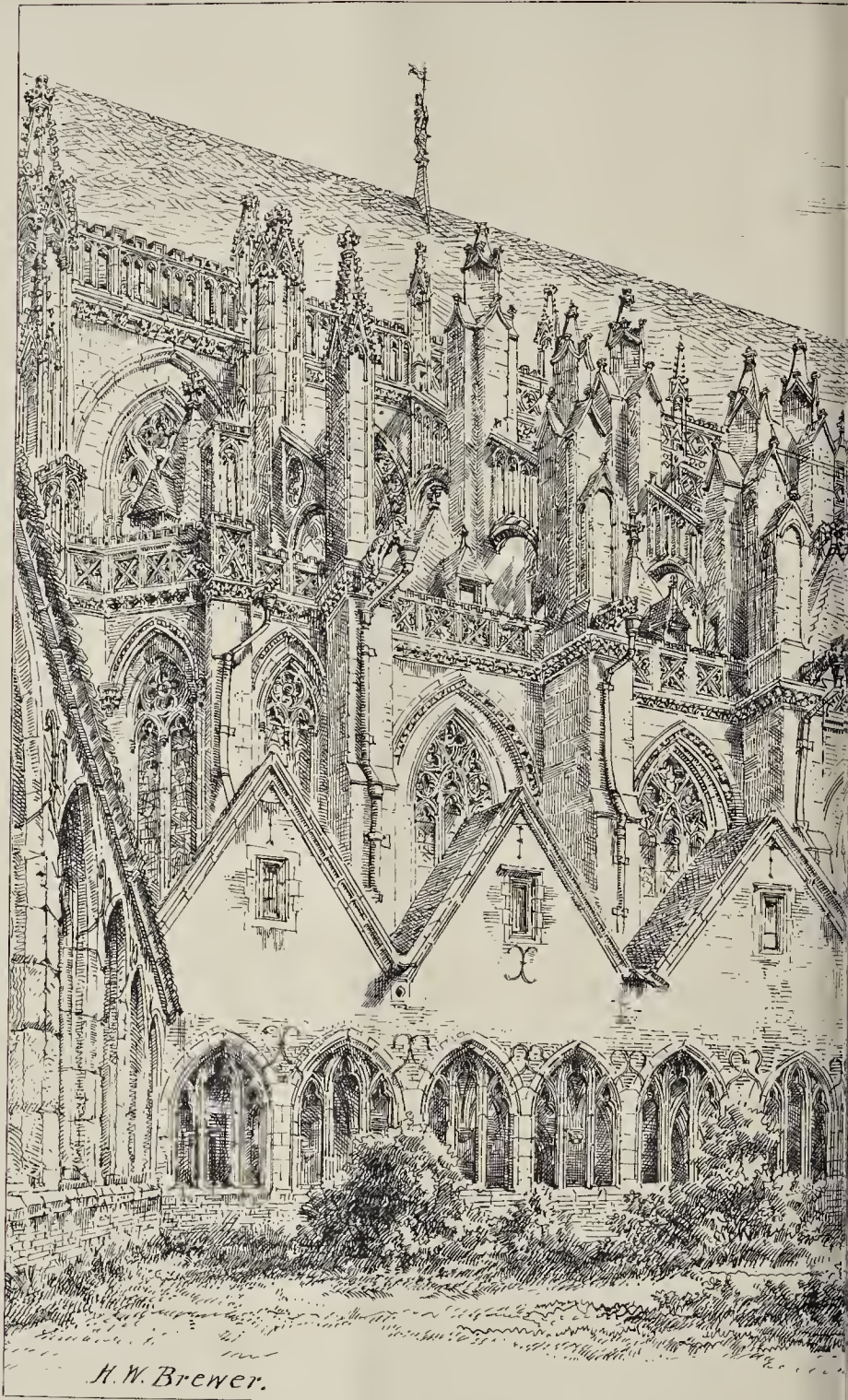
In addition to these three rooms most houses contained some other rooms for service and for sleeping, but the amount of accommodation varied, and, in most cases, such extra rooms were added on at a later date as required.

In many cases the house was protected by a moat, that is to say, an artificial deep ditch, some 10 ft. or 12 ft. wide, and full of water, and was approached by a drawbridge. It was usual (I think invariably) to arrange a moated house as a square block, with a quadrangle in the centre, and other houses were not infrequently

* Illustrated in Viollet-le-Duc, "Dict.," arts. Pan de Bois and Maison.

* Illustrated in Viollet-le-Duc, "Dict.," Art. Maison.





ST. VICTOR.
VIEW FROM THE EAST.



PHOTO LITHO. SIMMAGE & CO. 52 MARTIN LANE, LONDON E.C.



so planned, or were made to take the shape of three sides of a square, but in this respect practice varied.

Wardley Hall, near Worsley, in Lancashire,* is a good example of a moated manor house. It is a quadrangle, singularly irregular in shape, owing, apparently, to the irregular shape of the land enclosed by the moat. Wardley Hall is believed to have been built in the time of Henry VI., 1422-1460, that is to say, the middle of the fifteenth century, and to have been originally wholly of half-timbered construction, though it has been altered and, to some extent, defaced in later times. There is a gate-house at the north side of the quadrangle, in front of which used to be a drawbridge. Part of the gate-house was used as the chapel. The south side is occupied by a hall, about 40 ft. by 21 ft., with bay and great fireplace and passage. The east wing is the servants' wing, and contained the kitchen and dependencies; the west wing is the family wing, with solar or dining-room and withdrawing-room. The wings and gate-house were of two stories. The present staircase is of the seventeenth century,—it probably replaces an earlier one of smaller size. The chimneys are of brick.

Many country houses were, to some extent, fortified, and, even if they had not the protection of a moat, were made strong enough to resist the attack of a party of freebooters, at a time when gunpowder was not yet known. It was requisite to get a licence from the Crown before you added battlements and such-like military features to your house, and the licences to crenellate, as they are called, still exist among the public records, and are often of great value in fixing the date of the erection of a house.†

THE ARCHITECTURAL ASSOCIATION VISITS:

THE NEW HOSPITAL FOR WOMEN.

This latest addition to the hospitals of the metropolis, which is now being completed from the designs of Mr. J. M. Brydon, in the Easton-road, was visited on Saturday afternoon by a party of members of the Architectural Association, under the guidance of the architect.

The staff of this institution for the treatment of diseases of women and children will be composed entirely of women, and attached to the hospital a small number of lady students will receive a medical training, which many of them will put into practice in the zenana of India, from which medical men are so rigidly excluded.

The building, in comparison with other metropolitan hospitals, may be termed a small one, but efforts have been made to make the arrangements as complete and perfect as possible.

The site of the building is extensive, and will, probably, in due course, be bounded on the west by a new street. Part of the site will be laid out as gardens for the use of the patients.

The group of buildings consists of three blocks, a rectangular ward block, another rectangular administrative block with a circular ward block behind it.

The ground-floor of the front block is occupied by a library for students, and a large entrance-hall. Rectangular wards occupy the two floors above, and nurses' bedrooms the uppermost floor.

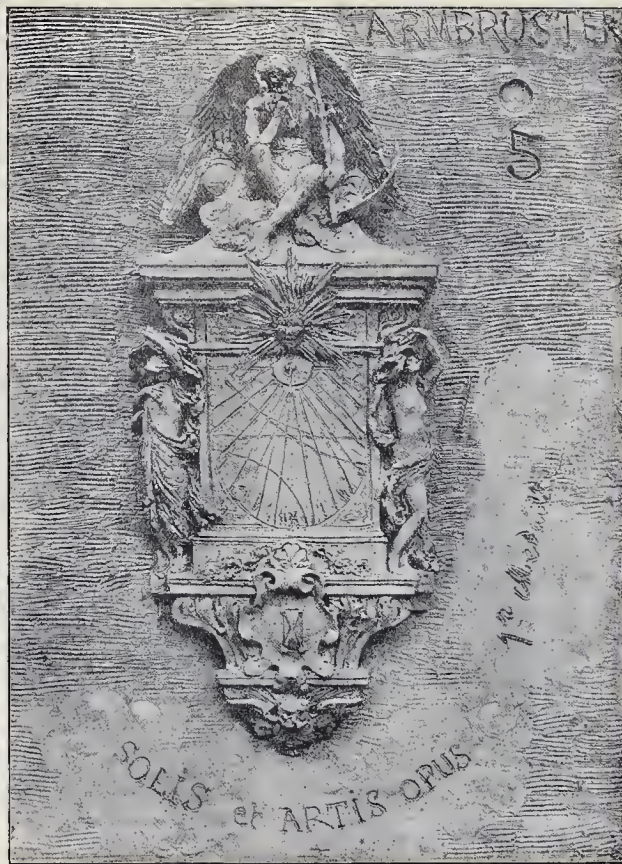
The administrative block has the drug, convalescent, and consulting rooms, with out-patients' waiting-rooms conveniently arranged, whilst the nurses' rooms and the kitchen are on the upper floors.

The arrangements for heating and ventilating the wards and the rest of the building have been carefully planned. Fresh, warm air is introduced through the stoves, which occupy a central position in both circular and rectangular wards, and through the hot-water coils placed under the windows, whilst extract ventilators, with Bunsen burners, are provided to carry off the vitiated air.

The floors of the wards are of fireproof construction, and covered with carefully-laid wood-block flooring.

The arrangement of the light which pervades all parts of this building cannot be too highly praised. The building seems well suited to meet the requirements, for which it has been carefully designed from a utilitarian standpoint.

* Illustrated in Henry Taylor's "Old Halls of Lancashire and Cheshire."
 † The conclusion in our next.



Sketch-Design for a Sundial: by M. Armbruster.

SKETCH DESIGN FOR A SUNDIAL.

It was mentioned in our "Letter from Paris" of February 1 that the subject of a "cadran solaire" had been set for the students' competition in decorative design at the Ecole des Beaux-Arts, and M. Armbruster's design had been awarded the prize. The accompanying illustration is reproduced from a photograph taken from the clay model of this design submitted in the competition. The design is for a wall-dial, surmounted by a figure of Time, and flanked by figures of Day and Night.

The Lock-out of Kentish Brickmakers.

Saturday last completed the fourth week of the strike of the Kentish bargemen, while on the same day the brickmakers, locked-out in consequence of the bargemen's strike, completed their third week of enforced idleness. According to the *South Eastern Gazette*, the trade of Sittingbourne and district is slowly but surely drifting away, and probably will never be regained. The brickmakers take a very gloomy view of the situation, and argue, with some truth, that the brick industry will never be what it has been. The action of the Kentish bargemen has been suicidal, so far as the interests of the brickmaking districts are concerned, for not only will many fields which found employment for a large number of hands be closed, but employers in some instances are seriously contemplating retiring from business altogether. This will compel many men to remove from the district, and the prosperity of the place must consequently decline. Subscriptions for relief of distress amongst the brickmakers are being received at Sittingbourne by the Central Relief Committee, of which the Rev. Henry Venn, vicar of Sittingbourne, is chairman, and Mr. G. F. Evans treasurer.

Illustrations.

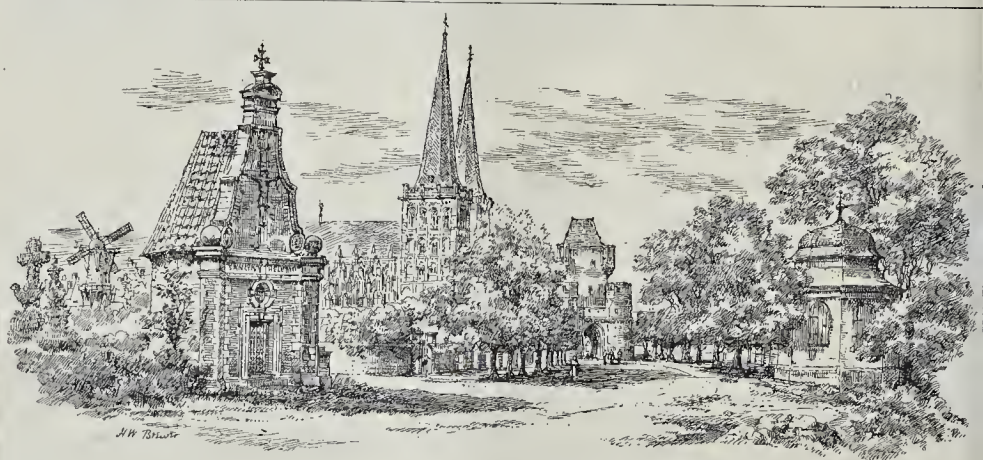
SOME CHURCHES ON THE LOWER RHINE.—II.*

SEVERAL old churches are passed on the road from Calcar to Xanten, but they are not of any great importance. The approach to Xanten is remarkably picturesque, and we give a sketch of it. By the roadside is a pretty little shrine, containing an altar dating from the end of the seventeenth century; a fine old windmill; some singular clipped trees are seen to the left; whereas a fourteenth-century brick gateway, with its barbican, is seen to the right; and above all rise the spires and lofty roof of the Minster. Passing through the old gateway, which upon nearer approach is seen to be adorned by a number of carved shields, one is admitted into the principal street of the town, which enters the market-place by a sudden turn. The whole of one side of this great square is occupied by ecclesiastical buildings. The first object which attracts attention is the Protestant church, a small seventeenth-century building with a rather picturesque octagonal bell tower. Close to it is another small church or chapel, dedicated to St. Michael, the nave of which is above a gateway. It is a very pretty little building, with an elegant octagonal turret, the nave Romanesque, and the apse fourteenth century work; it is now used as a school. Rising over these two small churches are seen the great Romanesque towers of the Minster church of Saint Victor, crowned by two lofty slate spires, the long roof-line of the nave, and the grand range of pinnacles and flying buttresses.

* See *Builder* for March 8 last, p. 173.



St. Alban's Cath. etc.
E. End of Lady Chapel.



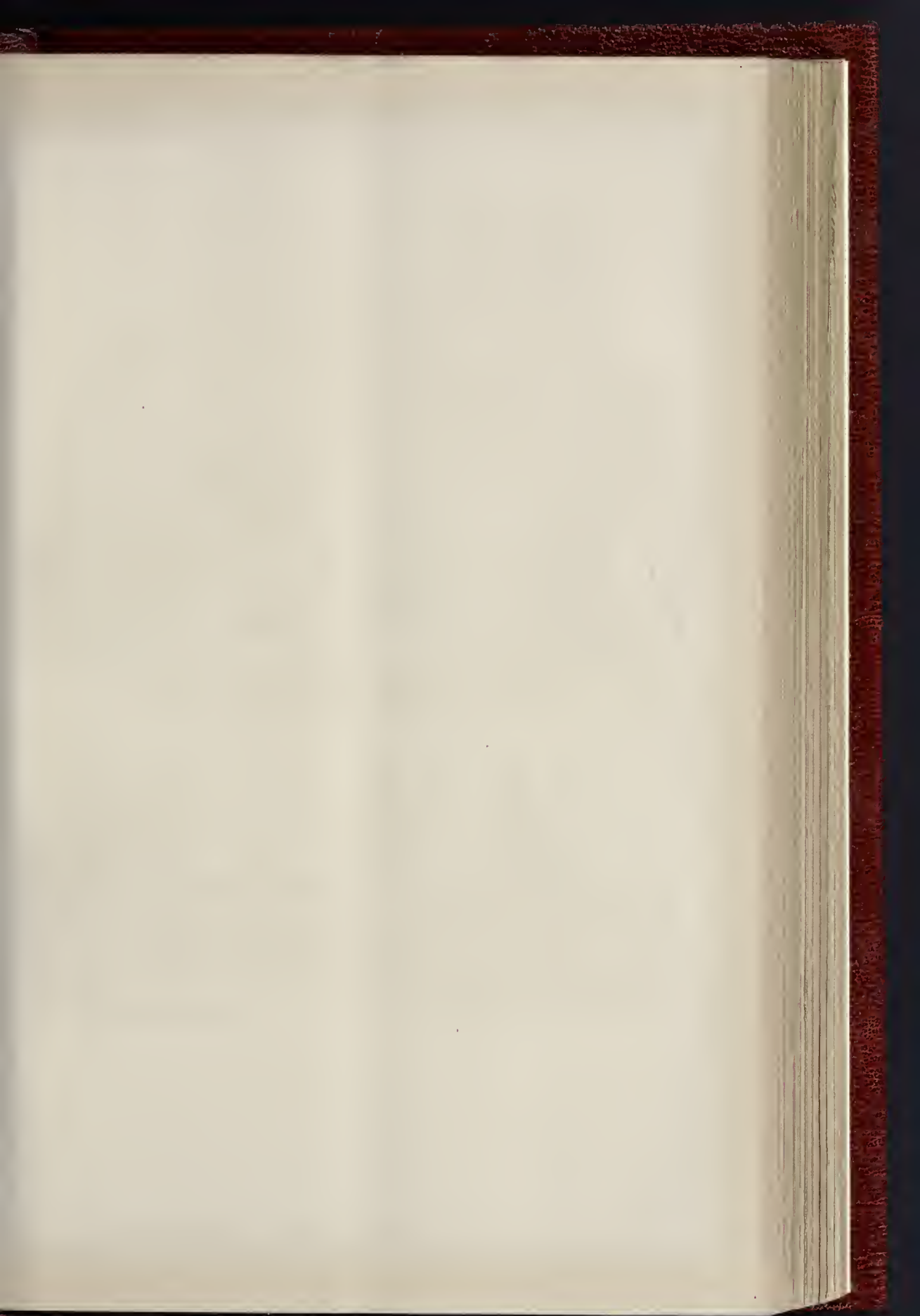
Outside Xanten Gateway.

Passing under the archway beneath the little church of St. Michael, one is admitted into the churchyard of the Minster. Immediately facing us is the very rich south doorway and the extended flank of that beautiful building, with its rich pierced flying buttresses, elaborate groups of pinnacles, and elegant traceried windows. To our right is a fine representation of the Crucifixion, composed of a group of statues, larger than life, carved in stone, dated 1330. Immediately to the left is the picturesque porch and stairway leading up to St. Michael's Chapel, and scattered about are various vaulted shrines, containing representations of Our

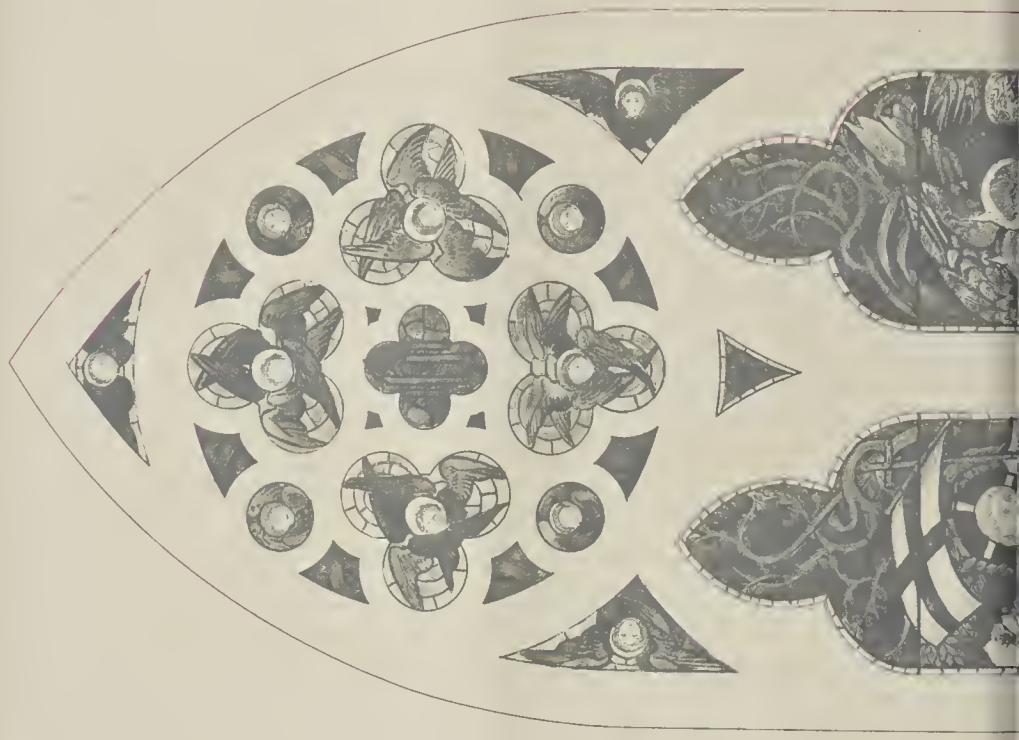
Lord's Passion. Passing on to the left one comes in front of the west-end of the church, flanked by Romanesque towers, and adorned with arcade work. It is, however, rather a flat and bald composition.

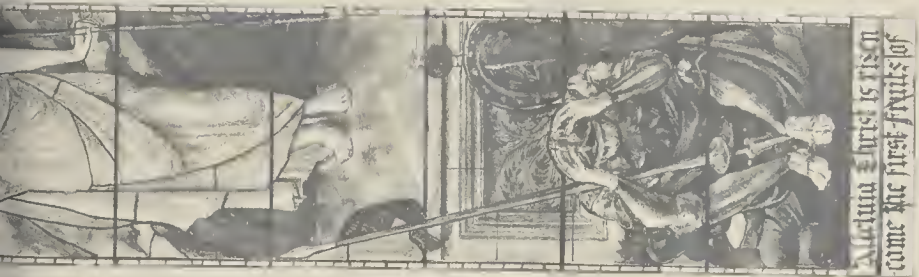
On the north side of the Minster is a very beautiful set of cloisters, surrounded by the old buildings formerly inhabited by the canons and other members of the Chapter before the ecclesiastical establishment was suppressed; in the centre of the earth is a most exquisite cross. The walls of the cloisters are covered with tablets, memorials, and inscriptions of every date, some of them undoubtedly Roman. I

should mention the fact that Xanten was one of the most important Roman stations in Germany. The remains of an amphitheatre and other works are still to be seen close to the town. Altars, cinerary urns, coins, &c., are discovered in every direction. There is an interesting collection of such antiquities in the Town-hall. From the cloisters, the noble flying buttresses of the north side of the church are well seen. The chapter-house is a fine apartment with a row of slender octagonal columns supporting the vaulting; it is full of ancient vestments dating from the eleventh to the seventeenth centuries, hangings, altar frontals, &c.,—



THE BUILDER, APRIL 5, 1890.



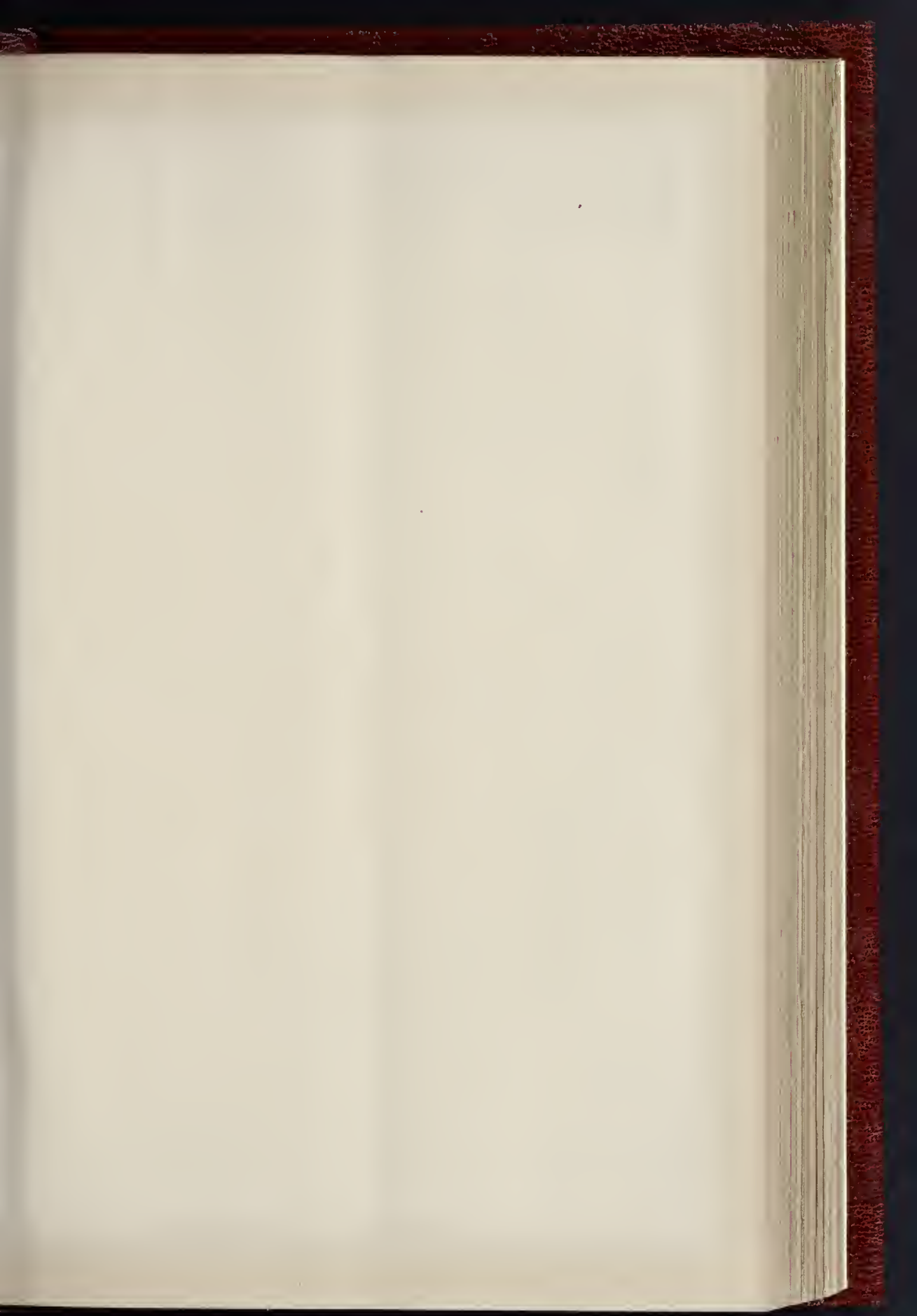


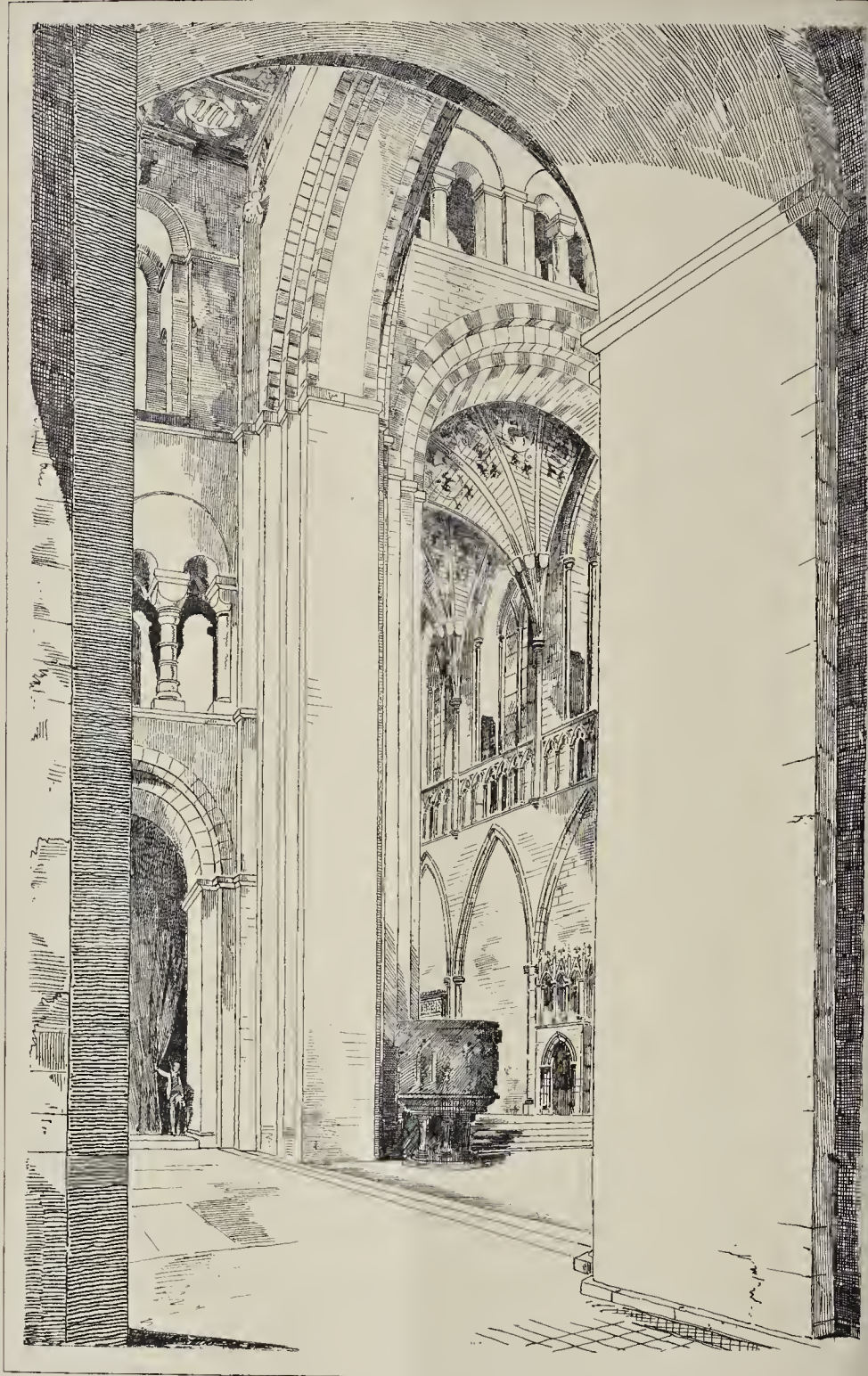
THE PHOTO COPY, F.R. MARTINE LANE, ARCHT., LONDON, E.

WINDOW IN APSE, RANMOOR CHURCH, SHEFFIELD.

By MESSRS SHRIGLEY & HUNT







VIEW OF CHOIR FROM NORTH TRANSEPT.

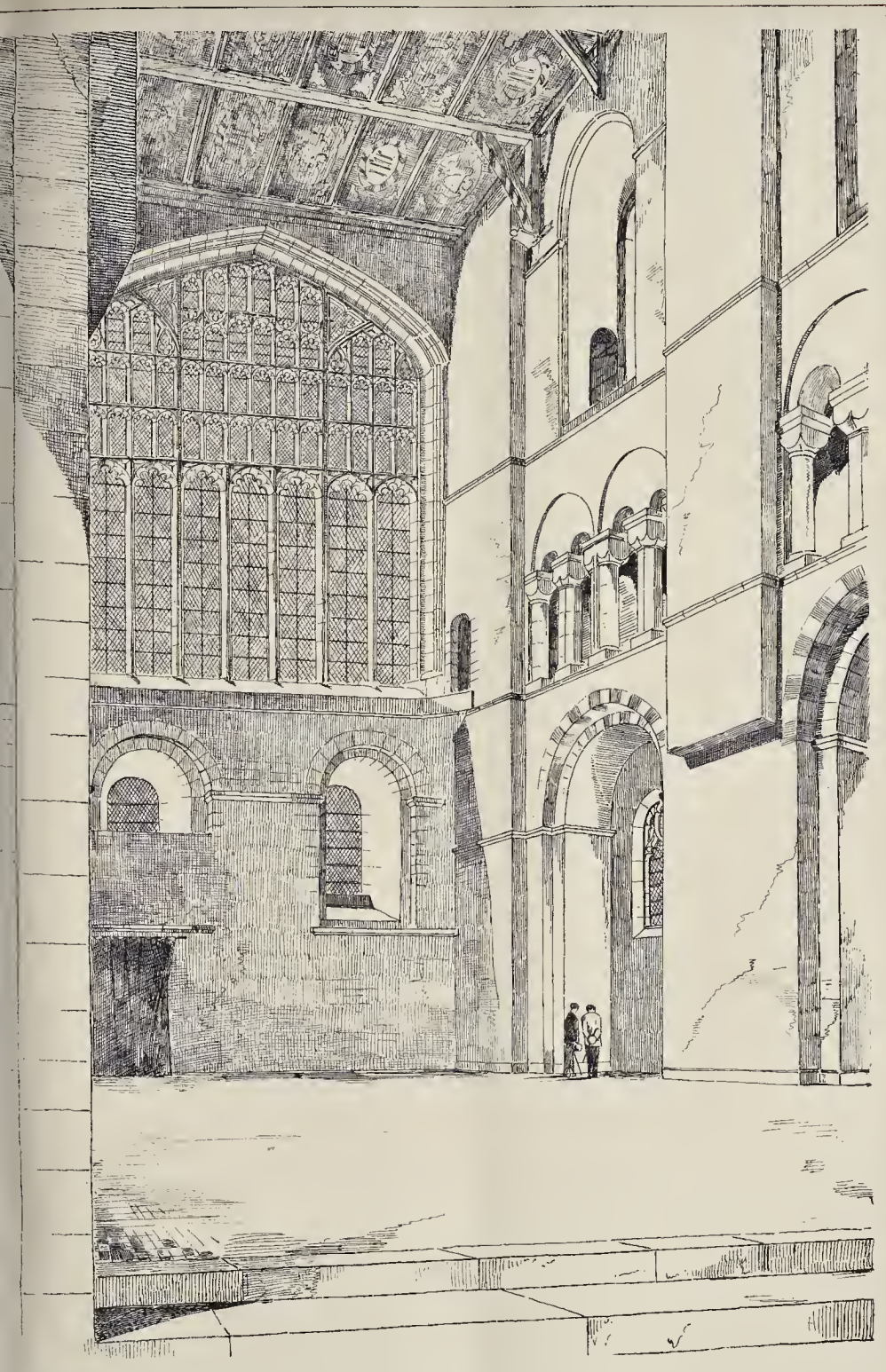
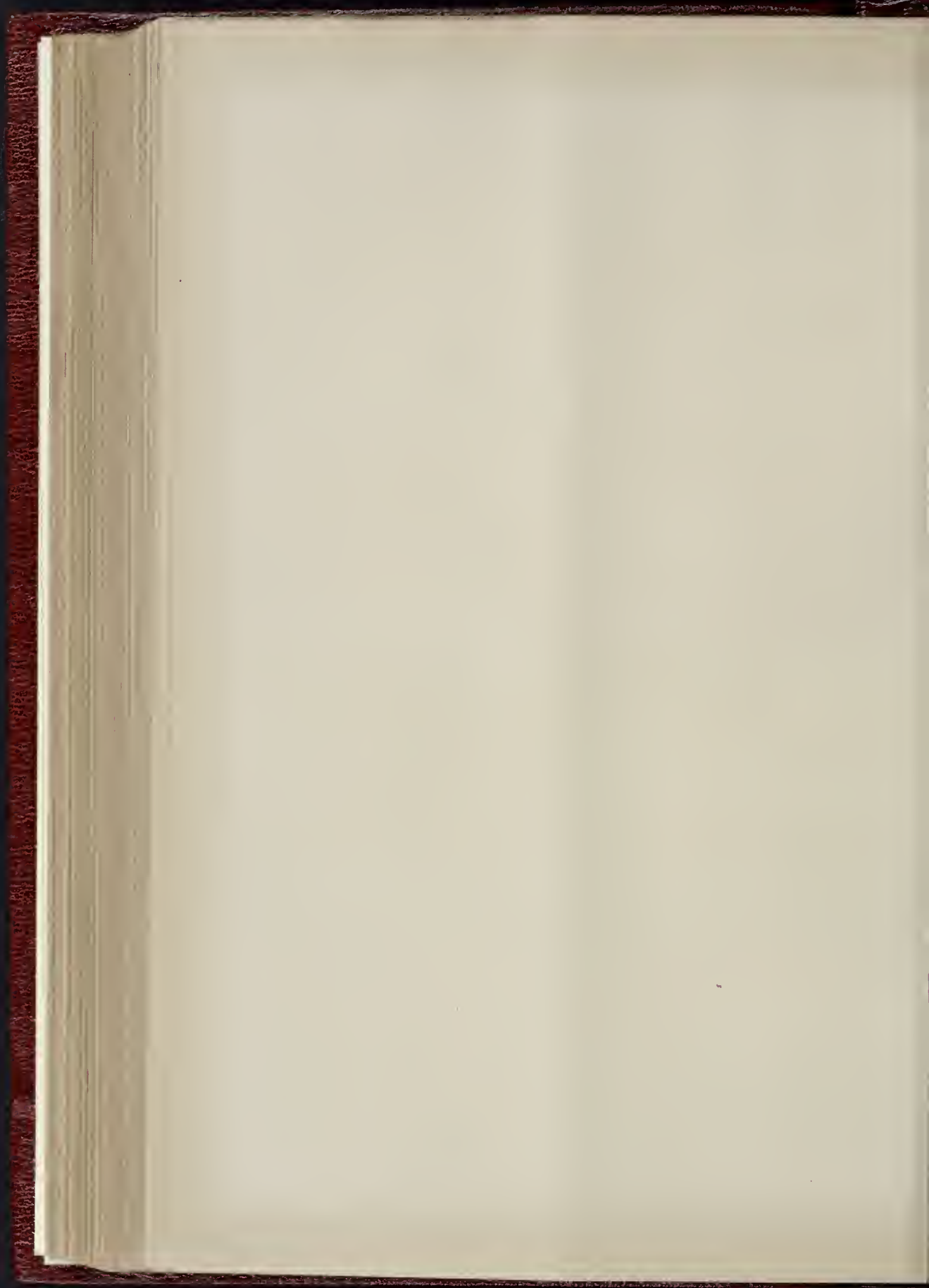


PHOTO LITHO. BARRAGUE & CO., 22, MARTIN LANE, CANNON ST., LONDON, E.C.

INTERIOR OF THE NORTH TRANSEPT, BEFORE "RESTORATION."





most remarkable collection of ancient embroidery. As will be noticed at once, the western portion of the church, including the two great towers, is Romanesque, but the nave and choir are very rich, thoroughly-developed Gothic work. It is said that the choir was commenced in 1153, and that the nave is at least a century earlier. The building has very little in common with the general run of North German churches, but bears a greater resemblance to the much richer ones of South Germany. In fact, the resemblance to Ratisbon Cathedral is remarkable that it is not improbable that the same architect. It would occupy too much space here to discuss this question. We reserve more detailed description of the building, its noble interior, and its most interesting contents, for a future article.

H. W. B.

ST. ALBAN'S CATHEDRAL.

THE interior views of St. Alban's Cathedral, which are given to-day, show the original work of the north transept and choir before Lord Grimthorpe's recent restoration (?), and also the present condition of the Lady-chapel, which is far untouched, but which will doubtless be dealt with shortly under the faculty granted to Lord Grimthorpe not many weeks ago. The choir of the north transept gives Abbot Bentham-Atstead's window of seven lights, of the same pattern as those formerly at the west end of the nave and in the south transept. All have now been swept away, the one shown having given place to an enormous rose window

which even unscals the solid Norman work near it. The old flat painted ceiling, which had a curious representation of the martyrdom of St. Alban in the centre, has also disappeared, and a plain ceiling has been substituted. In the arched recesses of the transept, on its eastern side, are an interesting series of encaustic and embossed tiles.

The only alteration, so far, made in the choir—a portion of which is shown in the view from the north transept—is the substitution of three-light Geometrical windows for the original three lancets under an enclosing arch. The beautiful window over the east end of the presbytery, which shows in the view of the exterior, has also been taken down, and a new one put in its place.

The Lady-chapel, which remains in an un-restored state, is illustrated by two views—one a general view taken from the ante-chapel, and a portion of the south-east angle with the Sedilia.

As will be seen by the general view, the chapel is of two dates. Up to the cill level it is Early English work, with arcading trefoiled on the north side, and cinquefoiled on the south. Over this, all is of Decorated date, the work of Abbot Everseden, 1308-1326, who also built the ante-chapel between this and the presbytery. The Lady-chapel fared badly during the period of its use as a school, the old arcading and the canopied niches having been cut down to accommodate the panelling, and a good many of the statues being destroyed. The chapel proper is of three bays, each with a four-light Decorated window. At the east end is a five-light window curiously designed, the principal lights being

surmounted both inside and out by crocketed gables with finials. On the south side are the remains of some gorgeous sedilia, with a row of canopied niches, and a triangular window over. Projecting south at this point is a vestry, formerly the Chapel of Saint Saviour, and of Late Perpendicular date.

The vaulting of the chapel is of wood with stone springers. On the splay and central mullions of the side windows are little canopied niches with figures of bishops, and rows of half-flower ornaments occur both at the inside angle of the splay and against the window tracery. Church has been largely used in the interior and Tottenhoe stone outside, together with flint and brickwork. The buttresses and mouldings of the exterior generally have become much worn, and much of the detail has entirely disappeared.

The heltry-tower or "clock house," a sketch of which is subjoined, is in the market-place, immediately north of the Abbey; and, according to Clutterbuck, there are deeds showing that it was built 1402-27. Near it was formerly one of the Eleanor crosses, destroyed in 1702.

WINDOW, RANMOOR CHURCH, SHEFFIELD.

THE subject of this window, which is placed in the apse of Ranmoor Church, near Sheffield, is the Resurrection. The principal figures are in toned white draperies relieved against the dark background formed by the rich colour of the foliage and rocks. The angels have ruby wings, and this colour is repeated in the dexter light in the cross upon the banner and in the nimbus around the head of Our Lord. The sleeping soldiers at the base are clad in brazen armour, which is subdued and in pleasant harmony of colour with the pearly tones of the tomb.

The window is by Messrs. Shrigley & Hunt, and the drawing from which the illustration is taken was exhibited at last year's Royal Academy.

THE ARCHITECTURAL ASSOCIATION:

NOTES BY THE A.A. TRAVELLING STUDENT.

AT the ordinary fortnightly meeting of this Association, held on Friday, the 28th ult., Mr. Leonard Stokes, President, in the chair,

Mr. E. S. Gale (hon. sec.) moved a vote of thanks to Mr. Norman Shaw, R.A., for receiving the members on the occasion of their visit to the new headquarters for the Metropolitan Police on the Victoria Embankment, on the 21st ult.

Messrs. F. E. Bristowe and F. W. Bryan were then elected members of the Association.

The Chairman then submitted to the meeting the committee's "house-list" of members proposed for officers and committee for next session, but it was open to any member to make other nominations for any of the offices up to that day four weeks. We may mention that the "house-list" nominates Mr. Stokes for re-election as President, and Messrs. F. R. Farrow and E. S. Gale for re-election as honorary secretaries.

Mr. A. E. Bartlett, holder of the Architectural Association Travelling Studentship for 1889, then read a paper, entitled, "An Account of a Tour in France, chiefly in the Loire Valley." The tour extended over a period of seven weeks, and the author left London on July 1, carrying with him an ample supply of sketching-paper, lining-paper for full-size details, and scale-paper for measured drawings. After a short stay of four days at Rouen (to which city he returned and spent a fortnight there at the end of his tour), he went to Chartres, and there he wandered about the cathedral some time before he could make up his mind what to set to work upon. The place was so colossal, and its details were so much in keeping with its grandeur, that it seemed useless, in the short time at his disposal, to attempt to measure any of the actual cathedral work, so he contented himself with making sketches about the place, and with measuring one or two details. The first thing that struck him on seeing the Cathedral of Chartres under a blazing July sun was the glorious effect of colour given by the bright green copper roof which topped the rich brownish-grey walls. The roof was skillfully constructed of iron, and was a comparatively new addition, to replace the old lead-covered wooden roof which was destroyed by fire

in 1836, and which, by reason of the multitude of its timbers, was known by the name of "the forest." The inside of the present roof was worth a visit, if only to see how little the vaulting had to do with the construction of the roof, the tie-rods of which came several feet above the cement finishing of the vaulting. It seemed rather a wasteful piece of construction, though it was undoubtedly effective. It showed us that constructive sbeams, for the sake of artistic effect, were not confined to one age or one style. Chartres seemed fated to suffer from fire. Five successive times before the present church was built was the cathedral burned to the ground, and on one occasion the greater part of the town was involved in the catastrophe. The graceful tower which stood at the north-west angle was designed by Jean Texier in 1506 to replace another which had been burned down. Though of so late a date, it showed little Renaissance feeling, except in some of the panels near the top. M. Durand, in his excellent monograph of Chartres, gave an interesting account of the building of the cathedral which stood here before the present one, and which was burnt down in 1174, and he quoted a letter from Hugh, Archbishop of Rouen at that time, who narrated that the clergy, holding High Mass in their ruined church, kindled in the neighbouring countryfolk a keen interest in its rebuilding; and he told how, by reason of certain miracles, performed on the sick, who were brought to the church, the interest afterwards grew till the whole countryside was in a fever of religious enthusiasm, and men, forming themselves into brotherhoods, loaded their carts with stone, wood, lime, and victuals for the workmen, and yoking themselves to them, set out on a pilgrimage to Chartres, to help forward the building of the church. So great were their loads, he told us, that sometimes it took a thousand men to drag one cart! Such was the account given by Archbishop Hugh of the building of the Cathedral of Chartres in 1037. The existing cathedral as we now saw it was begun in the year 1194, in the reign of Philip Augustus and the episcopate of Regnault de Monçon, and was consecrated on the 17th of October, 1260, as some said in the presence of St. Louis himself. He (Mr. Bartlett) could do no more than mention the rose windows, the stained glass, the excellent sculptures, the marvellous Renaissance screen running round the choir (which Fergusson compared to point-lace in stone), the intricate labyrinth marked out in black marble on the floor of the nave (over which in days gone by penitents used to crawl on their knees, saying a prayer at each turn), or the Black Virgin, the most precious treasure of the Cathedral, and which the mob of the Revolution crowned with a red cap of liberty, but did not dare to destroy. Except one small house in the Rue du Grand Cerf, there was not much good domestic work in the town. There was, however, a curious little Renaissance clock tower on the north side of the Cathedral, the cornice of which was almost exactly the same as the cornice on the main entrance front at the Château of Chenonceaux. Another detail worth noticing was the little cast-iron fountain in the market-place, which was a very excellent little design.

At Le Mans, one thing to be specially noted was the extreme care with which the Medieval builders chose their sites, taking that part for their church which seemed left by nature as the site best fitted for the noblest building, and letting the other buildings of the town group round it as they would. The great choir towered high above the surrounding town, with a broad flight of steps leading up to the level of the floor of the church. If the builders of the choir had pulled down and rebuilt the nave in accord with it, the Cathedral of Le Mans would probably be about the largest in France. As it stood, the nave was an interesting archaeological study, the caps of some of the columns in the nave showing their Classic origin in a very marked manner. There was a very good piece of colour decoration in the apse, and a very nice piece of domestic work at the west end of the cathedral.

The author's next stopping-place was Tours, in the very centre of all the great works of the François Premier period, and whence he visited Azay-le-Rideau, Loches, Beaulieu, Chenonceaux, Amboise, and Blois, and got his first impressions of the works of the French Renaissance. The early builders of the French Renaissance seemed to have used their own brains in devising their houses, and to have employed the skilful

hands of the Italian workmen to complete them, even as their predecessors the Romans, whom they professedly copied, used the cunning handiwork of the Grecian craftsmen to draw their own designs, and so they produced a series of works which seemed to belong to a distinct class; for in spite of their Gothic feeling and Classic detail, there was no appearance of the two styles clashing, and the François Premier style itself was as distinct from the Flamboyant which preceded it, and from the heavy Classicity of the Henri Quatre, which came after, as two adjacent styles could well be. As the requirements and occupations of the people who lived in these châteaux could not have been very different from those of the ordinary country gentleman of our own day, the author thought we might learn a good deal, not only by bagging detail, but by studying the planning and general arrangement of those châteaux. Their roofs were steep-pitched to throw off the snow, and so high sometimes as to savour of an affectation. Nearly every one had each its little chapel or oratory (often too small, one would have thought, for the needs of the household), where, if anywhere in the building, the Gothic feeling predominated. Their reception-rooms were stately and well-proportioned, and often decorated with carved panels into which the craftsman must have put months of labour. The windows of these apartments were of course so arranged as to gain some fair view over the neighbouring country, and the main staircase was treated as an important feature, worthy of the highest consideration. Thus at Azay-le-Rideau the beautiful little staircase was more lavishly decorated than any other part of the house. The great external staircase at Blois, again, allowed the chateau to be divided up into a series of flats. Then there was the great double staircase at Chambord, a curious device, by means of which two persons might pass one another on their way from floor to floor and neither be aware of the other's existence. The treatment of the balconies of the châteaux, and the way in which they were generally screened from the rain and sun, were worth attention. Every detail, in fact, pointed to an age almost as civilised, and, perhaps, quite as luxurious as our own. There was one detail, viz., the lead finial, which seemed at this period to have reached its highest excellence. The author exhibited the measured drawing of a finial at Blois, a very good one of a comparatively simple kind. He was fortunate enough to find it blown down, otherwise it would have been inaccessible. The upper part, which resembled the flower of the fuchsia, was made of wrought and hammered iron, and the base was of wood, covered with lead. It was at Tours that he saw some Renaissance detail which left a stronger impression on his mind than anything else he saw during his trip. In a chapel at the south transept of the cathedral, stood the beautiful monument of the two children of Charles VIII. and Anne of Brittany. The two children, watched over by four angels, all carved in white marble, lie on a black marble slab, underneath which was a white marble sarcophagus decorated with the arms of France and somewhat weak cherubs; the angles of the tomb were marked by dolphins and conventional eagle's wings. Along the upper portion of the sarcophagus were carved scenes from Bible history, most of which seemed to be illustrations of the exploits of Samson, conventionalised for decorative purposes. The monument was hacked to pieces by some of the furies of the Revolution, but it was restored as far as possible in 1815. It was the work of two brothers, natives of Tours, named Juste, who were contemporaries of Jean Goujon, and, in spite of a few faults of detail, it was an extremely beautiful and appropriate monument. Another monument which the author saw during his tour was the beautiful tomb of Agnes Sorel, the favourite of Charles VII., which stood in a tiny chapel in the stem castle of Loches. The general idea of the tomb was much the same as that of the one just described. The beautiful figure of the "Belle of Belles" lay, carved in white limestone, on a slab of black marble, with two angels at her head and two lambs at her feet. The effigy was a splendid piece of work, and the tomb was a lesson both to the sculptor and architect. Unlike the one at Tours, the body of the tomb was simple and devoid of ornament, which was, perhaps, an advantage, as it concentrated the attention on the beautiful figure at the top. It was a monument to be seen and remembered. Tombs such as these served a distinct purpose, recalling, as

they did, the figure, and often telling the history of the person whose death they commemorated. In an ordinary English graveyard the tomb of the present day savoured too much of the monumental marble-mason's catalogue to show any individuality, or interest any one except those who were immediately concerned in a person to whose memory they were raised. That would always be so until people understood that a work of art, such as any permanent memorial ought to be, could only be produced by the individual artist, and not by the wholesale manufacturer.

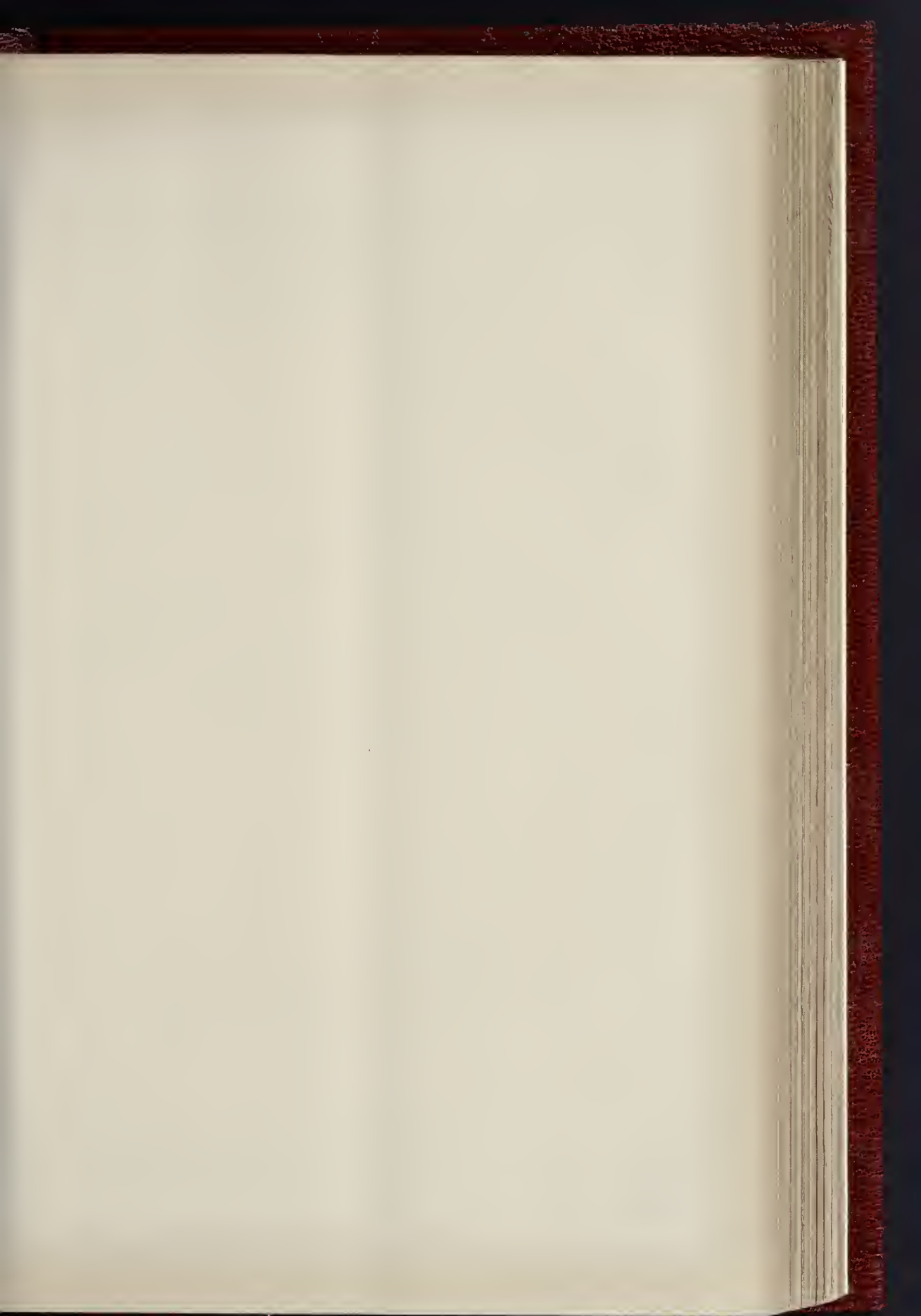
While in Tours the author's time was mainly occupied in measuring the tomb of which he had spoken, but he had time to make a few notes of various interesting buildings, among them a charming old fifteenth-century houses the Rue de Briçonnet which was known as a house of Tristan L'Hermite, the Prime Minister of Louis XI. The stories of the house were divided by string courses formed of the knots of an ordinary English greyware; the tomb of the house has also an excellent doorway, with twisted columns. The remains of the old castle of Plessis-les-Tours, about a mile and a half out, were well worth a visit. The chateau, in the house in the Rue de Briçonnet, was in a fifteenth century style, of red brick and stone dressings, and had a good new staircase.

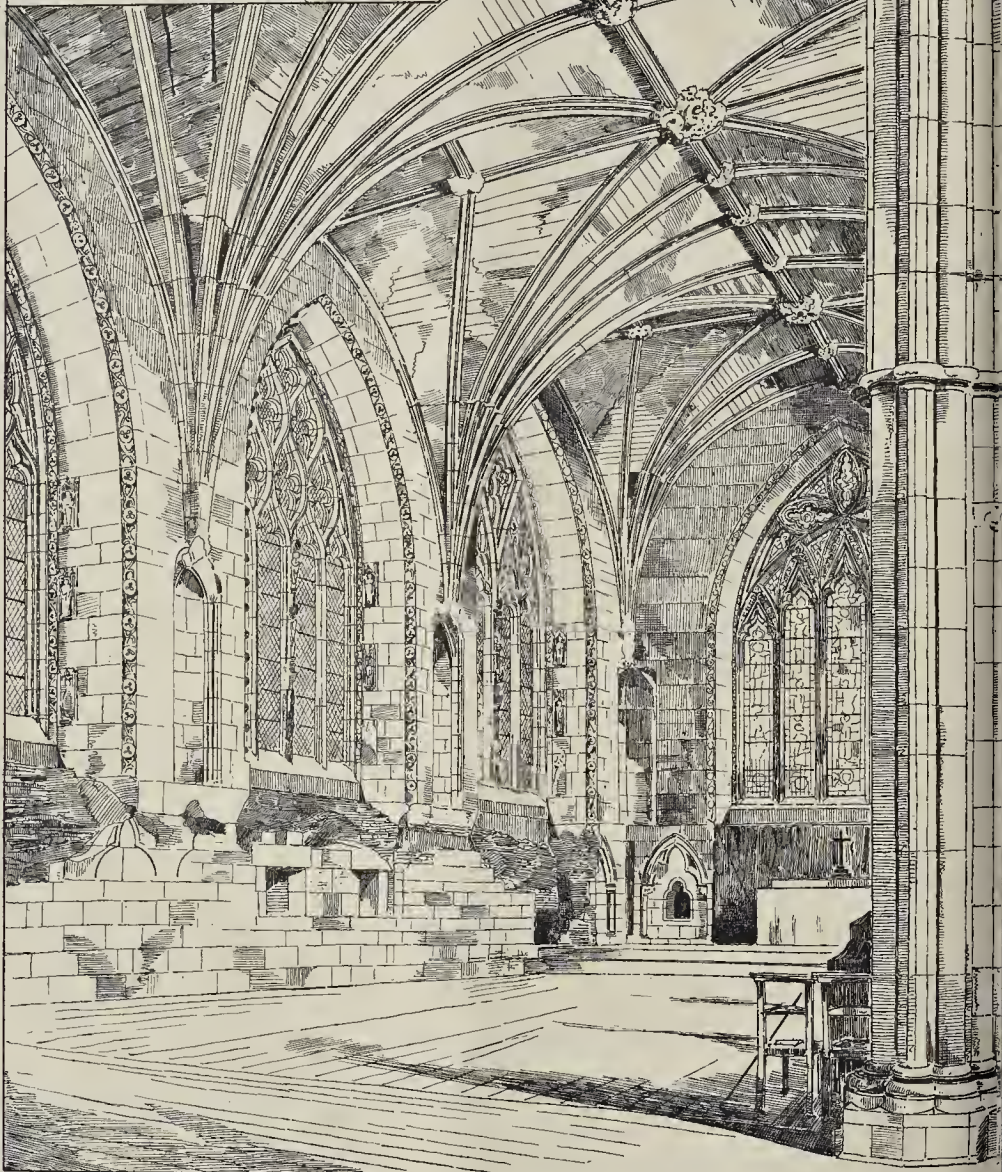
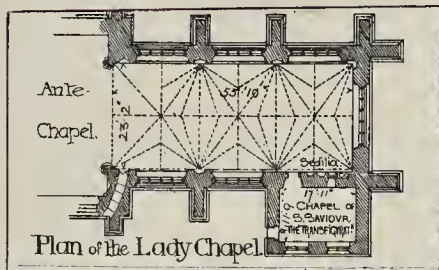
At Azay-le-Rideau, the chateau contained good collection of pictures; the staircase, though small, was lavishly decorated and ceiling with sort of barrel vault. The lead work at the top of the turrets was very noticeable. Each turret had a different moulding at the base. The church was worth a visit; it had a curious detail of a bay covered with a three-centred arch. Most of the cottages in the neighbourhood were built in the solid sandstone.

There was a great deal to be seen in the neighbourhood of Loches. The chateau was more famous for its terrible dungeons than for the modern group of buildings standing a little way off which formed the chateau proper. The Church of St. Urs was built in the latter part of the twelfth century. Its four cone-shaped roofs formed an effective and interesting skyline, and the circular western doorway, opening from the porch into the nave, was a splendid piece of Romanesque detail. The town contained a picturesque little François Premier Hôtel de Ville, and an interesting Gothic gateway to the town known as the Porte des Cordeliers. At Beaulieu, a little village close to Loches, there was a good deal to be seen and learnt. Between the town and the village of the pretty little Château de Sausac, of the François 1^{er} period. The Church of St. Laurent at Beaulieu, was a Romanesque structure, with the vaulting of the aisles of the same height as that of the choir, giving the church, in its present state of dilapidation and neglect, the appearance of a large ball than that of a church. In this village also were the remains of the Eglise des Moines, which was formed attached to a Benedictine convent; all that now left of it was the tall, graceful west-work and the lofty choir, which had been carefully restored, and was now used for services. The rest of the church was destroyed by the English in 1412.

The author's next stopping-place was Chenonceaux, with its famous little chateau built on a bridge spanning the river. At that time it belonged to Diana of Poitiers. On the death of Henry II. it was enlarged by Catherine de Medicis, who took up her abode there. The year the chateau was bought by a French financial company, the Crédit de Paris, and its future was somewhat uncertain. In the gallery were a couple of fireplaces, said to be by Philibert de l'Orme, but they were not particularly striking.

From Chenonceaux the author went to Amboise, passing through Tours again on the way. At Amboise he found the most charming little Gothic chapels standing in the Castle gardens, and built on a solid rock tower high above the town. It was dedicated to St. Hubert of Liège, and over the two chief western doorways under one arch is carved large representation of his miraculous death while hunting one day in Holy Week in a Forest of Ardennes, with a pure white cross bearing a crucifix between its horns. He afterwards lived for some years as a hermit in a Forest of Ardennes, but was at length ordained priest and finally made Bishop of Liège, and his death was canonised as the patron saint of the chase and dogs. This little chapel dedicated to him was worth a good deal of study.





GENERAL VIEW LOOKING N.E.

St. Alban's Cathedral: Interior of the Lady Chapel

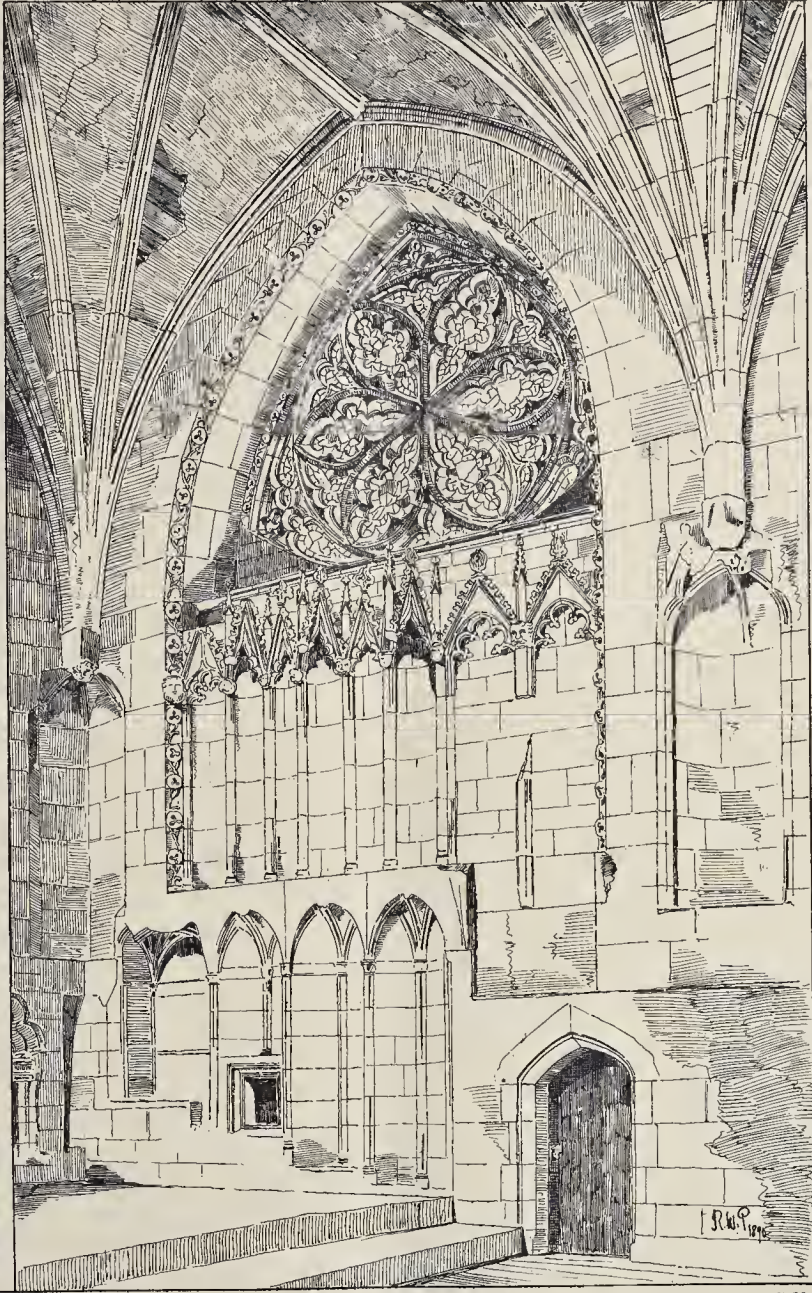
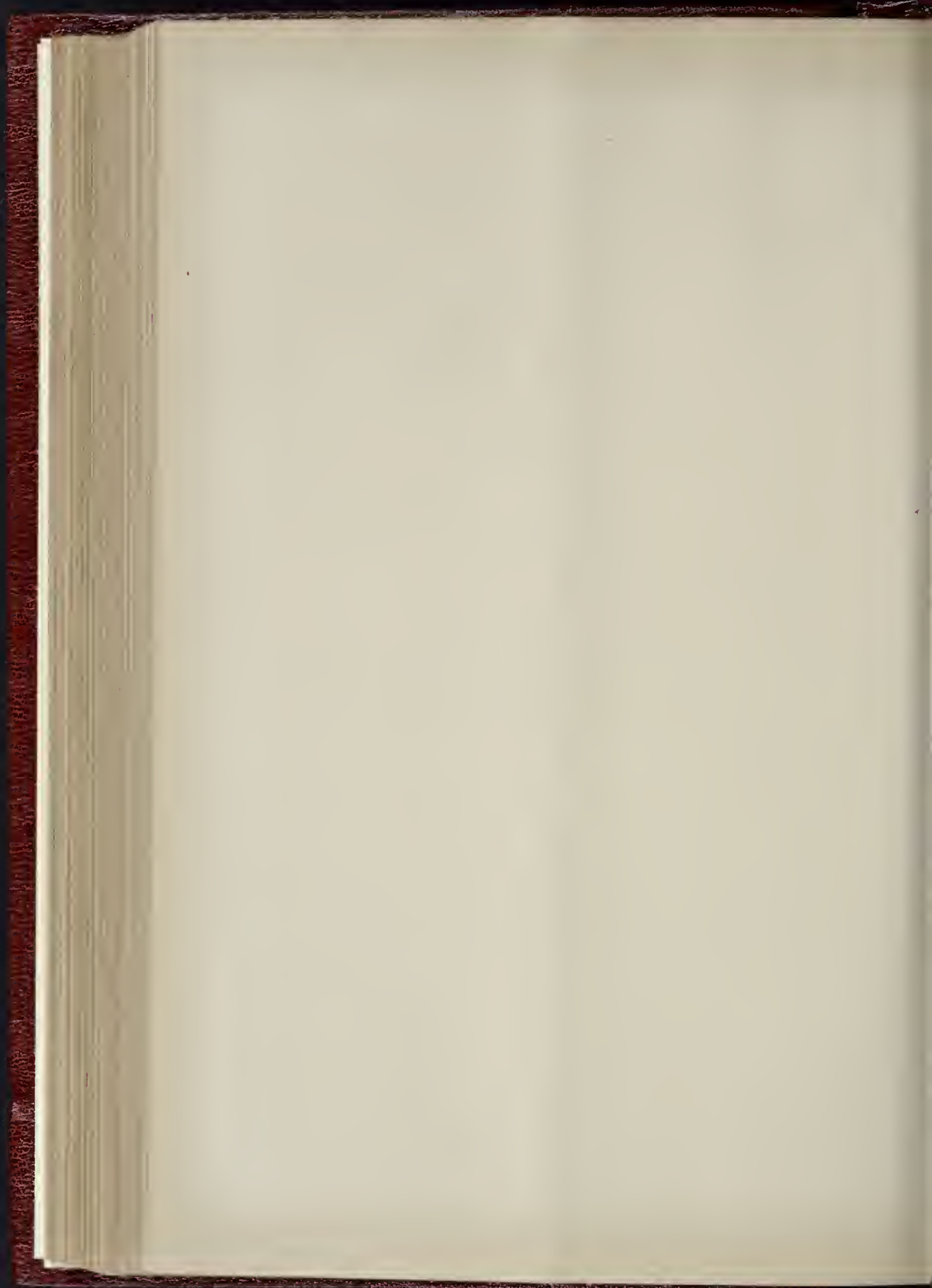


PHOTO-LITHO SPRAGUE & CO. 22 MARTINS LANE, LONDON S. W.

THE S. E. ANGLE.



t was a cruciform structure, measuring 40 ft. by 30 ft. inside. A plain stone slab on the floor of the chapel, with his name inscribed, marks the grave of Leonardo da Vinci.

The Château of Chenonceaux was an interesting building of red brick and stone dressings, built about the end of the fifteenth century, and containing a good deal of useful detail. Two great towers sprang from the base of the rock on which the castle stood; they were 42 ft. in diameter and 92 ft. in height, and each contained, instead of a staircase, a great inclined plane broad enough almost to allow a coach-and-four to drive up. The Romanesque church of St. Denis was well worth a visit; it contained some good twelfth-century detail and a handsome north door.

The author's next stopping-place was Blois. He supposed that the best known feature about the Château of Blois was the great open staircase standing in the courtyard of the castle, there was also a very excellent fifteenth-century staircase of red brick and stone dressings, of which there was a good illustration in Mr. Norman Shaw's sketches of mediæval architecture. The greater part of the château has been restored by the Government, and although it had been undoubtedly well done, it struck the author that it had been somewhat overpainted, as, inside at least, it was impossible to tell what was old and what was new work, and he often found himself wondering whether some paint-laden detail was of stone or wood. The work at the château was of various dates, from the thirteenth century Salle des États down to the western side of the quadrangle, erected by one of the Mansards, who, it was said, hoped to be able at some future time to remodel the three remaining sides of the quadrangle to suit the one he had already put up; happily that idea was never accomplished. The Salle des États was a big hall, 97 ft. long by 59 ft. broad, with a row of cylindrical columns running down the middle, supporting pointed thirteenth-century ribs with a broad, flat soffit. It had been so much restored that it savoured now rather much of modern thirteenth-century Gothic. At first light it seemed a somewhat undesirable arrangement in a salle des États to have a row of columns running right down the middle of the hall, but, of course, it depended entirely upon the arrangement of the seats.

There were several good churches in Blois. The principal one was St. Nicholas, a large cruciform twelfth-century church, with the ceiling covered by a Gothic dome, which was owned outside by a wooden fish. The tower was the cathedral and the Renaissance church of St. Vincent de Paul, close to the château. There were a few good domestic details about the place, mostly in unexpected places, but most of the streets were comparatively modern and uninteresting. From Blois the author went by train to Menars, whence he walked to Chambord. Of all the famous châteaux he saw during his tour, the most striking, the largest, and certainly the one which left the most vivid impression on his mind, was the Château de Chambord. But here, although the great house was empty, and stripped of its furniture, and although it was skillfully planned, ably executed, and carefully finished—a lesson to architectural students of all ages and countries—by the order of the owner's agent no less, unless he were a student of the Ecole des Beaux-Arts, was allowed to make any drawing inside the house, or on the terrace, or in the open galleries. Perhaps, on behalf of English architectural students, the Institute or the Association might be persuaded to take some action in regard to this matter before the summer holidays were with us again, so as to get for the English student the same privileges that were granted to, but he believed little appreciated by, the French students.

At Orleans the author visited the cathedral, a Gothic erection of the seventeenth century and singularly uninteresting. There was, however, some good domestic work in Orleans.

Leaving Orleans he travelled on to a place at which was little known to English architects, though a great deal visited by Americans, viz., the town of Chateaudun. It contained a most interesting chateau of late Gothic or early Renaissance, which was absolutely untouched by the hand of the restorer, and over which one is allowed to roam at will unaccompanied by any chattering guide or romancing cicerone, and in which the sketcher could work undisturbed by visitors from morning to night. The chief feature about this chateau was a

staircase which was illustrated in Viollet-le-Duc's "Dictionnaire." There were two or three good bits of domestic work in Chateaudun, one of the best of which was the Maison des Petits Bonhommes, a house with a stone ground-floor and a half-timbered first-floor, supported on sixteen wooden brackets, each of which was carved (so it was said) unto the likeness of some local celebrity of the sixteenth century.

The author spent the last fortnight of his tour at Rouen, chiefly in measuring up the sacristy of St. Ouen, where the old sacristan gave him a very animated and interesting description of a visit made by Mr. Ruskin to the church. Mr. Ruskin's most salient criticisms, done into English, seemed to have been that the church was too light for a religious building. The Church of St. Ouen at Rouen and the Cathedral of Chartres were, probably the two most famous churches which the author visited during his tour, and he was struck by the contrast between them, although they were built by the same nation and for people of the same creed. Chartres gave one an idea of grandeur and simplicity of detail, of massiveness and everlasting strength. In the great nave, which was low for a French church, even on the brightest days the light which came through the stained glass windows was subdued, and the church was in a perpetual twilight. St. Ouen, on the other hand, was lightness written in stone. Inside, the church was as light as a conservatory, and every line seemed soaring upwards. Besides St. Ouen, there was the Cathedral of Rouen, which was worth some weeks of study. The third great church of Rouen was St. Maclou; and the Church of St. Patrick had a very good, simple plan. The aisles ran the whole length of the church, but by the choir there were double aisles on each side, which arrangement gave a very good effect. There were many other churches and buildings in Rouen which were worth attention, and these were described by the author in concluding his paper.

The Chairman, in inviting discussion, said that Mr. Bartlett had given them a very interesting paper, although he was afraid that there was not a very great deal to discuss in it, from the nature of the subject.

Mr. F. R. Farrow proposed a vote of thanks to Mr. Bartlett for his interesting paper, and for exhibiting his drawings, the large number of which showed that he had made good use of his time during his seven weeks' tour. He thought that Mr. Bartlett had maintained the honour of the A. A. Travelling Studentship in a very worthy fashion. He thought he was to be congratulated, too, upon the manner in which he had dealt with the architecture of the district he had traversed, upon the catholicity of taste which he had shown, and upon the variety of methods of study which he had adopted. He was also to be congratulated upon having brought back a great many details which would be useful to him. With regard to the use of the steep-pitched roofs of the François Premier period of architecture in France, he thought the practice was due to something more than a mere desire to build such roofs as would throw off the snow, because those roofs were abnormally steep. One of the great aims of the noblesse of the François Premier period was to make a great show and appearance of luxury. He believed that one reason why these steep-pitched roofs were built was that they were expensive to build. He was very much interested in the description which Mr. Bartlett gave of the little church near Lèches. It was very interesting to hear of a church planned on what the Germans called the "hall" principle, which was very seldom seen outside Germany; he meant churches in which the aisles were of the same height as the nave. He thought that Mr. Bartlett had very mildly criticised the spire at Rouen, which was a most ghastly thing, spoiling the effect not only of the cathedral, but of the entire city. When visiting Rouen, members would do well to go a couple of miles out, to a little village named Boos, where they would find a very fine *colombier*, one of the finest examples of the kind to be found in that characteristic period, the French Renaissance. That period, and the Late Flamboyant period, were remarkable for these *colombiers*.

Mr. Bernard Dicksee, in seconding the vote of thanks to Mr. Bartlett, said he could not agree with Mr. Farrow that the high roofs of the François Premier period were due to any wish on the part of the owners to spend money for the mere sake of spending money. These steep-pitched roofs, he took it, were naturally

descended from the high roofs of the Gothic period.

The Chairman, in putting the vote of thanks, said they had all listened with very great pleasure to the paper, and he thought that Mr. Bartlett had been very wise in choosing the district which he had traversed during his tour, for the particular style which there abounded was coming into vogue. He thought Mr. Bartlett had acted very wisely, and as all students on tour should act, in taking with him a supply of lining-paper for full-sized details. Apart from their thanks to Mr. Bartlett for the paper itself, and for the drawings which he had shown, he was additionally entitled to their thanks for having come forward in an emergency to read his paper a month before the time for which it was promised. He was sorry to say that Mr. Keith D. Young, who was to have read a paper that evening on "Hospitals," had been obliged to postpone it through an accident. Mr. Bartlett had said rather regretfully that he had not always been able to tell modern work from the old, owing to the painted decoration which he found in many of the buildings. No doubt it was sometimes aggravating to be unable to decide readily what was new and what was old, but he thought it would perhaps be more useful if students generally would ask themselves whether work was good or bad, not whether it was old or new. As to the question of the high-pitched roofs of the François Premier period, he did not know that it was a very vital one for them to consider; there was perhaps something in what Mr. Farrow had said, but he (the Chairman) took it that these large roofs were, after all, less expensive constructions than stone façades would have been if carried up to an equivalent height. There was only one other point upon which he should like to ask for information, and that was as to the question of the cost of such a tour as Mr. Bartlett had described to them in his interesting and well-written paper.

The vote of thanks having been carried by acclamation,

Mr. Bartlett, in reply, said that in regard to cost, the tour had only cost him a pound or two more than he received as Travelling Student. He reckoned six or seven francs a day to cover all his outlay, exclusive of travelling expenses,—and these did not come to so very much. He hoped that the Association would try and get for its members the same privileges for visiting the Château de Chambord as were possessed by the students of the Ecole des Beaux-Arts. With regard to the question of the steep-pitched roofs, he was not prepared to say anything as to their origin.

The meeting then terminated.

THE LONDON COUNTY COUNCIL.

THE London County Council held its last meeting before the Easter recess, and probably its last meeting in the Council Chamber at Guildhall, on Tuesday evening last, Lord Rosebery in the chair.

Thanks to the Corporation of London.—The Chairman said that after the recess they would probably meet in their own enlarged Council Chamber at Spring Gardens. He suggested that the Council should agree to a hearty vote of thanks to the Corporation of London for their generous hospitality in lending the Guildhall Council Chamber. This was agreed to by acclamation.

Finance.—The Finance Committee brought up the estimates for the year 1890-91. Lord Lingen, in a long and explanatory speech, moved their adoption, and said that for most of the purposes of the Council they raised a rate both upon the new Administrative County of London and upon the City, but for certain purposes the City was exempt, and they had to levy a further rate upon that part of the County outside the City. That which they levied in common constituted really the rate which was imposed on the City. The proposed increased rate for the County and City together was estimated at 12-5d. in the pound, in place of 10-63d. raised in 1889-90; the rate upon the County, exclusive of the City, 7-5d., as compared with 1-90d. in 1889-90; and the total rate for the County outside the City would be 13-25d., instead of 12-53d., the rate of last year.

Mr. Campbell, in moving an amendment having reference to the form of the estimates, which was substantially adopted, pointed out that the increase of rates was only apparent,

not real. Out of 13d. in the pound referred to as the amount of the County-rate for London outside the City, 2d. was for Poor-law purposes, levied by the County Council instead of by the Poor-law Guardians; so that the rate for municipal purposes apart from Poor-law purposes would be about the same as that levied by the Metropolitan Board of Works, 10d. in the pound. The Poor-rates would be, or should be, reduced in a corresponding ratio to the increase of the County Council rate. The apparent increase of 2d. in the pound would, in fact, be only transferred from our pocket to another by the ratepayer.

After a good deal of discussion, the estimates were adopted.

The Money Bill of 1890.—The Finance Committee also recommended

"That the estimate, now before the Council, of the borrowing power to be provided in the Money Bill of 1890, be approved, and that the Council do hereby estimate the amount of new borrowing power (as detailed in the estimate), as follows:—

The new borrowing power recommended is	£2,180,306
Deducting the amount required to lend to other bodies	913,216
The amount required for the Council's own purposes is	£1,276,090"

Water Companies and their Charges.—The Special Committee on Water Supply and Markets reported as follows:—"We have to report that in pursuance of the following resolution of the Council of February 11, 1890—'That in view of the quinquennial re-assessment of property in London, which will come into force next year (1891), and the resulting effect, which will give the water companies power to exact an increased charge for their supply, this Council instructs its Special Water Committee to immediately take the question into consideration, and report thereon,' we have given careful consideration to the subject of the reference, and we submit the following recommendation—

"That the Council do introduce into Parliament during the present session a Bill for the purpose of suspending the powers of the water companies to increase their charges for water consequent upon any increase that may be made in the assessment of property in the County of London by the quinquennial valuation, and that it be referred to the Parliamentary Committee to take the necessary steps for the purpose."

Mr. James Beal, moved the adoption of this report, and it was unanimously agreed to.

Subways and Overhead Wires.—The Parliamentary Committee reported as follows:—"In concert with the Highways Committee, we have considered the thirty-seven petitions presented against the London Subways and Overhead Wires Bill by the gas, water, electric light, telephone, and other companies, and we instructed Mr. Wolfe Barry, C.E., and Mr. Cripps, the Parliamentary agent, to enter into negotiations with the various opponents in order to ascertain how far the objections expressed in these petitions might be met by modifications of the Bill. But, at a meeting with the solicitor, agent, and engineers acting for the associated water companies, these gentlemen declined even to enter into discussion on any of the details of the Bill, on the ground that the Bill is wholly objectionable, and that to discuss its details might have the appearance of accepting its principle. We understood that the object of the Council in promoting this Bill was to effect some scheme by which subways could be made under streets, not solely to relieve the inhabitants and ratepayers from the inconvenience and cost due to frequent obstruction and breaking-up of the streets, but also to promote the convenience of the gas, water, and other companies, in the conduct of their business. But, having regard to the attitude of uncompromising opposition to the project taken up by so many of the companies, and to the prolonged and expensive contest which the prosecution of the Bill in its present form would apparently involve, we recommend—

"That the application to Parliament for the powers sought by the Bill as to new subways be not proceeded with this session."

The introduction of the Bill has led to much valuable information being elicited upon the whole subject, which may enable the Council to deal with it more satisfactorily in a future session, after more mature consideration. As regards that part of the Bill which relates to overhead wires, we have been met in a more friendly spirit by the Telephone Company. Modifications have been suggested which we are not prepared to accept in their entirety, but which seem to afford a basis for further discus-

sion, and we hope the objections to this part of the Bill may be adjusted satisfactorily, or at least narrowed to a comparatively small issue. We recommend,—

"That this part of the Bill be proceeded with, and that we be empowered to make such modifications as we may think advisable to remove or lessen opposition."

If these recommendations are adopted by the Council, and the Bill in its amended form is passed by the House of Commons, we will report the Bill as amended to the Council for further consideration. We have consulted the Highways Committee on the points referred to in this report, and they concur with us in the above recommendations."

The recommendations were agreed to.

Building Act Business during the Easter Recess.—The Building Act Committee reported as follows:—"Your Committee believe that considerable inconvenience to the public would result from their adjournment over the Easter vacation, and they recommend—

"That the Council do, under the provisions of the Local Government Act, 1888, sec. 23 (2), delegate to the Building Act Committee power to hold one meeting during the recess, for the purpose of considering applications made to the Council under the Metropolitan Building and Management Acts, and at such meeting to act on behalf of the Council, and to grant or refuse such applications; provided, however, that the Committee shall only act upon such decisions as shall be unanimously arrived at by the members present, and that all such decisions shall be reported to the Council at its first meeting after the recess."

After transacting other business, the Council adjourned until Tuesday, April 22.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION: ANNUAL DINNER.

The twelfth annual dinner in aid of the funds of this excellent Institution was held on Monday evening last, in the Venetian Room of the Holborn Restaurant.

Mr. H. H. Bartlett (Perry & Co.) presided, and was supported by about 240 members and friends of the Institution, including Mr. Thos. F. Rider, Mr. W. A. Colls, Mr. Colin Patrick, Mr. W. Eckstein, Mr. W. R. Freeman (Mowlem & Co.), Mr. H. H. Leonard (Leonard & Clarke), Mr. Joseph Wilkinson, Mr. C. K. Turpin, Mr. E. C. Roe, Mr. Edwin Brooks, and many other gentlemen.

The usual loyal and patriotic toasts having been duly honoured, Captain Roe replying on behalf of "The Army, Navy, and Auxiliary Forces."

The Chairman proposed the toast of the evening, "The Builders' Clerks' Benevolent Institution," and said that it had been established about a quarter of a century, and during its existence it had paid away in temporary relief and in pensions the sum of 4,173*l.*, in addition to 787*l.* spent in purchasing three orphan presentations (each one tenable for twenty-one years), making a total of 4,960*l.* During the twenty-three years of the Institution's existence thirty-two pensioners had been elected on the Relief Fund. The number on the books at the present time was nineteen. The male pensioners received 25*l.* per annum, and the widows 20*l.* That meant a very considerable annual expenditure, and it was very desirable that the regular income should be materially increased by a large addition to the number of annual subscribers, as during the past year the income resulting from the invested funds and annual subscriptions had not sufficed to meet the expenditure, and the Committee had to trench to the extent of 120*l.* upon the amount received in donations at the last annual dinner, instead of investing the whole of it, as they would have liked to do. The Institution was one eminently deserving of the support of all builders' clerks and of the building trade generally. The calling of a builder's clerk was one of some precariousness, and involved considerable strain upon the mind and nervous system. The Institution had the hearty good will and support of leading master builders, many of whom, however, were unable to be present that evening. Letters had been received expressing the inability of the writers to attend from, amongst others, Mr. Taprell Holland, Mr. Thos. Stirling, Mr. Geo. Burt, Mr. Stanley G. Bird, Mr. Howard Colls, Mr. G. H. Trollope, Professor Banister Fletcher, and Messrs. Fowler & Hugman. Speaking for the master builders generally, he was warranted in saying that they were very admirably served by their clerks, who were a body second to no body of clerks in their

attainments and in their loyalty to their employers. They were engaged in a very good work in carrying on with so much energy and with so little expenditure in management an Institution so useful to the more unfortunate of their craft, and he therefore had much pleasure in proposing the toast of "The Builders' Clerks' Benevolent Institution."

The toast was very heartily received. Mr. Joseph Wilkinson proposed "The Architects and Surveyors," coupled with the name of Mr. H. H. Leonard, who briefly replied, speaking highly of builders' clerks as a body.

Mr. W. Eckstein, in proposing "The Builders," said he regarded that toast as only second to the toast of the evening, "The Institution," for without the builders where would their clerks be? With the toast he coupled the name of Mr. W. A. Colls (Colls & Sons).

Mr. W. A. Colls, in replying, said he was quite in agreement with what had been said by previous speakers as to the excellent manner in which builders were served by their clerks.

Mr. E. Brooks (Treasurer of the Institution) proposed the past-Presidents, who were, he said, all gentlemen occupying the most prominent and respected positions in the building trade. Their first President was Alderman Sir William Lawrence, who held office in 1867. Since that date they had had a succession of able and energetic Presidents, including Mr. Thos. F. Rider, who occupied the chair for two years and Mr. W. R. Freeman, who was also a most assiduous President. Last year they were fortunate in having as President Mr. John Aird, M.P., who was unable to be present that evening. With the toast were coupled the names of Mr. W. R. Freeman and Mr. T. F. Rider, who both briefly replied, Mr. Freeman speaking very highly of the energy and zeal of the Committee and their Secretary, Mr. H. J. Wheatley.

The remaining toasts were "The President" (proposed by Mr. T. F. Rider), and "The Visitors."

During the evening subscriptions and donations to the amount of nearly 300*l.* were announced, including 21*l.* from the Chairman.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—XIV.

ARMATURE REACTION.

If the armatures shown in figs. 30 and 31 be removed from the influence of the field magnets, and a current from some external source sent through the coils from P to S, the cores will become magnetised, fig. 34, so that lines of force traverse the iron

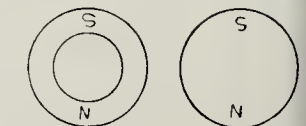


Fig. 34.

from the lowest to the highest point. The drum armature becomes a cylindrical electro-magnet, magnetised in the direction of a vertical diameter, while the ring armature is practically converted into two semi-circular magnets with their north ends in contact at the top and their south ends at the bottom. The lines of force within the cores are, of course, curved, but the coils may be regarded as producing in both cases magneto-motive force in the direction S-N. Whether the currents in the coils arise from an electro-motive force altogether outside the armatures, or from the electro-motive force set up within the coils themselves, when they cut lines of force as they revolve between the poles of their field magnets, can make no difference to their magnetising effects on the core. Hence, when current flows from an armature through the brushes, the coils tend to magnetise the core in the direction of the diameter of commutation.

To better understand this so-called "reaction of armature upon field," we may regard the core as a magnetised mass traversed by lines of force which are cut by the coils where they, the lines, pass into the core from the air and again as they emerge into the air from the core. The core revolves, but the lines do

By E. STIMSON.	
East Dulwich—L.g.r. of £43 p.a., u.t. 85 yrs.	£880
L.g.r. of £93. 10s. p.a., u.t. 85 yrs.	1,900
Camberwell—L.g.r. of £175. 0s. p.a., u.t. £80.	1,680
27, Kilmington St., u.t. 66 yrs., g.r. £1. 5s., r. 7s. 2s. 8d.	188
Peckham—L.g.r. of £30 p.a., with reversion in 85 yrs.	720
F.g.r. of £25 p.a., with reversion in 85 yrs.	600
By E. WOOD.	
Holloway—14, Hugo Pk., u.t. 79 yrs., g.r. £6. 10s., r. £35.	350
88, Duncombe-st., u.t. 40 yrs., g.r. £19. 5s., r. £92. 10s.	230
18, 19, and 20, Corporation-st., u.t. 71 yrs., g.r. £22. 10s.	640
Kentish Town—3, Leighton-grove, u.t. 50 yrs., g.r. £6. 6s., r. £40.	400
Wandsworth—3, 5, and 7, Berberd., u.t. 91 yrs., g.r. £19. 10s., r. £30.	720
Poplar—29, Anson-st., u.t. £10. 18s. p.a.	125
By BEARD & SON.	
St. John's Wood—20 and 30, Boundary-rd., u.t. 47 yrs., g.r. £21. r. £165.	1,915
85, 87, and 89, Abbey-rd., u.t. 60 yrs., g.r. £30. r. £225 p.a.	2,685
22, Chalk Farm-rd., u.t. 40 yrs., g.r. £27. 10s., r. £30.	915
L.g.r. of £30 p.a., u.t. 47 yrs.	610
Lambeth—214, South Lambeth-st., u.t. £240.	690
Baywater—11 to 12 (odd), Cornwell-rd., u.t. 74 yrs., g.r. £.	4,085
1 to 7, Clydesdale mews, u.t. 74 yrs., g.r. £25. 0s., r. £192. 8s.	1,900
Harrow on the Hill—Freskon House and two villa residences, and 2 acres, l., r. £104 p.a.	2,500
MARCH 28.—By EASTMAN BROS.	
Bermondsey—6, 7 and 8, Lamb-alley, l.	570
By F. WELLS & READ.	
Holloway—3, Ashbrook-road, u.t. 84 yrs., g.r. £4. 15s., r. £30.	310
By JONES, LANG & CO.	
Edmonton—A plot of l. land, ca. 2r. 11p.	60
By BAKER & SONS.	
Clare Market. f.g.r. of £27, with reversion in 33 yrs.	650
City of London—17, Hitchinowick, f.r. £44 p.a.	490
Southwark—24 and 25, Pitt's-pl., f.r. £38. 6d. p.a.	320
By ELLIS & SON.	
Islington—L.g.r. of £86 p.a., u.t. 28 yrs., at a g.r. of £23.	465
12, Northampton-st., u.t. 28 yrs., g.r. £55. r. £30.	185

MEETINGS.

SATURDAY, APRIL 5.
Association of Public Sanitary Inspectors.—Mr. F. T. Poulson on "Social Environments." 6 p.m.

MONDAY, APRIL 7.
Royal Institution.—General monthly meeting. 5 p.m.
Liverpool Architectural Society.—Mr. W. E. Hill on "Ormskirk Parish Church."

THURSDAY, APRIL 10.
Guild and School of Handicraft.—Mr. T. Cobden Sanderson on "Book-binding (34, Commercial-street, E.)." 8 p.m.
Institution of Electrical Engineers.—8 p.m.
Edinburgh Architectural Association.—Mr. John Keppie on "Accessories of Architecture." 8 p.m.

Miscellaneous.

Proposed Bas-relief in Rome in Honour of Sir Joseph Lister.—In Rome the magnificent Policlinico Umberto I., or great medical and surgical hospital and school, now slowly rising to completion, is to have its two principal facades ornamented with bas-reliefs in honour of the two men who, in the judgment of our Italian brethren, have conferred the most signal benefits on the sister branches of the healing art. Medicine is to be represented by the pioneer of pathology as it is now studied and taught, Giovanni Battista Morgagni, of Padua; surgery, by the author of the antiseptic system, Sir Joseph Lister. Already a competition for the best designs for the bas-reliefs in question has been announced, and a Commissione Aggudicatrice, consisting of two architects, two sculptors, and two painters, has been formed, under the presidency of the guiding spirit of the Policlinico, Professor Guido Baccelli. The best artists in Italy are expected to compete, the prize for the successful design of each bas-relief being great enough to induce the leaders of the statuary art throughout the peninsula to suspend all other engagements for the honourable rivalry. The stone employed for the bas-reliefs will be the "pietra di Monte Aflano," well chosen to combine the requisites of fineness of grain, richness of colour, and durability for the material in which Rome seeks to embody a worthy accession to her artistic masterpieces.—*Lancet.*

Edinburgh Architectural Association.—On Saturday afternoon last the Edinburgh Architectural Association visited Prestonpans and, notwithstanding the somewhat unsettled condition of the weather, a large number of members were present. The party was under the leadership of Mr. Hippolyte J. Blanc, who first introduced to them the interesting feudal tower of Preston, which was described as a work of early fifteenth century, comprising, in an area of about 34 ft. by 28 ft., a tall keep about 50 ft. to the parapet, with a seventeenth century addition, increasing the height by 17 ft. more. The original structure had been divided into four floors, with the usual appropriation of lord's hall, private apartments, and accommodation for retainers and stores. In a wing projected from the west side of the keep an interesting and unique construction of dungeons was examined, as also the special features of construction for the defence of the main entrance exhibited on the outside elevations. Originally a possession of the Hamiltons, the tower has remained, with but short intervals, from the period of its erection with the family; and although much of the property originally attached to it has been disposed of, the tower itself, with the enclosure in which it stands, is now owned by General Sir William Hamilton, through whose kindness the party was allowed to view it. The tower seems to have been occupied up to 1663, when a fire, the third from which it had suffered, rendered it no longer habitable. It possesses a good deal of interesting detail, sufficient to have elicited the interest of antiquaries, by whom, a few years ago, a considerable sum was expended, under the direction of Mr. Blanc, in replacing a great deal of the carved stonework found among the ruins, and generally receding to Preston Cross, which was explained to be one of a type of market crosses erected in various towns in Scotland at the beginning of the seventeenth century. Its details were separately pointed out and examined, and after visiting the ruins of Preston House,—the mansion of the Hamiltons after their occupancy of the Tower,—and the old parish church of Preston, the party returned by Northfield House, the apartments of which the party, by the permission of the agents, Messrs. Davidson & Syme, had an opportunity of examining. Points of interest were also brought under notice by the Rev. Mr. Mackay, of Prestonpans, who, in the absence through illness of Mr. Hislop, accompanied the party through their two hours' very enjoyable visit.—*Scotman.*

Gay's Hospital.—The students' new Residential College, which has been built after the designs of Messrs. Wood & Ainslie, architects, was opened on the 26th ult. by the Rt. Hon. W. E. Gladstone. The building is four-sided, but not rectangular, and is adapted for purposes of chambers and a medical students' club. The club premises comprise a gymnasium in the inner court, a dining-hall, with open timber roof, and a reading and smoking-room. The residential portion consists of a Warden's house, with apartments for the house staff, and thirty-nine sets of rooms, varying from one to three rooms apiece, to be let at rents ranging from 9s. to 20s. per week each. Thirty-four of these contain two rooms. This provision for medical students within the hospital precincts is a considerable improvement when contrasted with what it used to be in the times illustrated and described by Cruikshank, Albert Smith, and Dickens,—such as, for instance, Bob Sawyer's "first-floor front" in Lant-street, Borough. We shall publish an illustration of the new building next week.

Trade Dinner.—The foremen and workmen now employed by Messrs. Foster & Dicksee (of Rugby, and Mansera-road, Chelsea) on their London contracts, held their annual dinner at Clout's Restaurant, Victoria-street, S.W., on Tuesday evening, March 25. Upwards of 100 were present, and a very pleasant evening was spent. Mr. Dicksee presided, and was supported by Mr. Goddard, the head of the London staff.

Royal Victoria Hall, Waterloo-bridge-road.—The following "Penny Science Lectures" are arranged for April:—April 15, "The Colours of a Soap-bubble," illustrated by slides and experiments, by Mr. John Cox, late Fellow of Trinity College, Cambridge. April 22, Rev. Blomfield Jackson, on "Old London," with dissolving views. April 29, Sir Vincent Barrington on "Personal Experiences of Ambulance-work During War."

Liverpool Engineering Society.—The twelfth ordinary meeting of the sixteenth session of this Society was held on Wednesday evening, March 26. Mr. Henry H. Warren, M. Inst. C.E., President, in the chair. A paper on the usual business, a paper was read by Mr. Thomas L. Miller, Assoc. M. Inst. C.E., M.I.M.E., on the "Efficiency of Gas Engines." In his opening remarks the author referred to the practical statement of the efficiency of gas engines in terms of the gas consumption per horse-power per hour without any reference to the thermal value of the gas used, and showed, from a comparison of the calorific value of the gas in different countries, how unfair such a practice was when the efficiency of engines tested in different localities were so compared. An explanation of the different senses in which the term "efficiency" was used in the paper was then given, after which the author proceeded to explain a system of classification of gas engines adopted by Mr. D. Clerk, the theoretical efficiency of various types being given. The causes of loss in the gas engine were then referred to in detail, and the means by which such losses might be reduced explained. The experiments of Messrs. D. Clerk and G. C. Douglas on the explosion of gaseous mixtures were then touched upon, and the various theories advanced to account for the suppression of heat at the moment of ignition were dealt with. A discussion of the more important tests of gas engines then followed, the absolute amount of heat supplied to the engines per horse-power together with their efficiency, being given. The Hargreaves Motor was then referred to, and its method of working explained, and comparison was made between the results of tests with this engine and those of the more economical gas-engines mentioned. The author then concluded the paper with a comparison of the efficiency of the gas-engine with that of the steam-engine, in the course of which he pointed out that, while the gas-engine had the advantage from a thermo-dynamic point of view, its high price of its fuel soon placed it at a disadvantage, as, with coal-gas at 3s. per 1,000 cubic feet and coal at 15s. per ton, the gas engine, with a consumption of 20 cubic feet of gas per indicated horse-power per hour was just equal in cost of fuel to that of a steam-engine indicating 1 horse-power per hour for a consumption of 9 lbs. of coal. The discussion was adjourned to Wednesday, April 16th.

Guild and School of Handicraft.—The following course of lectures will be given in the Workshop of the School of Handicraft, 3, Commercial-street, E. (admission free), viz.:—Thursday, April 3, 8 p.m., Mr. Henry Holland on "Looking Backward," in its Relation to Life, Taste, and Art." Thursday, April 10, 8 p.m., Mr. T. Cobden Sanderson, on "Book-binding." Thursday, April 17, 8 p.m., Mr. W. L. Richmond, A.R.A., on "Gesso." Thursday, April 24, 8 p.m., Mr. Stirling Lee, on "A Talk on Sculpture," with practical illustration. Thursday, May 1, 8 p.m., Mr. E. Prioleau Warren, on "Parlour Architecture." On Monday, May 5, C. R. Ashbee (Architect and Hon. Director of the Guild of Schools) will give a lecture on "The Architectural Story of England." The chair will be taken at 8 p.m. by the Most Hon. the Marquis of Ripon, K.C. Admission to this lecture will also be free. It will be the first of a course of six on "Architecture, as the Language of the English People."

Partnerships.—Mr. Wm. Kidner, F.R.I.B.A. of 23, Old Broad-street, has taken into partnership Mr. W. H. Atkin Berry, A.R.I.B.A. formerly of 35, Bedford-row, who has been associated with Mr. Kidner in business five periods extending over the last seven years. The new firm's practice as architects and surveyors will be carried on at Old Broad-street under the style of "Kidner & Berry." We understand that Mr. Edward G. Williams, who some years manager to Messrs. Goodman & Company, brick and cement merchants, of Bishopsgate-street, has been taken into partnership by Messrs. Pilkington & Co., of King William-street, who have made arrangements to extend the scope of their trading operations to slating and tiling (encaustic and roofing).

The "Archer" Drain-pipe Joint.—We are asked to mention that a company has been formed (of which Colonel A. C. Hamilton, late Royal Engineers, is Chairman) to make and sell sanitary tubes with "Archer joints," and that offices and show-rooms have been opened in Shaftesbury-avenue.

"The Air We Breathe"—Mr. W. J. Lidcock, Assoc. San. Inst., gave a lecture on the 25th ult. in the George-street Lecture Hall, Plymouth, on "The Air We Breathe." Dr. Dance occupied the chair. The lecturer dealt with the normal condition, weight, and temperature of the atmospheric envelope which surrounds the earth, and to what depth we would plunge into this aerial ocean without sing our lives; and passed on to treat the object from a physiological and hygienic standpoint, explaining the actions of respiration, showing how inspired air and expired air differed one from another, pointing out the dangers of breathing in air that had been breathed over and over again through the want of adequate ventilation. References were made to a number of systems which could be adopted for ventilating our rooms and public buildings, and of the newest being the Crose ventilator, in which the freshest air is allowed to be indicated or disinfected air being thrown into the room, the disinfecting fluid being held in a metal trough out of sight, the advantage of this mode being that no space was taken up by unsightly tubes, shafts, &c., the whole contrivance being built into the wall, and mingling flush with its surface. The Bamber, Kyle, and other ventilators were shown and explained, and the lecturer concluded by an experiment showing that as well as providing outlets for foul air, provision must be made for supplying fresh air, or the extractors would not do could not be expected to work.

Drainage and Paving of New Orleans.—According to a recent report of the British Consul at New Orleans, the project for draining and paving that city by means of a tax on public property, to be passed judgment upon by the vote, has been defeated. The measure was opposed by all the objections attached to public works in American municipalities; but it had already been defeated before its adversaries reported of their work,—the deliberate refusal of 250,000 inhabitants to protect dirt and disease having subjected it not only to favourable comment, but to actual loss. The step, which helped to destroy the germs of disease, and the rain-storms, which supplemented scavengers' incomplete labours, have been shielded, and the canals, gutters, and streets in a condition which threatens disaster in summer sets in.

Soothill Nether Sewerage.—Mr. Arnold Taylor a few days since held an inquiry at the board-room, Soothill Nether, near Dewsbury, with respect to taking four acres of land otherwise than by agreement, for the purpose of dealing with the sewage of the district. Mr. Malcolm Johnson, M. Inst. C.E., of Bradford, explained a scheme. The estimated cost is £1,500, exclusive of the main drainage of the district, sewage-tanks for lime-treatment, and land for intermittent filtration. A special feature of the scheme is the provision for taking trade refuse to the sewers, in accordance with the Rivers Pollution Act, 1875, thus striking at the root of sewer pollution in the manufacturing districts. Soothill Nether is one of the districts proposed to be incorporated by Dewsbury, whose extension scheme, however, was rejected in its entirety by the Local Government Board.

PRICES CURRENT OF MATERIALS.

TIMBER.	£. s. d.	£. s. d.
Memphrill, B.G. ton	6 15 0	7 5 0
Wk. E.L. load	11 0 0	14 0 0
Wk. E.L. foot cube	0 2 3 0	0 3 0
Wk. E.L. load	3 0 0	4 5 0
Wk. E.L. ch	3 10 0	4 15 0
Dantsic, &c.	2 0 0	3 10 0
Wk. E.L.	2 10 0	4 10 0
Wk. E.L.	5 10 0	6 10 0
Wk. E.L.	3 10 0	3 10 0
Wk. E.L. yellow	2 0 0	5 5 0
Wk. E.L. fathom	5 0 0	6 0 0
Wk. E.L.	3 0 0	3 10 0
Wk. E.L.	0 0 0	0 0 0
Wk. E.L.	8 0 0	11 0 0
Wk. E.L.	7 0 0	7 10 0
Wk. E.L.	7 0 0	8 10 0
Wk. E.L.	10 0 0	14 0 0
Wk. E.L.	8 0 0	10 0 0
Wk. E.L.	6 10 0	10 0 0
Wk. E.L.	7 10 0	15 0 0
Wk. E.L.	8 0 0	17 0 0
Wk. E.L.	15 0 0	20 0 0
Wk. E.L.	10 10 0	17 0 0
Wk. E.L.	7 0 0	10 0 0
Wk. E.L.	8 15 0	11 0 0
Wk. E.L.	6 15 0	8 10 0
Wk. E.L.	6 0 0	8 10 0
Wk. E.L.	6 0 0	16 0 0
Wk. E.L.	0 11 0	0 14 0
Wk. E.L.	0 8 0	0 10 6
Wk. E.L.	0 6 0	0 7 9

TIMBER (continued).

	£. s. d.	£. s. d.
Cedar, Cuba foot	0 0 4	0 0 4 1/2
Honduras, &c.	0 0 4	0 0 4 1/2
Mahogany, Cuba	0 0 4 1/2	0 0 6 1/2
St. Domingo, &c.	0 0 4 1/2	0 0 6 1/2
Mexican, cargo average	0 0 4 1/2	0 0 5 1/2
Tobacco	0 0 5 1/2	0 0 6 1/2
Honduras	0 0 5 1/2	0 0 6 1/2
Box, Turkey ton	4 0 0	13 0 0
Rosa, Rio	15 0 0	20 0 0
Bahia	14 0 0	18 0 0
Saiba, St. Domingo foot	0 0 6	0 1 3
Porto Rico	0 0 10	0 1 3
Walnut, Italian	0 0 4 1/2	0 0 7

METALS.

	£. s. d.	£. s. d.
IRON—Bar, Welsh, in London	8 2 6	8 10 0
at works in Wales	7 15 0	8 0 0
Stainforthshire, in London	8 10 0	9 10 0
COPPER—British, cake and ingot	53 0 0	53 10 0
Best selected	55 0 0	56 0 0
Sheets, strong	62 0 0	0 0 0
Chill, bars	48 10 0	0 0 0

METALS (continued).

	£. s. d.	£. s. d.
YELLOW METAL lb.	0 0 5 1/2	0 0 6 0
LEAD—Pig, Spanish ton	12 12 0	0 0 0
English, com. brands	12 12 0	12 12 6
Sheet, English	14 10 0	0 0 0
Pipe	15 0 0	0 0 0
TIN—Straits	90 15 0	0 0 0
Australian	90 10 0	0 0 0
English Ingots	95 0 0	0 0 0

OILS.

	£. s. d.	£. s. d.
Linseed ton	22 15 0	23 0 0
Cocoanut, Ceylon	28 10 0	0 0 0
Cocoanut, Ceylon	25 5 0	0 0 0
Palm, Lagos	34 10 0	24 15 0
Rapeseed, English pale	32 5 0	0 0 0
do. brown	30 15 0	31 0 0
Cottonseed, refined	22 5 0	0 0 0
Tallow and Oleine	21 0 0	40 0 0
Lubricating, U.S.	5 10 0	6 0 0
do. refined	7 0 0	12 0 0
TAR—Stockholm barrel	1 6 0	0 0 0
Archangel	0 17 3	0 0 0

COMPETITION, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITION.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page
Public Library	Whitechapel Comms.	Not stated	Not stated.	xii.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Additional Workshop Accommodation	Hackney Union	W. Barnet	April 9th	ii.
Stoneware Pipe Drain, &c.	Twickenham Local Bd.	H. M. Ramsay	April 10th	ii.
Alterations at Schools	Westminster Union	J. Waldram	April 11th	ii.
New Filing Department Buildings	Sheffield Gas Light Co.	F. W. Stevenson	April 11th	ii.
Brick Sewers	St. Giles' Bd. of Wks.	G. Walker	do.	ii.
Wooden Blocks for Paving	Paddington Vestry	Official	do.	xii.
Wood Paving	do.	do.	do.	xii.
Thames Ballast, Sand, and Cement	do.	do.	do.	xii.
Outfall Sewers	West Ham Council	Lewis Angell	April 15th	xii.
Additions to Railway Hotel, Yatton	Great Western Ry. Co.	Official	April 16th	xii.
Works at Milford	do.	do.	do.	xii.
Telegraph Factory, Clerkenwell	Hastings R.S. A.	Jeffery & Skiller	do.	xii.
Additions to General Post-Office East, E.C.	Com. of H.M. Works	Official	April 17th	ii.
Fifth Hoists, &c., Barking Outfall	London County Council	do.	April 21st	ii.
Depot and Store, Upper Thames-street	Com. of Sewers	do.	April 25th	xii.
Supply of Road Materials, &c.	Colchester Town Coun.	H. Goodyear	April 25th	xii.
Mission Buildings, Kensal-road, W.	do.	A. R. Pite & Son	Not stated.	xii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Accounts Checking Clerk	London County Council	200l.	April 16th	xvi.
Building and Drainage Inspector	Croydon Corporation	48s. weekly	April 21st	xvi.

TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

ASHTON-UNDER-LYNE.—For alterations to the "Stanford Park Hotel." Mr. J. H. Burton, architect, Warrington-street, Ashton-under-Lyne:—

J. W. Williamson, Ashton	£523 0 0
Jabez Gibson, Driffield	515 0 0
Underwood & Brs., Dukinfield	496 0 0
W. Tickle, Ashton	493 0 0
R. Hoobson, Ashton	490 0 0
R. H. Booth, Stalybridge	489 0 0
Thos. Dean, Ashton	465 0 0
H. Gardner, Ashton	460 0 0
H. Rowland, Ashton (accepted)	427 0 0

CATFORD.—For alterations and repairs to the "Tiger's Head" public-house, Southend, Catford, for Messrs. H. & V. Nicholl, Limited, Mr. Albert L. Guy, architect and surveyor, 78, High-street, Lewisham:—

Soper	£197 0 0
Robson	165 0 0
Hoare	161 0 0
Pritchard (accepted)	160 10 0

Painter's Work.

Williamson (accepted) 30 0 0

COLCHESTER.—For alterations and additions to premises and for building drying oven, for Mr. J. B. Semitt, Wye-street. Mr. J. W. Start, architect, Cups Cubers, Colchester:—

Alterations. Drying Oven.	
W. Sheed, Jun.	£226 10 6
Geo. Dobson	194 0 0
W. A. Chambers	185 0 0
(All of Colchester.)	* Accepted.

BOURNE END (Bucks).—For new Club House at Bourne End, Bucks, for the Upper Thames Sailing Club, Mr. Arthur Vernon, architect, 25, Great George-street, Westminster, S.W.:—

Silver	£795 0 0
Gibson	728 12 4
Lowell	719 0 0
J. Woodbridge	665 0 0
Nash & Sons	507 10 0
Hunt (accepted)	579 0 0

ENFIELD.—For alterations and repairs to premises at Baker-street, for Mr. Pierce. Mr. Alfred Bowyer, surveyor, Enfield Town:—

Woodfield	£205 0 0
Crab	124 0 0
Gibson Eros	138 10 0
Smithers	185 0 0
Sayer (accepted)	179 10 0

BROMLEY.—For repairs at the "Red Cross," Keston; "Greyhound," Bromley and "Plough," Bromley-common, for Messrs. H. & V. Nicholl, Limited, Mr. Albert L. Guy, architect and surveyor, 78, High-street, Lewisham:—

Pritchard	£244 0 0
T. Knight	231 0 0
Fisher	188 10 0
R. Hoare	187 15 0
D. Payne (accepted)	105 0 0

LONDON.—For the erection of six cottages in Whitecross-street, Southwark, S.E. Mr. E. Hoole, architect. No quantities supplied:—

Macfarlane	£1,284 0 0
J. O. Richardson	1,258 0 0
Holloway (accepted)	1,230 0 0

CROYDON.—For the erection of convalescent home, Brighton-road, South Croydon. Mr. Alfred Hill, architect. Quantities supplied:—

Maldes & Harper	£1,269 0 0
Docking	1,205 0 0
Evans	1,165 0 0
J. O. Richardson	1,119 0 0
Smith & Bulled	1,097 0 0
Bullock	1,067 0 0
Scuders	1,066 0 0
Page	1,063 0 0
Notley	1,050 0 0

LONDON.—For alterations and additions to the "Clock House" public-house, Leather-lane, E.C., for Mr. Lavell. Mr. Albert L. Guy, architect and surveyor, 78, High-street, Lewisham:—

Soper	£270 0 0
Way	225 0 0
S. Pocock	231 0 0

LONDON.—For alterations and repairs to the "Anchor" public-house, Lewisham, for Messrs. H. & V. Nicholl, Limited, Mr. Albert L. Guy, architect and surveyor, 78, High-street, Lewisham:—

Woods	£477 0 0
Robson	278 0 0
Pritchard	268 0 0
Hoare	198 10 0

LONDON.—For the erection of new warehouses and business premises in Hammersmith, for Mr. W. J. Sanders. Mr. J. H. Hume, architect and surveyor, 130, High-road, Chiswick:—

H. J. Greenham (accepted)	£640 0 0
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LONDON.—For the erection of store buildings, stable, bath, &c., in Kennington Park, &c., for the London County Council:—
 Barnum & Son £770 0 0
 Ball & Brown 745 0 0
 Buller 643 0 0
 Tarrant 619 0 0
 Simmons Bros. 597 0 0
 Lupthorne 549 0 0
 Channing 546 0 0
 King Bros. 519 0 0
 Mays 425 0 0

LONDON.—For sundry painting and repairing works at Victoria Park and Bethnal Green-gardens, for the London County Council:—
 Channing £576 0 0
 King Bros. 561 0 0
 Humphrey 395 0 0
 Barrett & Power 271 0 0
 G. Barker 230 0 0

LONDON.—For alterations and repairs, &c., at No. 71, Newington Green-road, N., for Mrs. Higginbotham. Mr. Horace Gilbert, architect, 59, Chesham-road, S.W.:—

	Estimate No. 1.	Estimate No. 2.	Repairs and Painting.
A. & W. Garner	£294	£249	£46 10
J. H. Thompson (too late)	239	227	39 10
Thos. Wontner	237	207	52 0
C. P. Roberts	223	197	—

* Accepted.

LONDON.—For building a block of facades adjoining Fern Cottage, Archway-road, Highgate, and sundry alterations. Mr. F. J. Chambers, 11a, College-hill, E.C., and Mr. Geo. Waymouth, 23, Moorgate-street, E.C., architects:—

G. Seed	£925 0 0
W. H. Laiden & Son	497 0 0
H. Cattle	420 0 0
G. Parker	410 0 0
Thos. Wontner Smith & Son	395 0 0

LONDON.—For proposed alteration and additions to shop and premises, Hornsey-road, for Mr. W. J. Crawford. Mr. J. Hume, architect and surveyor, Chiswick:—
 Holding £247 0 0
 Hornbourn 210 0 0
 Drake 204 10 0
 H. F. Hume, Westbourne Park 198 10 0

LONDON.—For general repairs to houses in Drummond-crescent, N.W. Mr. Alfred Bowyer, surveyor, Enfield Town:—
 Porter £149 0 0
 Crabth (accepted) 128 10 0

LONDON.—For additional work at the "Bell Tavern," Shore-ditch, E., for Messrs. Levy & Garner. Mr. Joseph G. Needham, architect:—
 A. Hood (accepted) £225 0 0

LONDON.—For alterations, new front, &c., at No. 45, Strand, W.C., for Mr. F. F. Anstiss. Mr. H. I. Newton, architect, Victoria-street:—
 Godden £750 0 0
 Osborn 717 0 0
 Kellaway 677 0 0
 Years & Co. 669 0 0

LONDON.—For sundry alterations and repairs at No. 32, Cannonbury Park North, N., for Mr. Thos. Bear:—
 Thos. Wontner Smith & Son £146 14 0
 * Accepted.

MITCHAM.—For the erection of married couples' quarters at the works, Mitcham, for the Guardians of the Poor of the Hibernian Union. Messrs. H. Saxton Snell & Son, architects. Quantities supplied:—
 J. O. Richardson, Albert Works, Peckham, S.E. (accepted) £1,870 0 0

RICHMOND.—For partly taking down and rebuilding the "Foresters Arms" public-house, Richmond, Surrey. Mr. T. Walter Moss, architect, 21, Doughty-street, London, W.C.:—

	House.	fittings.	Total.
T. J. Messon	£2,425	£295	£2,720
Lansdown & Co.	2,397	266	2,663
T. Hiecock	2,350	275	2,625
E. Toms (accepted)	2,129	247	2,436
J. Hery	2,209	259	2,460
Filler & Sons*	1,896	163	2,059

* Withdrawn.

WEST WYCOMBE (Bucks).—For alterations and additions to West Wycombe College, Bucks, for Sir Edwin Abercromby Dashwood, Bart. Mr. Arthur Vernon, architect, 26, Great George-street, Westminster, S.W.:—

Silver & Son	£1,755 0 0
Jos. Lacey	1,665 0 0
Grist	1,578 0 0
Gibson	1,560 0 0
Harris	1,475 0 0
Martin	1,467 0 0
Nash	1,439 0 0
Hurd	1,237 0 0
Flint & Middleford	1,229 0 0
Loosley	1,190 0 0

WOOLVICH.—For alterations and additions to the "Globe" public-house, for Messrs. H. & V. Nicholl, Limited. Mr. Albert L. Guy, architect and surveyor, 78, High-street, Lewisham:—

Proctor	£709 0 0
Fritchard	480 0 0
Jerrard	437 0 0
R. Soper	418 0 0
T. Knight	402 0 0
D. & R. Kemur	390 0 0
Chas. Robson (accepted)	390 0 0

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W. H. T. (Franklin-W. & A. (revised).—P. E. M.S. C. the quotation may be applicable, but has become rather old.—G. J. T.—S. (we cannot say whether or where the system you propose has been tried; but we should rather doubt its efficacy for raising the temperature desired).—M. B. D. (too space).—W. C. (we cannot report tradesmen involving trades disputes of general interest).—H. G. H. (there was nothing on the stand).—W. P. B. (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 printing 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, should be accompanied by 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. LVIII. No. 252.

FRIDAY, APRIL 12, 1900.

ILLUSTRATIONS.

The New Palace of Justice, Rome: Front and Side Elevations.—Prof. Calderini, Architect	Double-Page Typo-Gravure.
Christ Church (Presbyterian), North Dulwich.—Mr. Charles Barry, Architect	Single-Page Photo-Litho.
Holy Trinity Tower, Coventry.—From a Sketch by Mr. C. E. Mallows	Single-Page Photo-Litho.
Lodge at Gnarls' Corner, Ditcham Park.—Mr. Walter F. Cave, Architect	Single-Page Photo-Litho.
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The Recent Discussion at the Institute.



THE proceedings of the special meeting of members only, held at the rooms of the Institute of Architects on March 31, are now in the hands of all members, and may, therefore, be considered so far public property as to be the subject of public comment. The minor business, but first in order, of the meeting was to consider a recommendation from the Council that the Institute should enter into a lease with the Architectural Union Company for a further portion of the premises of 9, Conduit-street, hitherto in use as a shop; in other words that the permanent enlargement of the Institute premises has become a necessity, and that the opportunity should be taken of effecting this object. This was soon disposed of by a unanimous vote, and the real business of the evening then followed.

The meeting resolved itself into a special general meeting called by the Council under the provisions of by-law 60, whereby the Council shall be bound to call a special meeting to consider any proposed resolution on the receipt of a written requisition to that effect signed by twelve subscribing members, of whom the majority shall be Fellows. The subject proposed for discussion was summed up in the following resolution:—

1. That, at as early a date as possible, statutory powers should be sought to establish, as in other professions, a system of compulsory examination to be held by the Institute, and to be extended to all architects hereafter entering the profession, whether as members of the Institute or not.
2. That when such compulsory examination comes into force, the position of all existing architects shall be completely respected.
3. That, whether these (Nos. 1 and 2) be carried or not, a poll be taken by voting-papers, in order that under any circumstances the opinion of the entire body of professional members may be ascertained."

As we recorded in general terms in a former issue, a counter resolution to these was moved by Professor Roger Smith, and carried at first by a majority of about three to one, and subsequently adopted, in the usual form, in a substantive motion, by a practically

unanimous vote. The following are the terms of this amendment:—

"That, while not opposed to the principle of compulsory examination as applied to those about to practise architecture, this Institute is of opinion that the difficulty of restricting by statutory powers the practice of architecture to those who have passed an examination is at present so insuperable that it is undesirable to make an immediate application for such powers."

The first comment we have to make on these main facts of the procedure is to endeavour to clear up the minds of some people who seem to be under a very mistaken impression as to the real meaning of the two opposing resolutions, and of the act of calling the meeting at all. From one or two letters we have received it seems that some of the provincial members are under an impression that the Institute having made up its mind in favour of compulsory registration, and called a meeting to put the matter in train, had at the last moment allowed a red herring to be drawn across the track in the shape of a counter-resolution, and had stultified itself by carrying this instead of the originally proposed resolution. That anyone should think so only shows how carelessly members read the printed documents circulated by the Institute to give them information. The Council were summoned by a requisition, in the prescribed form of the by-law, to call the meeting, and had no power to refuse. The requisition was promoted and signed by the people who were concerned in getting up the Architects' Registration Bill which is again being attempted to be thrust on Parliament, and it was simply an attempt to drag the Institute at the heels of that Bill and its promoters. The list of signatories to the requisition does not include the name of a single member who is in the front rank of the profession, and a majority of them are those of persons almost unknown. Among the speakers in favour of the resolutions the only one whose opinion on a matter affecting the welfare and honour of the profession could be considered worth any serious consideration was Mr. Common, of Leeds, who moved the resolution, and who perhaps may be in earnest in his ill-regulated zeal; but Mr. Common seems to be quite *l'été monté* in opposition to the Institute, and has shown on various occasions, in his attacks upon it, an absolute want of moderation, of logic, or of tact, which have really taken away all serious value from his utterances. Of his speech at this meeting we are glad to be able to say

that it was considerably less unreasonable than others which he has made in the same room, though he did descend to the foolish claptrap of accusing the Council of being opposed to registration because they had all made their reputations and position and required nothing further: a kind of insinuation which is made simply for effect, and which those who make it do not really believe. Of the other speakers on the same side it is not worth while to take any notice here, further than to observe that if the profession of architecture is to be reduced by compulsory registration to their standard, it would probably be the desire of most of the high-minded artists in the profession to escape from any nominal adherence to its ranks, and to find some other denomination under which to range themselves than the one of "architect," which would by that time have become a badge of inferiority rather than a title of honour.

Apart from this, the main question is no doubt one that is worth serious discussion, if only to remove some of the fallacies which are rife in connexion with it. We print in another column a letter from Professor Aitchison, than whom no one has a better right to speak in regard to whatever concerns the higher interests of the profession. It is by the leaders of the profession that such a matter must be deliberated, and by their opinion that it must be settled, not by the clamour of a few obscure persons who are desirous to pose as reformers, and who are not particular as to the means they employ to recommend their tactics. *Non tali auxilio* is no doubt the feeling which is tacitly present to the minds of many who are supporting the action of the Institute against this noisy minority. If so important a step is to be taken, let it be taken at the instance and under the guidance of people whom we honour and in whose *bona fides* we can have confidence. And this is a point in regard to which the Colonial and American journals which have commented on the subject seem to be very much in the dark. We have observed in such quarters references to the "unhappy dissensions" among the English architects on the subject of registration. They are misled into this idea, probably, by those who have an interest in misleading them. Colonial critics may rest assured that nothing of the kind is the case. There are no "unhappy dissensions" among those English architects who are worthy of the name and whose talents and reputation are an honour to this

country. There may be decided differences of opinion among them, but there is no acrimony, and there is a perfect willingness to discuss the subject dispassionately in all its bearings. But this is a very different thing from putting up tamely with an attempt to force registration upon them by unworthy tactics, and by an appeal to a Parliament the members of which are mostly quite destitute of the special knowledge and culture which alone could enable them to understand and to weigh the possible effect upon architects and architecture of such a piece of legislation.

There are two distinct points to be considered in regard to the question of placing barriers by legislation to the entrance of the architectural profession: first, is it desirable at all? and secondly, is this the time for it? Professor Roger Smith's motion dealt really only with the second question. It is easy to reply that the objections existing now will exist at any time, and that to bow to them is only to postpone the encountering of them to a future day. Professor Smith gave sufficient reasons against this view; but nothing in the debate was so well put or so conclusive as what was urged by Mr. Phené Spiers in his very practical speech. He adduced the case first of the chemists, who applied for a recognition from Government in order to prevent the danger of anyone calling himself a chemist being allowed to sell poisonous drugs. The Government replied that it was impossible to make the restriction, but that if they instituted an examination they might obtain a title in course of time: which was the course adopted. Again, the Plumbers' Guild has started examinations, and has registered many plumbers, but they were not registered without passing an examination, "and it never seems to have occurred to the Plumbers' Guild," adds Mr. Spiers, "to ask that 'the position of all the jehing plumbers in the country should be respected.' If you were to go to Parliament and ask them now to admit all architects who have been in practice (however incompetent they might be), you would be met at once with the reply that it would be impossible to register as competent architects who have never been submitted to any test or examination." We hope so. At all events that is the plain common sense of the matter. If the Institute Examination is continued for some years, and meets with proper numerical support, there would come a time when there would be a sufficient body of men in the profession who had passed an examination, to render it worth while to ask for legal recognition for them. The outsiders would then in all probability find themselves compelled to pass the Examination also.

But whether that would necessarily be to the highest interests of architecture and of the profession is still doubtful; or if we conclude that it could do no harm, it does not follow necessarily that it would do any good. That the institution of an examination for entrance to the Institute has been a good thing for the credit of the Institute, under existing circumstances, we certainly think; but we must take into account what those circumstances are. We have before our eyes the example of the Institution of Civil Engineers, who have never held, nor we believe talked of holding, any test examination for entrance to their body. Yet the fact remains that membership of the Institution is so valued and is so generally recognised as an indication, if not a guarantee, of professional ability and competency, that every engineer, we believe, becomes a member of that body as soon as he can. And this fact is the more striking because one of the great difficulties in regard to an examination for the architectural profession does not exist in regard to engineering. An architect can be tested by examination in regard to his knowledge of the practical side of his profession; but the great and highest value of architects and architecture to the nation consists (though the majority of the nation have not yet recognised the fact) in artistic genius and consequent power of artistic design; and in regard to that it is utterly impossible to set

any standard of examination. Nor can you, perhaps, test by examination the possession of those qualities of readiness and resource under unforeseen difficulties, of enterprise, of boldness and inventiveness of constructive conception, which go to make up engineering genius: for it is unquestionable that genius, and not merely acquired knowledge, is an element in the character of a really great engineer: and it is perhaps the perception of this which has kept back the Institution of Civil Engineers from adopting a system of examination. But at all events the principal studies in which an engineer is engaged in preparing for his profession are practical studies, his proficiency in which could be tested by examination, whereas the highest elements of an architect's studies are artistic, and cannot be tested by examination. Yet in spite of this the Institution of Civil Engineers finds an examination test unnecessary; the profession is kept up to an adequate standard, and membership of the Institution is desired by the profession, and is accepted by the public as an indication of competency in the profession. If there is not the same feeling on the part of the architects that it is essential to be members of the Institute, nor the same feeling on the part of the public that such membership is a guarantee of competency, it is obvious, by comparison with the conditions of the engineering profession, that this difference has nothing to do with the existence or non-existence of an examination test. Then what is the reason of it?

The cause of the difference rests to some extent with the public. They know what they want in engineering works, and ask for it; and, as Sir F. Leighton said about art, what the public ask for they will get. They do not know what they want in architecture, and the highest part of architecture, architecture as an art, they mostly do not want at all. They therefore ask for nothing definite and consequently get nothing definite. But the reason lies far more with the architectural profession themselves; in their want of unity and *esprit de corps*. That a great many of them do not belong to the Institute is not the fault of the Institute; it is their own fault. Mr. Canon mentioned, in the discussion in question, that only a very small proportion of the Leeds architects were members of the Institute, and that their acknowledged leading man in that town was not; and he seemed to think this fact was a slur on the Institute. He is quite mistaken; it is a slur on his own townsmen: not because the Institute is a perfect or a perfectly-mangled body, though we do consider that at the present moment it is a very well-manged representative body, and is doing its best, in a very energetic manner and amid much discouragement, to benefit the profession and the art of architecture. But it is a slur upon those who do not join it, that they should be so shortsighted and indifferent as not to see the advantages to the whole profession of united action and a united front. A well-known architect who is not a member of the Institute, said, in reply to a question why he was not, "What advantage should I get by it?" That is a narrow-minded, shortsighted, and selfish view to take. Probably he would get no direct personal advantage, but the profession at large would benefit by greater unity of action, and each individual member can contribute to that. The engineering profession has proved practically that, without any examination test or legislative recognition, the profession can hold its position uncompromisingly before the public, and that membership of its representative society is regarded as an indication of a certain standard of professional acquirement. That the case is not similar with the architectural profession and its representative society is to some extent due to the ignorance and indifference of the public about architecture, but to a far greater extent it is due to the want of unity and loyalty to a common cause among the members of the profession themselves. Their representative body is not a power-

ful one like that of the engineers, simply because they will not take the only way to make it so. Until that spirit of loyalty is got rid of, test examinations will not, we fear, do very much to put the profession in a better position; and if it were got rid of, examination tests would be unnecessary, for the profession would be strong enough to hold its own in public estimation and to keep up the standard of efficiency within its own ranks, without the necessity of legislative interference, as the experience and example of the sister profession and the Institution irrefragably proves.

NOTES FROM ATHENS.

AFTER an unusually severe winter for Athens, the warmer spring weather and the bright sunshine has at last set in, and the near approach of Easter has brought the annual influx of University men who come full of energy and enthusiasm to visit the familiar Classic sites. This year Professor Middleton has brought a party of his students from Cambridge, and he is taking them round in that delightfully instructive way which is so pleasantly remembered by those who have had the advantage of participating in his former visits to Rome. They will probably stay for about a fortnight in Athens, visiting all the principal sites in the neighbourhood, such as Sunium, Egina, Eleusis, &c., and afterwards go to Mycenae and Epidaurus, allowing a few days for a short stay in Rome on their way back in time for the commencement of Term.

The work of the English and American Schools in Athens has been going on continuously during the winter, and many public meetings have been held in both schools; where papers have been read by directors and students on various subjects of archaeological interest. In addition, the directors have lectured to the students on special branches of archaeology, such as sculpture, vases, inscriptions, &c., in the museums, and on the topography of the various sites. Complete harmony exists between the two schools, and they have worked together amicably and pleasantly through the winter.

The American School resumed their excavations on the site of Plataea in February and carried on work there for about a month. They were greatly hampered by bad weather, especially during the early part of the time, when the ground was covered with snow for several days. Advantage was taken of the presence of an architect, as a student of the school, to make a complete survey both of the walls of the city, which date mostly from the time of Alexander, and of the whole region where the battle was fought, and important historical data have been verified and doubtful positions more definitely fixed.

A large number of remains of ruined Byzantine churches have been unearthed, and also a considerable quantity of Roman and Byzantine pottery and lamps. This points to the existence of a large Byzantine town on the site of the older city, and, we should think, makes the chances of discovering much work of good Greek times less probable. But until more extensive investigations than opportunity has hitherto allowed have been made, it would be a pity to abandon the site.

In one of these churches which lies at the south-east corner of the city, near the wall, was found, forming part of a grave beneath the floor, a slab containing another portion of the Edict of Diocletian, the preamble of which was discovered last year on a slab in the floor of another church. This inscription, which is in three columns, supplies about a column and a quarter of hitherto unknown matter, consisting principally of a list fixing the maximum prices of different textile materials. In the same church was also found another inscription of over seventy lines, dating from probably the end of the third century or the beginning of the second century B.C.; it contains a dedication by a number of women to a goddess, whose name

is not given, of votive torches, lamps, &c. It is especially interesting as giving us a large number of female names, some of which are new to us.

A number of small inscriptions were also discovered, some belonging to funeral stelæ, and one dedicated by a victor in the games of the festival of the Eleutheria. Part of a water conduit was also unearthed running into the city, under the walls, from the direction of the hills. It is formed of U-shaped terra-cotta tiles resting on the solid rock, and covered over with stone.

Several trenches were sunk in the part of the city where Leake places the temple of Hera, but without result. However, in a small church near this, where some architectural remains were also discovered, was found, among the debris, a foot of a large archaic seated statue in poros stone. Trenches were also sunk in what seemed a promising site for a temple, in the north-west part of the town, but owing to the depth of soil, had weather, and limited time, operations had to be suspended in the meantime. It is hoped that further excavations will be made by the American school on this interesting and extensive site, where much must still remain hidden which may throw valuable light on the history of Platea in Greek times.

The British School have commenced operations on the site of Megalopolis, in Arcadia. This is their first excavation on Greek soil, and the results of the first few days seem to promise well for the future. Almost immediately under the present level of the ground on the north side of the river Helisson, where the Agora was situated, the foundations of a large stoa have been discovered running for a considerable distance in a straight line east and west, and it seems to have had two rows of columns, the outer Doric and the inner Ionic. The remains already found point to a Roman restoration. Foundations have also been unearthed of what promises to be the plan of a temple, but operations at these two places cannot be proceeded with further at present owing to the standing crops of corn, interference with which would necessitate heavy compensation. Attention has consequently been directed to the site of the theatre on the south side of the river. This was the largest theatre in Greece, and there seems every chance of finding the complete arrangement of the stage walls as they stood in the fourth century B.C. These stage buildings, as far as can be at present seen, seem to differ entirely in arrangement from those of already excavated theatres. Behind the line of the stage wall an isolated unfluted column was found, with three deep holes on the top. This may possibly have had something to do with the machinery of the stage. The digging here is much deeper than on the north side of the river, the pits going down in some cases 15 ft. It will consequently take a little time before everything can be laid bare. Wherever trial-pits were dug, foundations of some sort were come across, and these were not confined to places where walls showed above the surface, but were done generally over the whole area. We hope to say something further about these promising excavations in the course of a few weeks. Two students are at present looking after the works, which were set going by the Director in person about the middle of March. The school now numbers ten students, including two who are in Cyprus, where the excavations on the site of Salamis, which are being carried on under the auspices of the Cyprus Exploration Fund, are, according to latest accounts received here, likely to show important results.

The French School have commenced excavations on the site of Troezen in Argolis, opposite the island of Poros.

The usual winter course of architectural and topographical lectures given by Dr. Dörpfeld, the Director of the German School, in Athens and neighbourhood, has been somewhat interrupted this year through his absence for some time in Cyprus, where he went to look into questions connected with German excavation in the island. While there he

took advantage of the opportunity to visit various places of archaeological interest,—amongst others, the site of the former British diggings at Papho, and the works now in progress at Salamis. He has since gone to Troy with Dr. Schliemann, who is making further explorations there this spring.

A number of the fragments of the large temple statues found by the Greek Archaeological Society last season during the course of their exploration of the site of the temple of Despoena at Lykosoura, in Arcadia, have been brought to Athens and stored in the Central Museum till arrangements can be made for bringing on the remainder, the present rough tracks being insufficient to transport some of the larger torsos. When these arrive the remains will be pieced together, and great hopes are entertained that almost the entire group, consisting of figures of Demeter and Kora with Artemis and Anytos, which, according to Pausanias, stood in this temple, will be recovered, and the Museum of Athens will then be enriched by the addition of a genuine temple-statue group of the fourth century B.C.

The very fine Byzantine mosaics in the church at Daphne, which suffered so much from an earthquake about the beginning of last year, have been temporarily secured till the arrival of a competent craftsman from Italy, who is shortly expected, and who, it is hoped, will be able to leave them in such a state as will ensure their stability for some time to come; but, while it is very important and necessary to thoroughly fix these, we trust that no attempt will be made to do anything in the way of restoration, which would utterly ruin their value as records of the finest period which have remained as they left the hands of their creator, and which, but for the injury they received from enraged and fanatic Turks during the time of the Greek Revolution, might have been preserved to us till to-day in an almost perfect state.

In three small rooms on the first floor of the offices of the Ecclesiastical Synod in Athens has been got together the nucleus of what promises to be a most interesting and valuable collection of Greek Christian antiquities. This small museum, which, we understand, is indebted for substantial help to Lord Bute, whose interest in Greek Christian remains is well known, was opened two or three weeks ago by the King and Queen of Greece. The collection embraces a general series of objects connected with the architecture and ritual of the Greek Church, and also includes a number of plans, drawings, and photographs of churches and of mosaics and frescoes, several old church service books, and some reproductions of illuminated manuscripts.

The architectural fragments consist principally of sculptured slabs, ceramic ornaments, fragments of mosaics and frescoes, portions of details of internal fittings such as the Iconostasis, &c., pieces of pavements and points of interesting constructional detail.

In connexion with ritual, we find a large number of vestments of various kinds, some being beautifully and richly embroidered, several croziers, specimens of flagons, chalices and patters, many of them of pewter, rich altar-crosses of delicate silver filigree work, often inlaid or picked out with gold, and usually enclosing intricate and minute figure-subjects cut out of olive wood. We also find several bottles for holding the sacred oil, made of cast lead with ornamental borders and quaint figure panels, ceramic plaques for stamping the sacred bread, Christian hand and other lamps, and large flagons for storing the oil for these.

There are also many very carefully-taken stamped impressions of Christian inscriptions and of the flat, slightly-cut ornament which was so commonly used round the doors and in other parts of the churches; a number of old and interesting typical sacred pictures of Christ and the Virgin, and of saints and prophets, and a collection of about 800 Byzantine coins.

We hope shortly to give a more detailed

account of this interesting series of objects, with perhaps a few sketches of the various types.

NOTES.



are still in the midst of an epidemic of strikes, and the subject engrosses the attention of a large section of the commercial and industrial community, having been discussed during the last few weeks at numerous meetings both of employers and employed. It appears highly probable that the Strikes Bill alluded to in our "Notes" of the 29th ult., will be quietly dropped. There could be no hope for such a measure unless the principle underlying it was acceptable to the majority of those concerned; and, so far from this being the case, it does not commend itself to either party. The element of compulsion in the Bill is condemned by all,—not excepting those responsible for it. Among the names appearing on the back of the Bill is that of Mr. Cremer, M.P.; and he has actually stated that he shall ask the hon. member who introduced it to withdraw it, and apologise to the House! The Trades Council term it "an unwise and astounding proposal," and earnestly entreat Parliament to reject it: while the Associated Chambers of Commerce simply ignore it as impracticable, and not worth consideration. They suggested the formation by the various Chambers of Boards of Conciliation, which would command the confidence of both parties, to arbitrate upon labour disputes; and invited the Trades Council to elect delegates to serve upon the Board. The latter, however, virtually decline to comply, although expressing themselves willing to assist to prevent conflicts. The result of most of the recent strikes has rendered workmen even more disinclined than before to submit to arbitration, under any name, and the proposals of the Chambers of Commerce were regarded with suspicion and designated "capitalist humbug." At the same time, they cannot go to the length of condemning the principle of conciliation, but they would only allow it to take the form of conferences between the parties to a dispute. This promises no improvement upon the existing unsatisfactory state of things, for the tone of recent Conferences of this nature has frequently been far from conciliatory. Indeed, it is impossible for the parties to a dispute to approach it with impartiality, though such conferences would serve to clear the way and narrow the issues. A practical but unprejudiced arbitrator, or Board of Arbitration, would then constitute the best and fairest mediator, and be far more likely to effect a speedy settlement of the dispute. In the absence, however, of permanent recognised "Courts of Appeal," there is always the danger of a dispute passing into the acute phase of a strike or lock-out before such a tribunal could be formed, or a suitable arbitrator selected.

THE academic labours of the Berlin congress came to a conclusion on March 29 with mutual congratulations to each other by the delegates and many expressions of gratitude to the Emperor of Germany for initiating the congress. We have called them "academic" labours because the very report of the delegates shows that the only force which can bring forth practical results is the national opinion of each separate European community. It is recommended that the States which may follow out the suggestions of the congress should "exchange the text of all legal measures adopted by them" with reference to the subjects before the congress. To pass legal measures it is necessary to have some popular force behind,—any changes, however small, will have to be discussed before popular audiences in this country,—whereas in Spain, where public opinion on such subjects as the labour of children in factories is not in so forward a condition as in this country, it is not likely that the recommendation of the congress will receive much

attention. A good deal of the proposed legislation has also been anticipated in this country, as, for instance, the prohibition of underground work for females. On the whole, the congress has been interesting rather as throwing light on the apparently benevolent autocracy of the young Emperor of Germany than for its practical usefulness.

THE whole archaeological world will have heard with regret the death of Mr. J. T. Wood, whose name will be connected for all time with the recovery of the remains of one of the most famous buildings of the world's history, and who it is to be feared impaired a naturally strong constitution and physique by his ardent labours at his chosen work under very great disadvantages from climate and circumstances. The melancholy part of it is that several years of these labours were, as we mentioned at the time of the appearance of his book on the Temple of Diana, unnecessarily wasted in hopeless search on the wrong side of the city; and that had he made due use of the information open to every one as to the probabilities of the site of the Temple, he might have achieved his object with far less waste of vital energy and in a much shorter space of time, and might have thus reserved health and time to publish the results of his labours in a form worthy of their importance. As it is, his best friends can only regret that he produced nothing but a popular book on the subject, an admirably-written and most interesting narrative, but not a monumental monograph of the type which archaeologists had hoped to see from him, and which any German savant who had made such a discovery would certainly not have failed to give to the world, and which remains to be done, if at all, by other hands. However, the fact remains that he did discover what it had long been said could be discovered by any one who would seriously make the attempt, and that in the carrying out of his determination he exhibited a degree of energy and perseverance which is worth as much in its way as the highest archaeological sagacity; leaving an example to others not to be discouraged by long delay and difficulties in prosecuting such a work, besides building himself an enduring name and place in the records of archaeological enterprise.

ALTHOUGH apparently Captain Bötticher has not responded to Dr. Schliemann's invitation to meet him at Hissarlik and there discuss the question whether the remains are only, as Captain Bötticher asserted, those of a cemetery where the dead had been burned, Dr. Schliemann has produced a counterblast to the assertions of his critic by summoning a jury of experts and others to sit on the question and sign their names to a statement in French which was communicated to the *Times* of Tuesday. The list of signatories to the declaration, eight in number, includes the names of Professor Virchow and Dr. Waldstein, the former being probably included as being one of the best-known scientific men of the day, and one who was not likely to be easily taken in with respect to the weighing of evidence and the logical deductions to be made from it. Otherwise, Herr Virchow is not exactly an archaeological expert, nor we presume is Mr. Calvert, the United States Consular Agent at the Hellespont. The others are M. Babin, Ingénieur des Ponts et Chaussées, and delegate of the Academy of Inscriptions and Belles Lettres of Paris; Dr. von Duhn, Professor of Archaeological Literature at Heidelberg; Dr. Grempler, President of the Society of Antiquaries of Breslau; M. Hamdy, Director of the Imperial Museum at Constantinople; and Dr. Humann, Director of the Royal Prussian Museum. These gentlemen, the opinion of the majority of whom at all events should carry some weight on such a subject, have entirely dismissed Captain Bötticher's criticism, and certify that the remains are obviously those of a fortified town; that there is no sign anywhere of provision for the

burning of human remains; that the ruins afford evidence of being composed of strata of débris belonging to successive periods, and that they found the foundations of Greco-Roman houses "dans la dernière couche," by which they mean, we presume, the upper stratum. They do not commit themselves to maintaining that Hissarlik is Troy, which could hardly be expected of them; but their evidence is, short of that, entirely in favour of the correctness of Dr. Schliemann's views as to the nature of his find; nor should we have expected otherwise. Whether the trouble which has been taken to secure this formal support is not impolitic in the sense of attaching too much importance to what was obviously a captious and sensational criticism, may be another question.

A PAMPHLET has been circulated by Mr. W. Saunders, member of the London County Council, consisting of "a statement of facts compiled from official sources" in regard to the question of Thames communication and the Blackwall Tunnel, and intended as putting a case in favour of a short tunnel and hydraulic lifts rather than a long tunnel and inclined approaches. He formulates the case briefly on the title-page as thus:—

Three tunnels with inclines,	= £2,500,000
Time in crossing 40 minutes.	
Two tunnels with lifts,	= £400,000
Time in crossing, 8 minutes.	

We do not believe there will be such a difference in the times of crossing as is suggested here. We presume the figures refer in the first instance to the whole time occupied on the inclined roads at each approach as well as in the tunnel: but that is hardly a fair way to put it; and the eight minutes must be calculated on the assumption that the descent and crossing is commenced as soon as the vehicle arrives at the lift, which is certainly not likely to be the case always or even in the majority of instances: where one lift serves all crossers one way, it is inevitable that many must be kept waiting till the lift is fairly filled, and that even when there were a sufficient number of vehicles waiting to fill it at once, there must be time occupied in getting them into position. At the Mersey Tunnel the delay at the lift is very considerable, with foot passengers only. Apart from this, there is a great deal in Mr. Saunders's pamphlet that deserves serious consideration. The expenditure of horse-power in dragging up long inclines would mean a serious annual waste, besides the first cost both in actual operations and in purchase and compensation that would be entailed in making the sloping road approaches. Mr. Saunders states that Messrs. Armstrong estimated the annual cost of working lifts at the Tower-subway, for a traffic of 4,412 vehicles daily, at 4,000*l.* a year. Taking the traffic at Blackwall to amount to 2,500 vehicles daily, the cost of the lifts would not much exceed 2,500*l.* a year; a very small percentage certainly on the probable saving in first outlay, even if we regard Mr. Saunders's figures as somewhat too favourable (as they probably will prove to be) to his short tunnel theory.

WE have received the third annual report for 1889 of the Herkomer School of Art, Bushey. It appears to have attained a thoroughly sound and self-supporting position; the maximum number of students is seventy, formed into two main divisions, "preliminary students" and those attending the life class. Appended to the report is a reprint of Professor Herkomer's paper in a recent number of the *Universal Review*, "How we Teach at Bushey," in which he points out that the aim of his teaching is "the suppression of the art student" and "to coax out individuality," and to make successful work the aim of the student, and not praise or prizes. In these days of bustle and commonplace monotony of work, no objects could be more admirable. At the end of the report is a list of the present and past students who have during the

past year exhibited works at the principal public galleries. We naturally turn to it to see the results of the six years' existence of the Herkomer School. The Royal Academy Exhibition comes first, and we receive a mild shock when we observe that the first picture which heads the list is entitled "Three to One on the Field" (oil)! Can this be the result of these high views, of this pure artistic life, of these pastoral plays on sunlit lawns; has the national sport even swallowed up this community too? A further perusal of the list does not raise our spirits. There is not one work which deals with the higher subjects of art; there are portraits, "Shiplake Backwater," "A Poacher's Bag," "On the Thames near Wargrave," and so on through the regular stereotyped subjects. What is the last? "Purple Clematis" (oil). "Far too many people dabble in art nowadays," says Professor Herkomer, in the above-mentioned paper: the works exhibited by the past and present students would, on the first appearance, seem to fortify this assertion.

THE Workmen's Exhibition which was opened on Saturday last at the Central Hall, under the auspices of the Working Men's Club and Institute Union, and which closed on Thursday last, was not very large or varied in extent, but in some respects it afforded a better display than is generally witnessed in such exhibitions. That this was so was mainly due to the fact that the amateur element, although quite sufficiently obtrusive, was more than counterbalanced by the exhibits which were the productions of workmen and workwomen in their own special trades and handicrafts. The majority of the exhibits showed good workmanship,—workmanship so good, in fact, that it was regrettable to see that the design of many of them was so poor. The trade which was most fully represented in the exhibition was cabinet-making; the building trades were very poorly represented. Among building trade exhibits we noticed some good specimens of plumbers' work by H. Goldman, a member of the Jewish Working Men's Club; and there were many good specimens of decorative work, as well as some bad examples. Among the curiosities of the exhibition we may mention what was apparently a very carefully-executed model of the South Hackney Club, made by Mr. C. Hamilton, a law clerk. The model was stated to consist of no fewer than 11,000 separate pieces of wood, each individual brick, seemingly, being represented by a separate piece of wood. The model is very cleverly executed, but, while commending Mr. Hamilton's industry and skill, we cannot but regret that so much time and ingenuity have been expended on making a model of what is a very commonplace brick house. Another thing that struck us, more, we must confess, on account of the exhibitor's name than on its own account, was "an imitation chess-table-top," as it is described in the catalogue: an "imitation-marble chess-table top" was what was meant to be described. It was apparently made of scagliola, in bright colours, and its exhibitor was "J. Ruskin," described as an "artist," and as a member of the United Radical Club. There are, it seems, two Ruskins in the field. We understand that this is the first exhibition of the kind held under the same auspices. The results have been so far encouraging, on the whole, but we shall look for improvement in future displays of the prowess of the "pick of the working classes" understood to be included in the membership of the workmen's clubs.

WE presume that the new hydraulic railway, at a gradient of 1 in 1 $\frac{1}{2}$, which is to facilitate intercourse between Lynton and Lynmouth, is a practical convenience to people who are not strong enough to climb a hilly road, and it will probably also provide a merciful relief for many unfortunate horses from a weary pull up the hill; but it would be of some interest to know exactly what are the "devices" for stopping the cars and

verting danger in case of any accident to them or the machinery. A railway with such a gradient might be the scene of a very serious casualty, unless the provisions made against any chance of coming down with an air are thoroughly trustworthy.

A CORRESPONDENT draws our attention to the following interesting bit of "æsthetic" from *The Queen* of March 29. It is in reference to the works of an American idyl sculptor, Miss Freehorn:—

"Sarcophagi monuments have claimed her attention, in the first instance in memory of her own parents. It would be difficult to find anything more original or beautifully adapted to its purpose than this public memorial that represents two large columns, the one straight, the other spiral, intended to embody separately the idea of female grace and virginal strength, blended by a spiral arch at the summit. While purely original, the spirit is Byzantine."

Which is the manly strength and which the female grace, the spiral or the straight, does not appear, nor does it appear to have occurred to the writer that columns are constructive features designed with reference to a superincumbent load, and therefore hardly suitable for separate and symbolic use. However, spiral arch "is good."

A QUERY of Lord Bury's as to the need of a verb which should be applicable to the movements of an electrically-driven launch, as steam ("to steam so many knots") is applied, very irregularly and inelegantly, to the movement of a steamer, has drawn a number of letters in *Thursday's Times* making suggestions which are amusing at all events, but very practical. The first correspondent suggests "to motor,"—"an electric-launch kicks half an hour to motor from Morlake to Putney,"—which would be the same as if we said that a boat driven by a steam-engine took half-an-hour to engine "from the one place to the other. That is not happy. R. W. S." is better with his suggestion to "mote," a verb properly formed from the same root as "motor," and already received into the language under the intensive form "promote." This is ingenious and logical. Two other correspondents suggest "electrize" and one "electrate." So long, and not convenient words. Mr. Andrew W. Tuer distinguishes himself by the invention of a new cockneyism, and suggests that as Lord Bury calls a monovalent, "to tric" will do to describe going in an electric launch: about as vulgar as "bas," and for the same reason most likely to be taken up. To "volt" will not do, if only because it is the same sound as "vault," and its formation into a verb of description is as absurd as it would be to apply to a steam-engine the word "to horse-power" from one place to another, because steam-power is roughly measured by horse-power. To "ohm" is worse, since, as another correspondent remarks, ohm is a measure of resistance, and therefore suggests the contrary idea to speed. We have no doubt that electric word must give rise to some new word-coinage, and we hope it will be made on better principles and in a less awkward manner than has been done so far, the barbarous jargon of "ohm," "ampère," "volt," "watt," &c., which have no innate suitability of meaning, and which give to treatises on electricity the effect of being written in a foreign language. Meantime, in regard to the present query, we are in accordance with the Rector of St. Mary's, Colchester, (another contributor to the correspondence in question) in thinking that no new word is required at all, and that it is perfectly intelligible, as well as good English, to say that an electric launch "runs" from one place to another in a given time, and that her work may be described as "a fair day's run." We may observe that the use of "to steam" as a verb applied to the progress of a steamship is not only irregular but unnecessary, and is not in universal use; it is in fact a piece of newspaper reporter's phraseology, and not classical English.

THE MEDIEVAL HOUSE.*

A GOOD example of an early house is Stokesay, near Shrewsbury.† It appears that the Hall was built some time in the thirteenth century, and that in 1291 the lord obtained a licence to crenellate, and built a tower. The buildings and courtyard are surrounded by a moat, 22 ft. wide, and are mostly of stone and in good preservation, but in some respects they depart from the customary arrangement. There is a gate-house. Opposite stands the house. It consists of a hall 51 ft. by 30 ft., with an open roof, and tiered windows which had glass in the tracery but shutters below. The hall has no fireplace. North of this is a room apparently intended for the cellar, with two rooms over, the upper one being of timber construction, and with a fireplace and good windows. The cellar and intermediate rooms have narrow windows (loops) intended for defence. At the other end of the hall is the solar—up steps, and with small rooms below it. Detached, but connected by a passage, is a tower of singular but picturesque shape. It was of three stories, and it seems probable, as there is a large fireplace in the ground-floor room, that that may have been the kitchen. The window openings in the tower all had shutters, and most of them had seats formed in the eills.

This may be taken as a good specimen of an English manor house as they were built about the time when the choir of Westminster was completed, and to which little has been since added. Much picturesque beauty it is true there is, the design of the windows, gables, buttresses, and open roof of the hall, most artistic and careful precautions against attack, but of comfort, convenience, privacy, warmth, and even shelter, very little indeed.

Stabling and other offices were in this instance, as in others, appended so as often to make three sides of a quadrangle.

The fifteenth century saw a great advance in the social condition of our ancestors, an advance which had begun in the century previous, and the Medieval house was in that century accordingly much improved. A large number of noblemen and gentlemen had for country houses some sort of castle, and they had begun, in the fourteenth century, in those cases where a stout tower or keep was standing by itself, to surround it with enclosed and fortified courtyards, within the shelter of whose walls rooms of various dimensions had been erected. This process was, in the fifteenth century, extended. The hall, whether in the castle or the manor house, ceased to be the common sleeping-place of retainers, and, by degrees, as manners and customs grew more refined, it ceased to be the dining-room of the lord and his family. Consequently more rooms, some of them for servants, others of larger size and higher finish for their masters, were added, and there were also not a few places which were required as stabling for horses, and occasionally for cattle and sheep. To the solar was often added a second large room. Of these two, one served as dining-room, while the other began to do duty as a ladies' withdrawing-room; and here we meet the drawing of our own invariable dining-room and drawing-room. A long room, called a gallery, begins to make its appearance in large houses. It was often hung with the family pictures, and hence probably our modern use of the word gallery to signify a place where pictures are collected. Sometimes, as at Hever, and, I think, at Penshurst, it is in the roofs; sometimes it seems to have been arranged at a lower level, in order that it might be used on state occasions *en suite* with the other principal living-rooms, as in the case of the magnificent gallery usually known as the ball-room at Haddon Hall.

Not infrequently a private chapel forms part of the construction of a large manor house, as it usually did of a castle. This is not usually large, but is often a graceful and well-contrived specimen of the architecture of the time.

At every period the architectural treatment of tracery, mouldings and carving with which we are familiar in churches, is paralleled by the treatment of the same parts in the domestic work. Vaulting, which is the finest, or almost the finest feature of church architecture, is, however, not largely employed in manor houses, though often in the more stoutly-built castles.

* A lecture delivered by Professor Roger Smith at University College, London, as part of the Course of Archaeology now being given there. (Concluded from p. 249, ante).
† Illustrations in Parker's "Dom. Arch.," Vol. I., p. 158.

On the other hand, the specially domestic features of fireplaces and chimneys, and the arrangement and treatment of the windows, so as to correspond to the many rooms of a mansion instead of the one space of a church, give a very different aspect to the Medieval house from that of a church, and this difference is very much intensified by the constant presence of chimneys, and by the retention down to a late period of some of the features which the manor house borrowed from the fortifications of the castle,—as, for example, the tower, the turret-staircase, the battlemented parapet, the moat, and the protected entrance, with its drawbridge or portcullis.

To the interior of houses the art of the fifteenth century contributed a great deal that was eminently domestic in character; but, at the same time, rich and even sumptuous in quality. Carved and moulded woodwork in panelled dados and wall-linings, doors, staircases, and so forth; ornamental ironwork in fire-dogs, the latches of doors and windows, and other minor fittings. Ornamental lead-lights in windows, filled often with armorial bearings. Tapestry, and, as time wore on, stamped leather for lining the walls, and well-wrought plasterers' work for ceilings. These resources, together with painting, gilding, and colouring, were now all at the disposal of the architect of a country house, and what he was able to do with them now invites our attention a little in detail.

All that went to make up the Medieval house is fortunately not of equal interest to us here, and there are many portions and features that we may well pass over, but upon one or two of them we should bestow a little attention.

First, the *fire*, and what it involved. The domestic hearth, much as the ancients made of it, cannot have been half so precious to them as to us and our forefathers in this chilly climate, probably worse in the Middle Ages than now. When there was only one room, whether it was a small house or a goodly hall, the fire in early days was, as has been remarked, at a hearth in the midst, and there was, of course, no chimney. In the hall-roof it was then common for there to be what is called a louvre,—that is to say, a kind of raised roof at the ridge of the general roof, and just over the hearth, with openings screened by what we still call louvre-boarding,—that is to say, boards some little distance apart placed on the slope like the laths of a venetian blind, so as partly to keep out rain, and yet to let smoke escape through the gaps between them. This feature is seldom left in halls that are in any way in use, as, if smoke is not going out of it, cold wind is apt to come in; but in the hall attached to the deanery at Westminster Abbey, already referred to, used as a refectory by the Westminster School, there is a louvre in the roof, very much in its original state, though the hearth has been replaced by a modern stove.

In smaller rooms, and before we have the fire-halls, it began to be customary to have the fire at the side, and to carry the smoke up a chimney. It was very early an established custom, when a fire was to be provided for, to build a regular projection, often 10 ft. or so wide, and several feet deep, from the side of the room, to form a hearth in the middle of the space so gained, to throw a great beam across the opening between this hearth-place and the room, and gradually to contract the great space above and behind this beam into a chimney. Thus, there were two very warm, if perchance, smoky snuggeries, created on each side of the hearth. These were the chimney-corners, or ingle-nooks. The fire was of wood, and there were iron bars at each side the hearth, called dogs, on which the logs could lie a few inches above the glowing ashes on the hearth. The front supports of these dogs were often richly ornamented with iron or brass work.

When the room was smaller, and especially in upper floors, the fire opening was smaller, and was constructed very much as we make them now, only that where we put a grate there was a hearth,—usually a little raised, with iron dogs.

The lintel over the openings of such fireplaces is generally not a timber beam, but a beautifully-constructed stone lintel, worked in many interlocking pieces. Sometimes it is an arch. These lintels and arches also frequently occur over fire openings of very wide space in Medieval kitchens and halls.

When coal came into use, the iron grate to hold it followed as a matter of course, and the fireplaces became smaller, but substantially

though coal may have been used early in the North of England, the fires of the Middle Ages were wood fires, with their cheerful flame, ruddy glow, great heat, and pleasant smell; and the collecting, storing, and cutting of wood for fuel must have been one of the constant occupations of the household servants.

Next to the fireplace, perhaps the window is the part of a house that has most home-like character. No windows of any Mediæval house were like the sash-window of our day. It is a modern invention.

In early times, though glass was known and used for churches, the window-openings in houses were closed only by shutters. In the thirteenth century and down into the fourteenth we find domestic windows with tracery in the heads, the beads having been glazed, but the lower parts fitted with shutters, and the hinges and holes for the bolts and stone ledges for the shutters to close against show this clearly. If I am not mistaken, this was the case in some monastic buildings down to a later period.

When glass began to be obtainable, it was at first so scarce and costly that we are told that gentlemen in the Middle Ages used to carry their casement-windows with them from one house to another—and also, by the by, their tapestry hangings.

When glass became fairly plentiful,—which, we may assume, was in the fifteenth century,—the windows were made up of small pieces set in leadwork, often in the familiar diamond-shaped quarry, but not infrequently in more complex ornamental patterns, and these were secured usually to iron frames and bars let into the stonework of the window-opening. Such portions of the windows as opened (and they were not many) were hung as casements, and often fitted badly, and did not open far, but the latches and stays were usually charming specimens of ornamental ironwork. Of course, in timber-built houses the casements were of wood.

A feature which is of such frequent occurrence that its absence,—when it is absent from stone-built houses,—is a surprise, is the window-seat. The walls being mostly thick, there was plenty of room inside the window-sill to form a seat, which is frequently so fashioned that two persons could sit and face each other. At other times it is arranged,—as we mostly do it now when we employ it, bench-wise,—so that those who occupy it sit with their backs to the window. In all the Mediæval period it must be remembered that domestic windows were divided into comparatively narrow lights by upright bars of stone or timber, called mullions, and in the latter part of the time they were also frequently provided with one or more horizontal bars known as transoms. By this means, though the individual light was kept down to such dimensions that a leaded window was strong enough to fill it, it became possible to have wide and lofty windows, made up of many lights, when they were wanted.

The bay-window and oriel-window are features of the Mediæval house which added much to its beauty and also to its brightness. A bay window is a wide projecting window, sometimes square, sometimes half-octagon, and occasionally of other forms in plan, rising from the ground floor of the house.

It became usual, as has been already said, to introduce a bay-window into the hall. It was generally at the distal end of the apartment, and usually reached from floor to ceiling, often being of great size. In the Elizabethan mansions this feature was introduced into many other parts of the house (fifteenth century).

The oriel-window was a bay-window on an upper floor, only corbelled out, and consequently rarely so large as the bay. When the bay is introduced elsewhere than in the hall, it is very useful for it to be carried up through all the storeys of the house, and as the desire to make upper rooms pleasant increased bay-windows of this sort and oriel-windows came more and more into vogue.

You will probably turn next to the walls, and inquire in what manner they were finished. In early times,—and in less important rooms at all times,—they were plastered; but the Mediæval plastering was a very thin coating, not like the inch or inch-and-a-half which we at the present day heap on to our rough walls and then smooth down. When the inner face of the walls was not smooth the plastering did little to hide the roughness, and other methods were employed. I ought to add that this plastering seems to have been usually decorated by the painter, often being lined out in red, in imitation of

masonry, or else painted upon with histories or fables.

As early as the thirteenth century, wainscoting, *i. e.*, lining walls with woodwork, began to come into use. It appears that Norway planks, *i. e.*, planks of fir, were imported into this country for this purpose, though most of our joinery was in oak. In later times the custom of so lining the walls of rooms to which it was desired to impart an air of comfort and finish became common. In the fifteenth century the curious ornament known as the linen-fold came into general use in the panelling, and towards the close of the century stamped leather began to be employed as a sumptuous wall-lining. The finest wall-covering, however, was the tapestry which was one of the glories of the Middle Ages, and may be said in Domestic work to have held a place something akin to that of stained glass in the churches and cathedrals.

As early as the twelfth century tapestry was occasionally in use, but it appears to have not been till far on in the thirteenth that it was often employed. The town of Arras became so celebrated for the production of tapestry that the Arras became the familiar name for it. In Shakespeare's *Henry V.*, at the inconvenient moment when the search for the Gad's Hill robbers had become warm, you may remember the Prince says to Falstaff, "Go hide thee behind the Arras." Much good tapestry was produced in London, while Norwich became famous for worsted stuffs, while were used as a substitute for tapestry as a wall covering.

Tapestry was first employed to ornament the upper end of the hall, and gradually introduced into other parts of the house. It seems to have been usually so arranged as to take down and hang up from pegs or books so that it might be put away when not wanted or (as is stated to have been done) carried from the town house to the country one and back. I need not dwell on the capacity of this kind of material for serving as coloured decorations of the noblest sort.

It would he, I think, treason against the highest attributions of the study of archaeology if in this lecture no word should be said on the group of buildings of which it takes cognizance viewed as works of art. When we endeavor to discern the special merits of their architecture, we, I think, must at once admit that they are singularly full of character. No buildings of any age or country are more happily successful in conveying to the spectator the impression that they are built for the purpose they were meant to serve. This is probably the first quality of good architecture; it is the one most commonly missed in imperfect modern work, and the complete attainment of it is the quality above all others which gives to the best ancient work its high value. Of such places as Ightham, Penshurst, Knole, or Haddon, your first impression is that they are dwellings: English, feudal, dignified, if you will, but, before anything else, domestic.

The next most prominent quality, especially of their exteriors, is picturesqueness. The accidents of situation, of varying requirements, and of subsequent alteration have provoked the most charming irregularities, and the most telling contrasts; and, so far as the interiors remain untouched, the same thing is there also true, though unfortunately nearly every Mediæval house that has been kept up has been dreadfully modernized, like Windsor or Alnwick; while almost every one that has not been kept up has been allowed to fall into ruinous decay. Few and far between are the Mediæval houses of which the hall and rooms have escaped one or other of these fates!

Ludor, Elizabethan, and Jacobean houses have been, in this respect, much more fortunate, and I am inclined to believe that a better general impression of what Mediæval interiors were at their best,—how artistic, how rich, and how varied,—would be derived from a visit to such a house as, for example, Audley End than from anything else. Time will not permit my saying anything about the furniture which went to create the artistic effect of those interiors, but it would be a subject worth your study, and in case you care to see a splendid series of copies of old decorations and furniture, I ought to add that the late Emperor of the French, with all the resources of the most artistic nation of modern Europe at his command, strove to restore the magnificent county Chateau of Pierrefonds, near Compiègne, to a condition of completeness, inside and out, including its furniture. He had the advantage of the learning of Viollet-

le-Duc. The old walls were almost, if quite, perfect when the work was begun, but all else is the creation of the great architect. I believe it has probably been overlooked by those who are interested in Mediæval domestic art to recommend a visit to Pierrefonds as an archaeological lesson worth taking.

I propose now to invite you to accompany me on an imaginary visit to one Mediæval house, in many respects the best for our purpose which England affords, and of which fortunately, excellent photographic illustrations have been provided by Mr. Brooks. I allude to Haddon Hall, in Derbyshire.

Haddon Hall* is the property of the Duke of Rutland. How it came to them, and why have been its fortunes since Domesday, which survey the place is named, is very pleasantly told in the article in the current number of the "Quarterly Review" from *T. P.*, as it is said, of the present Duchess of Rutland. The hall has not been occupied since the year 1700, and no alterations and modernizations have been introduced since that date, and though it has been robbed of much of its furniture, whatever remains is appropriate. There is much good tapestry, and the fabric has been constantly looked after, and is not allowed to fall into decay.

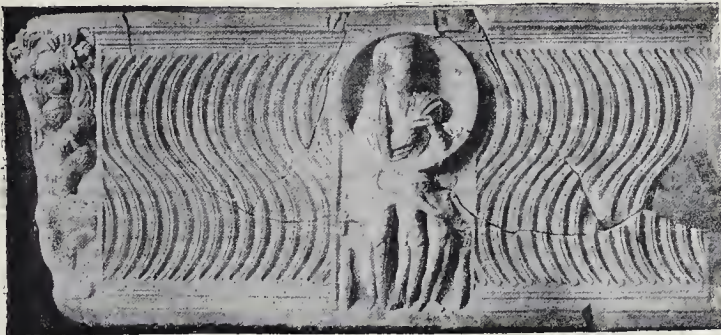
It is erected entirely with stone-walling, strongly built, but very picturesque, and is a house of very considerable extent, quite fit for a nobleman's seat.

Haddon has no mote. It stands on a projecting crag or spur of no great height, throwing forward from the rising ground that forms the west boundary of the valley of the Wye, and the stream washes part of the foot of the rock, but can never have formed a substitute for a mote, and though walled it never was a castle, only a strongly-built manor house. Haddon was built and altered at several times during the Mediæval period, and part of the place was built or rebuilt in Elizabeth's time, and a little internal fitting was done to a few rooms at a rather later date still. I propose, however, that for our present purpose we accept it entire as an example of the Mediæval house. The block of buildings is a parallelogram of slightly broken outline, and there are two internal, somewhat irregular, quadrangles. The entrance front faces due north; the garden front is south; and the quadrangles are east and west. The hall, with its butteries and kitchen at its north end, and its solar and upper withdrawing room, at its south end, forms the middle block, and extends across the whole building from north to south, and so has a quadrangle on either side. Each quadrangle is separately entered, and each entrance is under a tower, the two towers forming the ends of the north front. The Eagle Tower, the north-east one, is the earliest, and appears to have been built in the thirteenth century. The Entrance Tower, chiefly made use of, is at the north-west angle, and forms a commanding feature. It is of much later date, being, as we see it, probably part of the work of Sir George Vernon, known as the King of the Peak, who held Haddon from 1515 to 1565.

The chapel, one of the oldest parts of the building, is at the south-west corner. It adds to the hall, the solar, and the kitchen are the only important parts of the building on the ground floor; the other rooms, for family occupation or state, are on the first floor; and under them, on the ground level, are offices or very inferior rooms, and in some cases no rooms at all. The general disposition of the first-floor rooms may be described as follows:—There is a range of rooms, formerly used as family living rooms and bedrooms, in the north range of buildings and part of the west. There are three such rooms also on the south range at its west end. Over the solar (or dining-room) there is a drawing-room. The whole of the remainder of the south wing is occupied by the gallery, often called the ball-room, 109 ft. 6 in. long and 18 ft. wide, exclusive of the bays. The east range of buildings is mainly occupied by the great state bedrooms, and the two ante-rooms belonging to it.

Thus we have the normal arrangement of the hall, with all its usual appendages, forming the heart of the house, and added on to it the various ranges of buildings which were necessary to make Haddon a lordly mansion.

* The plan of Haddon Hall occurs in Parker's "Domestic Architecture," vol. III., p. 97, also in the *Quarterly Review* for January, 1890, and is given with many other illustrations in Mr. Jewitt's guide to Haddon Hall. For a careful account of the architecture of the Hall see a paper by Prof. Roper Smith in the *Builder* for May 15, 1880, with illustrations.



Sarcophagi recently discovered at Rome.

A COMPULSORY EXAMINATION FOR ARCHITECTS.

SIR.—The members of the Royal Institute of British Architects are now being asked to vote on this momentous question: "Whether it be expedient or not to at once close, if they can, the hitherto open profession of architecture."

It seems to me an opportune moment for the whole profession to give this question a full and impartial consideration.

I think such a devotion towards architecture animates the whole body of the profession, from the humblest to the highest, that the body would not hesitate for a moment to sacrifice the present good of the architects for the good of the art, did such an antagonism exist. At the same time, I think it is possible that some important considerations may be overlooked when an immediate answer is called for.

As I take it, the question to be solved is this: Will a compulsory examination of all, who shall hereafter be allowed to practise the profession, really promote greater excellence in the art?

If a compulsory examination becomes law, the efforts of the students must be directed to fitting themselves to pass it. Can any examination be devised that will really aid men of genius in becoming better architects? For I hold it to be of infinitely greater importance that the few great men should not be hampered in the attainment of the requisite knowledge and skill, than that the bulk of architects should be a little better, and that absolutely ignorant impostors should be excluded.

If the examination he slight it is illusory, and if severe it comes under Mark Pattison's description that, by another turn of the examination screw, not only is more useless torture inflicted, but all independent thought is crushed out.

If we knew how the great architects of the great fine art epochs had been trained we should have some safe ground-work to build on, but on this subject we are in the profoundest ignorance. Some believe the Greek architects were sculptors, but if so, what was their subsequent training? We do not even know how the Roman architects were trained, though we believe that most of them were Greeks. We know nothing of how the Byzantine architects were trained, though Procopius states that Anthemius of Tralles was a great mathematician.

We read in the "Arabian Nights" that when great buildings were to be erected the "geomet-

ters and mathematicians" were called in. In the dark ages and in the early Middle ages the architects are called "stone-cutters." We learn from Viollet-le-Duc that there were schools of architecture in some monasteries, and that in the thirteenth century architecture fell into the hands of laymen, but the "Bons" who built the Ducal Palace, the Porta della Carta, and refronted the Ca' d'Oro at Venice were called "stone-cutters." Lombardo contracted for a certain sum to build and carve Santa Maria dei Miracoli, according to a model he had made. Baldassare Longhena kept a mason's shop to the end of his life.

Brunelleschi was a goldsmith and sculptor before he domed the Cathedral of Florence, and he learned how to do it by studying Roman vaulting and making models. Most, if not all, the Italian architects of the Early Renaissance were brought up as goldsmiths, and became painters or sculptors before they became architects, and their main architectural study was measuring Roman ruins. We know that Bramante, Baldassare Peruzzi, and Vignola were painters, that Fra Giocondo was a monk and a scholar, and that Sansovino was a sculptor. Bernini was first a sculptor, then a painter, and then an architect. Inigo Jones was a landscape painter, and became a pupil of Palladio; Wren was a universal philosopher—he was a demonstrator of anatomy and a lecturer on astronomy as well as an architect. Perrault was originally a doctor, Allievi a harrister. What was Sir John Vanbrugh besides a playwright? how did he acquire his architectural skill? though we know he was for some time clerk-of-the-works to Wren. Were Gibbs, R. Adam, Sir W. Chambers, and Wilkins brought up as architects, in our sense of the word?

We might possibly learn how the Persian architects are trained, and the native architects of India, for no matter how skillful our architects may be who go there, most of them soon adopt Persian or Indian styles.

Let us suppose that a love for architecture should arise, and the public begin to have a taste in some definite direction, can we now say from what class the architects would arise who would put that taste into shape? Would they arise from the carpenters, bricklayers, masons, or plasterers, from the engineers or ornamentalists, from the architects, or from a class that has nothing to do with the constructive professions or trades?

Some years ago the Royal Institute of

The hall is entered by a porch which gives access to a passage cut off by an oak screen with two arched door-openings. At the higher end of the hall there is a dais or platform raised one step, on which still stands the massive oak table and bench. In the middle of one side is a wide fireplace, and there are windows with pointed heads and fourteenth-century tracery, but there is no bay. Unfortunately the original roof has perished. It, of course, was an open one, but as there is a regular chimney it probably had to leave. Over the passage already alluded to as cut off by the screen is a minstrel's gallery.

At the south end of this room up some steps is a fine parlour with woodwork of the time of Henry VIII. This is the solar, and over it is a drawing-room—part of the Elizabethan additions.

The finest Elizabethan feature is, however, the noble hall-room with three vast bays, its walls lined with wainscoting, its ceiling a beautiful specimen of ornamental plastering, and its extensive floor of oak furnished, it is said, by a single tree.

SARCOPHAGI RECENTLY DISCOVERED AT ROME.

OUTSIDE the Porta S. Lorenzo, the engineer Cantoni, making some excavations for the foundation of a new house, discovered, a few weeks since, two interesting Roman sarcophagi, of marble, of which we give illustrations, reproduced from photographs. The first, of rectangular form, is covered in the front with sculpture in high relief, representing the story of Medea. The style of art is that of the second century after Christ.

The second sarcophagus, very interesting for its ornamental motive, exhibits, in the centre, a group of the Graces, and above this is a bust (probably a portrait of the deceased person) in a medallion. The remainder of the surface is treated with an undulated fluting. On the ends were sculptured decorative lions' heads, of which only one remains in position.

This sarcophagus, according to the character and coiffure of the bust, may probably be referred to the time of Alexander Severus (222-235 A.D.).

L. B.

British Architects settled that in future no person should become a professional member of its body who could not show by examination that he had an acquaintance with the main elements of the profession, or could prove it by the works he had erected; but beyond this the candidate has to show that he has passed some sort of apprenticeship to the profession. It cannot be denied that this examination has given an impetus to the students to study the subjects included in it. No one knows, however, how it will eventually succeed, as it has not been tried long enough, and the system, too, has just been changed; nor can any one say that the success achieved is wholly due to this examination, and not to other concurrent circumstances.

The professional sense of the word "architect" is a person who, besides planning conveniently, building soundly and healthfully, can add a certain amount of heauty to the structure.

The bulk of the public probably take it to mean anyone from whose drawings any building has been erected or altered.

Suppose the votes in favour of closing the profession preponderate, and that every future architect must pass a legal examination to be allowed to practise; can it for a moment be supposed that the Legislature will insist on a fine-art test? The material good of the public is certainly all that will be legislated for,—unless, indeed, a change has come over its views, and it will require an examination to be passed before a man can practise as a painter, sculptor, musician, actor, or author. Will the Legislature break at once with Adam Smith and the philosophers of the last century, and insist on apprenticeship or any other test but the examination in construction and sanitation? Every person of legal age who can pass this will be allowed the title of architect, and permission to practise. Every tradesman, too, who has had "Architect" painted on his shop before the passing of the Act, or who has furnished drawings for a building erected or altered, will be an architect by Act of Parliament.

As to the effect of the examination, if it be slight, as at present, it will not present grave obstacles to those whose strength lies in esthetic design, provided they have had a good education, but make it severe, and it will exclude a vast proportion of esthetic talent.

I am told that in Austria, where the constructive examination is severe, it excludes many of the artistic architects, so that the certificated engineering architect has to keep as a partner an uncertificated architectural designer.

It was from this point of view that Professors Cockerell and Street deprecated a compulsory examination, both of whom put this question to the Institute, "Are we so overwhelmed with artistic talent that we can afford to exclude any of it?"

I may add that Professor Huxley published a paper deprecating the compulsory examination for doctors.

G. AITCHISON.

ATHENS: ITS MYTHOLOGY AND ART.

BEFORE proceeding with her examination of the Athenian cults, Miss Harrison devoted the whole of her sixth lecture to a sketch of the topography of Athens, following in her exposition the views of Dr. Dörpfeld. The chief points to be noted are:—The ancient district of the *Limnai* (Marshes), so long thought of as south of the Akropolis, is now placed just by the Dipylon Gate. Here Pausanias (l. 2, 5), soon after he enters the city, sees a precinct sacred to Dionysos,—here would naturally be the god's older worship, first established on his entrance into Athens. Later, this cult in the *Limnai* was thrown into the shade by the more important theatre and temples south-east of the Akropolis. This *Limnai* district was watered by the newly rediscovered Eridanos (*Builder*, March 1). About here lay the Kerameikos, or potter's quarter, and the commercial *agora* or market-place, commanded by the Kolonos Agoraios (market-hill) on which was a temple of Hephaistos (long misnamed "Theseion"), patron of potters and all artisans. Slightly to the north of this temple may be placed the shrine of Aphrodite Ourania. (A beautiful type of this, the heavenly Aphrodite, may be seen on the matchless plate from Kameiros, in the British Museum,—it shows Aphrodite passing through the air on a swan.) Below the eastern slope of the Kolonos Agoraios were the various famous *Stoa* (Basileos, Eleutherios, &c.), and the temple of Apollo Patroos, noted

by Pausanias on his progress south towards the Areopagos. Under the north slope of the latter hill was the *Metroom*, or shrine of the mother of gods, within whose sacred precinct were enclosed the *Bouleuterion* or Council Chamber, and the *Tholos*, or dining-place of the Prytanes (Paus. l. 3, 5). Above the Metroom under the north-western brow of the Areopagos were the statues of the Eponymous heroes of the Attic tribes. Opposite these, on the other side of a road leading to the Akropolis, were the famous statues of the tyrant-slayers, Harmodios and Aristogiton, by Kritias and Nesiotos. The *agora* proper,—the ancient political *agora*, not to be confounded with the commercial market-place mentioned above,—occupied, Miss Harrison maintains, the ground between the Areopagos, Phyx, and Akropolis. Here, about the south-west angle of the Areopagos, was the celebrated *Enneakroonios* fountain, of which Dr. Dörpfeld believes he has discovered the channels. Next was the sacred enclosure of the Eleusinian deities (*Builder*, March 1). South of the *agora*, near the *Pelagion* was the temple of Aphrodite *Pandemos* (of the people). This new explanation of the topography of Athens makes the long-discussed route of the Panathenaic procession quite clear. Starting from the *Dipylon*, it passed through the *Limnai*, then east of the *Kolonos Agoraios*, down the road between the *Areopagos* and *Phyx*, passed through the *agora*, skirting the *Eleusinion*, and so went up to the Akropolis. The district south of the Akropolis, stretching to the *Liissos*, where the Athenians of the fifth century had their dwelling-houses, was shown to have been built on at a much later date than the whole western region. In resuming her exposition of cults with that of Dionysos, the lecturer showed his intimate connexion with the Eleusinian deities. The theatre of Dionysos, the old *orchestra*, or round dancing-place, the *choros*, and the mimetic character of Greek choros dancing, had all been discussed in the autumn of 1888, and Miss Harrison seems to abide by the views then expressed. In returning to the Akropolis, an interesting analysis was given of the old and rather dim cult of *Zeus Polieus*, guardian of the city, who guarded it in the days of Kekrops, before ever Athene came, and contested for the lordship of the land with Poseidon. *Zeus*, too, was the original lord of the olive-tree, afterwards the special token of Athene. Sophokles keeps up this tradition for us in the fifth century, when in the chorus of the *Oedipus at Kolonos* he says of the olive: "Youth shall not mar it, . . . for the sleepless eye of the Morian Zeus beholds it." The lectures ended with an examination of the sculptures of the Parthenon. It is interesting to note that Miss Harrison holds the view which seems, slowly but surely, to be gaining ground among archaeologists, to the effect that in the Eastern pediment of the Parthenon the birth of Athene was represented realistically, i.e., the goddess was springing, fully-armed from the head of her father, in the old Athene Polias type, in striding motion, with shield and spear. This supposed scheme is echoed for us in many vase-paintings. It would have the double advantage of giving us the actual moment of the birth, so important in a temple of the goddess, whereas all other schemes have given vague and undefined moments, and the small figure of the goddess would admirably fill up the angle at the apex of the pediment towards which drive all the lines of the composition, architectural and sculptural. For the Western pediment, the lecturer, in accordance with a theory of Mr. Cecil Smith, of the British Museum, thinks the exact moment represented was that in which the two deities, Athene and Poseidon, move aside to show their tokens—the great olive-tree and the well of salt-water. These tokens would occupy the centre of the pediment, and from the top branches of the olive-tree would perhaps float down a little Nike to crown Athene,—such a figure would well correspond to the new-born Athene of the Eastern pediment. This new conception, instead of the old one of strife, when Poseidon with his trident was looked upon as attacking the olive-tree, gives great dignity to the composition—the gods, after striking the earth with their respective weapons, are moving aside in corresponding attitude to the left and right, to show their great gifts to the land.

Within the temple, the great ivory and gold statue of Athene Parthenos, by Phidias, was the embodiment of the best thought of Athens, religious and political, and was, moreover, the

highest artistic expression of the most sacred type of Athene; for the Parthenos is merely the old fighting Polias softened down to suit a time of triumph and of peace; with the religious myths most dear to the Attic race serving as rich designs for her pedestal, her sandals, or her shield,—with all the great attributes of the city grouped about her, the snake, the Victory, and, doubtless, the olive, she might well let spear and shield sink to the ground in rest; she needs them no longer in the strife, but only as emblems of power, for the Athens of the age of Perikles is a victorious Athens; and Athene, conqueror herself in her great ritual, to the exclusion or absorption of all other gods, stands there in the famous temple as the sole protector and guardian of the city.

"Pallas, our lady of Athens."

The lectures have been admirably organised by Mr. R. G. Tatton, secretary of the Chelsea centre for the Extension of University Teaching. The audience has been very large, and regular in attendance. At the close of the last lecture a vote of thanks to Miss Harrison was moved by Mr. Ernest Myers, in the name of the Council for the University Extension.

THE EXAMINATION IN ARCHITECTURE, MARCH, 1890.

AT the Examination to qualify for candidature as Associate, held in London during the week commencing the 24th ult., fifty-three gentlemen out of fifty-six admitted by the Board of Examiners presented themselves. Of these, twenty-one have been relegated to their studies for one year, and six have not passed. The names of the twenty-six gentlemen who have passed are:—

Ancombe, A. E.	Hill, H. L.
Beckett, R. T.	Howard, E. P.
Bedford, F. W.	Hughes, H. H.
Carter, E.	Metnam, W. J.
Eaton, W.	Nunn, B. W.
Eccles, T. E.	Russell, S. Bridgman.
Frere, E. C.	Scott, J. D.
Gibson, J. S.	Spackman, A. E.
Goodwin, W. B.	Wehh, W. A.
Habershon, A. E.	Wood, H. S.
Hart, A. H.	Woodington, H. A.
Harvey, G.	Worthington, P. S.
Heron, A. H.	Young, E. A.

The oral examination of the fifty-three gentlemen who presented themselves, which was conducted by the Board of Examiners in Architecture, commenced at 10 a.m. on Friday, 28th ult., and terminated at 7.30 p.m. on the following day. No Qualifying Examination was held this March by the Allied Societies.

THE PRELIMINARY EXAMINATION,* MARCH 1890.

Seventy candidates were admitted to the Second Preliminary Examination, of whom eighteen have been declared exempt. Of the remaining fifty-two candidates, eighteen have been relegated to their studies until next November, and thirty-four have passed. Of the latter, twenty-two were examined in London, five in Bristol, and seven in Manchester. The names and addresses of the fifty-two passed candidates, which have been entered on the Register of Probationers, are here given, that is to say:—

Austin, C. A.	King, A. S.
Bailey, H.	Lawrence, G. C.
Beckett, J. H.	Leslie, H. G.
Bishop, T. H.	Ligertwood, G.
Booth, H.	Longworth, W. H.
Brown, W. G.	Lucas, T. G.
Bulman, H. G.	Lynan, T. R.
Carré, H. B.	Marchant, R.
Cox, H. J.	Middleton, O.
Delves, S. W. W.	Morton, R. H.
Finch, W. H.	Nicholson, E.
Fraser, G. W.	Pearce, R. L.
Galt, W.	Pearson, H. L. D.
Goldie, C. R.	Price, F. J.
Goodwin, W. D.	Rochester, C. D.
Gullan, H. F.	Savage, R.
Harris, S. S.	Scrivener, H. M.
Harrison, J. E.	Simpson, G. M.
Haywood, G. W.	Simpson, W. H.
Hennell, A. R.	Sterry, H. E.
Hicks, F. G.	Stratton, A. J.
Honfrey, H.	Streetfield, G. E. S.
Hunt, J.	Watkins, W. G.
Hunter, R. H.	Ware, E. F.
Johnson, H. W.	Wells, W. W.
Jones, W. S.	Whitmore, S. W.

* To qualify for registration as Probationer.

OBITUARY.

Mr. J. T. Wood, F.S.A.—We announce with much regret the death of Mr. John Tuttle Wood, F.S.A., Hon. Fellow of the Royal Institute of British Architects, Mr. Wyatt Papworth contributes to the *R.I.B.A. Journal* for April 3 the following appreciative notice:—"In the Annual Report of the Institute, read May 3, 1875, reference was made to the election in 1874 of Mr. J. T. Wood as a Fellow, 'whose antiquarian researches at Ephesus have won for him an European reputation, and whose valuable services in rescuing from oblivion the site and remains of the famous Temple of Diana, have been deservedly recognised by Her Majesty's Government.' To-day it has to be announced that Mr. Wood died on the 25th ult. at Worthing, of heart disease, in his 70th year. He had been advised in January to reside for a time at the seaside to escape the London fogs, and had hoped to return to town this month. Having been away from England for so many years, there are few probably who know much of Wood; my acquaintance, however, dates from about 1849, in connection with his making a plan of part of St. Martin's parish, at which time his office was near Somerset House. He was born February 13, 1821, in London, and studied at Cambridge under a tutor. His master's name is unknown to me, but I think he was in the office of Mr. H. E. Kendall. In 1850 he was at Venice. In 1853 he married, and practised in Victoria-square, Grosvenor-place, as an architect. In the early part of 1858 he accepted the appointment of architect to the Smyrna and Aidin Railway, and went out there in April to design the stations on that line. He commenced the first excavations at Ephesus in May, 1863, exploring the Odeum and the great Theatre. Whilst so engaged in April, 1865, the place was visited by the Duke of Connaught, and Mr. Wood accompanied him to Mitylene, Pergamos, and Assos. After spending his own money on the work for two years, he commenced his search for the Temple in 1867, under the auspices of the Trustees of the British Museum, who forwarded to him a small sum. With a larger grant, and after six years of toil, just at a moment of despair, he fortunately hit upon a corner of a thick wall of large stones, which proved to be the Periholus wall built by Augustus. A sufficient sum was then granted to complete the discovery of the Temple itself, which was effected in May, 1869. He then returned to England, and, in July, 1871, read a Paper at the Society for the Encouragement of the Fine Arts,* when he gave an account of the discovery, and stated that the first clue which led to the finding of the Temple was an inscription, unearthed by him at the great Theatre, particularising the circuit of the city to be made by the priests of the temple in their sacred processions, and specifying a certain Gate. This Gate he found about May, 1868, and choosing the most worn of two roads, he opened it up; then, following a road branching towards the open country, he at last came upon this Periholus wall. Trial holes showed a white marble pavement and remains of large columns with their capitals and bases. Wood afterwards resumed the excavations. Then came the discovery of buildings connected with the Temple from 12 to 20 ft. deep; mosaic pavements and inscriptions; the pavement and other remains of the Temple itself; the discovery of columns *in situ*, and many fragments. The site of about eight acres was then purchased. Some coins, portions of a large sculptured frieze, and of a sculptured drum of the *columna velata* of Pliny, were obtained. These occupied the time up to April, 1872. Probably Wood was again in London pressing for money, for I find that in July the Institute, with other societies, had considered the question of the continuance of the excavations, as shown by the President's Address of November 4, 1872. The public press now began to take an interest in the discoveries. In the *Builder* of February 10, 1872, vol. xxx. p. 106, appears the first illustration, a plan and part of a column, and, p. 726, a drum of one of the sculptured columns. In 1873 Mr. Wood forwarded a plan of the Temple, with a letter dated January 18,† describing his researches and conclusions; for explorations on the site were continued from season to season to 30 ft. beyond the lowest step of the platform on which the last step had

been raised.* More of the great sculptured frieze, of the sculptured columns, and of architectural detail, were discovered. The plan of the Temple was gradually developed; discovery was made of the distinct remains of three temples of Diana on the same site, and of the evident use of gold and colour in the building. The excavations were finally abandoned in the spring of 1874. The pit dug out was 500 ft. long, 300 ft. wide, and 22 ft. deep. All this cost about 12,000l.; the total amount expended from first to last was 16,000l.† Wood then returned to London, and in January and February of 1875 he gave a course of four lectures at the Royal Institution of Great Britain, 'On the Results of the Temple of Diana, and other remains of the Government Excavations at Ephesus.' In 1875, February 15, Mr. Wood read a Paper at the Institute, 'On the Temple of Diana at Ephesus.' After its perusal, a resolution was passed 'to consider the propriety of memorialising her Majesty's Government with a view of soliciting its substantial aid towards continuing the researches at Ephesus, &c.,‡' and on March 1, 1875, it was announced that her Majesty's Government had recommended Mr. John T. Wood for a pension of 2000l. a year, in recognition of the valuable services which he had rendered by his exploration and discoveries at Ephesus. He had been employed on this work for thirty-six months out of five years. When out of these five years are taken the periods devoted to fever and other circumstances trenching upon a considerable part of the thirty-six months, and that he had to work below the surface some 20 ft. down to the ancient water-bed, and to contend, not only with miasma and fever, but with many obstacles and privations, it is fortunate he has discovered as much, and so much of a remarkable character. In 1877 Wood published his well-known work, 'Discoveries at Ephesus, including the Site and Remains of the Great Temple,' in octavo, with numerous illustrations.§ As was said of it at the time, 'No one will read this book without a lively interest in its graphic descriptions, and a feeling of respect and admiration for the indomitable perseverance of the author, and for the healthy, manly, unaffected tone which pervades his narrative.' Moreover, in it he refers to the valuable assistance he and his labourers experienced from the care and attention bestowed upon them by Mrs. Wood. At the Society of Biblical Archaeology, on February 6, 1878, he read a Paper 'On the Antiquities of Ephesus having relation to Christianity, the Sejour of St. Paul in that City, the Tomb of St. Luke, &c. In this year he resigned his membership of the Institute, and thereupon was elected an Honorary Fellow. In July, 1882, finding that Government would not aid in further excavations, his friends obtained permission to hold a meeting at the Mansion House to promote the resumption of the work. It was expressed that 12,000l. spent on the previous labours was nothing to the amount expended by the Germans at Olympia. A public subscription was proposed. Another meeting was held at the South Kensington Museum.¶ A sum, moderate in amount, was raised, and with it he worked at Ephesus. In June, 1883, Mr. Ferguson, having read a Paper at the Institute, 'The Temple of Diana at Ephesus, with especial reference to Mr. Wood's discoveries of its remains,' he replied to it by one on June 9, 1884. Both papers are in our 'Transactions.' Towards the end of 1884 he wrote for the *Builder*¶ an 'Account of the early works, and of the excavations carried on by the private subscriptions,' which had been raised under a committee, from March, 1883, to February, 1884, by which he was enabled to explore the portico surrounding the Temple area; and giving his modifications of his plan. A fund was proposed for further works, Sir John Lubbock being the hon. treasurer.** Last year Wood lost his son, his only child, by fever, while practising as a civil engineer in Spain, which appeared to his friends to tell

upon his health, and may have hastened his decease.†

Mr. Ernest C. Ayton - Lee.—We also regret to have to record the death, on the 29th ult., of Mr. Ernest Claude Ayton-Lee, better known by his old name of Ernest C. Lee, at the early age of forty-four. Mr. Lacy W. Ridge, writing of him in the *R.I.B.A. Journal*, says:—"Among the students of a generation who have now passed well into middle life, he was conspicuous for his ability and originality as designer and draughtsman. He gained both the Pugin Travelling Studentship and the Soane Medallion in 1870. When the Gothic revival was at the top of its tide, he came under the influence of William Burges; and, like him, brought great care, genuine enthusiasm, and a quaint power of design to bear on the study and development of architectural detail and ornament. The studies which he earnestly pursued himself he endeavoured to commend to others, and he was among the first promoters of the 'Architectural Association Sketch-book,' and almost the founder of the Colour-decoration Class. He became in turn President of the Class of Design, and ultimately of the Association itself. The influence given by this position he used to promote the welfare of the Architects' Benevolent Society. He built, and rebuilt after fire, the parish Church of Whitechapel. He erected churches at Brentwood and elsewhere; also Berechurch Hall, near Colchester, for his uncle, Mr. O. E. Coope, the late member for Middlesex, as well as many other works. A professional career so well begun was not destined to be long. He was elected an Associate of the Institute in 1869 and a Fellow in 1881. Ill-health necessitated retirement to the bracing air of Ramsgate, and to-day 'Goths' and 'Picts' mourn the loss of a talented professional brother and a genial friend." From another source we learn that Mr. Lee was born on April 17, 1845. In 1864 he was articled to Mr. R. W. Edis. In 1869 he gained the Soane Medallion for a design for a railway station. In 1870 he was elected Pugin Travelling Student. In 1880-81 he was President of the Architectural Association. It was mainly due to his exertions that the A. A. Travelling Studentship was established. Later on he was instrumental in securing the gift of a silver medal by the R.I.B.A. to all Pugin Students. He was one of the five successful competitors in the first (open) competition for the new Dublin Museum buildings. The following buildings were erected from his designs and under his superintendence, viz.:—Church of St. Thomas, Brentwood, Essex; Church of St. Paul, Bentley, Essex; Church of St. Mary, Whitechapel (two churches, the first of which was destroyed by fire in 1880); Church at Collier Row, Romford, Essex; and a church at West Greenwich. He restored the Church of St. Andrew, Hornchurch, Essex; and the Churches at Dagenham, Essex, and St. Mary, Iford, in the same county. Among his miscellaneous works are the following:—St. Matthew's Mission House, Westminster; schools at Barrow-Furness (in conjunction with Mr. H. Curzon); schools at Brentwood, Essex; bank at Colchester, for Messrs. Round & Green; Berechurch Hall, for the late Mr. O. E. Coope, M.P.; Gower's-walk Free Schools, Whitechapel; The Grange and cottages at South Weald, Essex; houses at Kedbrook-park and Maida-vale; vicarage at Bentley, Essex; vicarage at Horsell, near Woking; house at Bentley, for Mr. E. W. Matthews; houses at Brentwood, for Captain Cole; and houses at Shere, Surrey. In 1887 he added his original family name of "Ayton" to that of "Lee." His remains are interred in Teddington Cemetery.

The Rev. Prebendary Searth, F.S.A.—The death is announced of the Rev. Prebendary Searth, F.S.A. He died at Tangier on the 5th inst., whither he had gone for the benefit of his health. He was in his seventy-sixth year. Mr. Searth was one of the oldest beneficed clergymen in his diocese, having entered it so far back as 1841, when he was presented by the Duke of Cleveland to the important living of Bathwick. Here he laboured for thirty years. In 1871 he retired to Wroughton, hoping in the greater ease and tranquillity of a rural parish to devote more time to those antiquarian studies and researches in which he took such delight, and which had brought him not simply national, but European fame. His genial manner and his great knowledge of Roman antiquities rendered him a welcome visitor at archaeological congresses. His death will be deeply regretted by all who knew him.

* *Builder*, 1874, vol. xxxi. p. 160.

† Sir C. Newton gave a lecture in 1874 on the discoveries.

‡ R.I.B.A. Annual Report, 1875.

§ Reviewed in the *Builder*, vol. xxxv. p. 171. Many views of Ephesus were taken, and published 1870, with a catalogue edited by the late Mr. E. P. Pullan.

¶ The *Builder*, vol. xliii. pp. 138 and 700.

** 1885, vol. xlviii. p. 2.

*** The *Builder*, 1882, vol. xliii. p. 675, gives 'Characteristics of Ephesus,' by Shaftesbury; and 1889, May 4, vol. lvi. p. 535, 'Architectural Remains of the Archæus Temple of Artemis at Ephesus,' by Mr. A. B. Murray, reader at the Hellenic Society.

* Reported in the *Builder*, vol. xxix. pp. 860, 610.

† *Athenæum*, March 8, 1873.

Illustrations.

THE NEW PALACE OF JUSTICE, ROME.

IN 1887 the Italian Government opened a competition for the erection of a Palace of Justice, which was won by Prof. William Calderini. The area on which this edifice will be built is in the prati di Castello, to the east of Castle S. Angelo, opposite the new bridge Umberto I.

The works, which were commenced last year, are being continued rapidly, and besides the excavations which have been executed on the vast area, in order to lay the foundations, the extensive platform of concrete, on which the edifice is to be raised, has already been completed.

The building will contain the following departments:—1. A basement floor, inwardly communicating with the ground-floor, which is accessible on all sides to carriages for prisoners and witnesses, and for the general business or trade traffic of the building. 2. The ground-floor, containing the Corti d'Assize, the Pretura Urbana, and the Sezione del Tribunale Correzionale, and the Ufficio del Registro. 3. The first floor, in which will be the Corti di Cassazione and di Appello, the principal hall for general meetings, and the library of the Corti and of the Publico Ministero. 4. A special staircase will be constructed to communicate with the two courts independently from the other entrances. 5. The second floor will contain the Tribunale Civile, the Tribunale di Commercio, the Consiglio dell'Ordine degli Avvocati, and the Tribunal of discipline for the Procuratori, and the Biblioteca delle Autorità Giudiziarie. 6. The entresols will be used as Chancery offices, archives, &c. 7. Eight large courtyards will be provided for air and light; of these, the four central ones will be 50 metres in length and 23 metres in breadth.

The whole edifice will be mainly built of bricks, but it will be faced with travertine marble up to the windows of the ground-floor, and the rest of the decorations will be in cement. The ceilings of the portico and of the principal halls, as well as the architectural and ornamental decorations in the Palace, will be of brick, covered with fine plaster. The pavement of the basement will be of asphalt and peperino stone, where carts or wagons will have to pass; the other floors will be paved in the so-called Venetian manner. The steps on the outside will be of Travertine marble; those in the palace itself of Tuscan pietra serena, while the principal staircase will be entirely of Carrara marble.

The architect has evidently aimed at giving to the design the stern and severe character which is best suited for the architectural treatment of a Palace of Justice, and the scale of the building is so large that it will assert its importance even by the side of the great neighbouring mass of the Castle of St. Angelo; and on the whole it may be said to be, in its severe dignity of style, a modern building not unworthy of its site and surroundings.

PRESBYTERIAN CHURCH, NORTH DULWICH.

ABOUT four years ago an effort was made to organise a congregation for service according to the Presbyterian ritual, and there being a large number of Presbyterians in and near Dulwich, the matter was warmly taken up, and by the exertions of the energetic minister, the Rev. Rupert Patterson, a regular service was organised in a temporary building, and funds collected for a permanent structure.

An excellent site has been secured on the Dulwich College Estate, at the corner of Townley-road and East Dulwich-grove. Plans have been prepared by Mr. Charles Barry, architect, as here illustrated, to accommodate about 500 worshippers, at an estimated cost of 5,200*l.*, including not only a church, but large lecture-hall, class-rooms, vestry, &c. Funds have been collected or promised sufficient to proceed with the erection of the church, and this will be immediately commenced.

HOLY TRINITY SPIRE, COVENTRY.

THE view of this spire, one of the famous three, is from a sketch made by Mr. C. E. Mallows on his tour as Pugin Student.

The sketch was made from the roof of the north aisle of St. Michael's Church, some portions of which form an effective foreground.



LODGE, GUARDS' CORNER, DITCHAM PARK.

THIS lodge has a plinth of red bricks, the upper part being entirely composed of timber and concrete panels, with a roof of Broseley tiles. The architect was Mr. Walter F. Cave, and the builders were Messrs. J. Simpson & Son.

GUY'S HOSPITAL COLLEGE.

THIS building has been erected from plans prepared by Messrs. Wood & Ainslie upon a site in the immediate neighbourhood of Guy's Hospital, with the view of providing suitable residential accommodation for about forty students and fourteen officers of the medical school connected with the hospital.

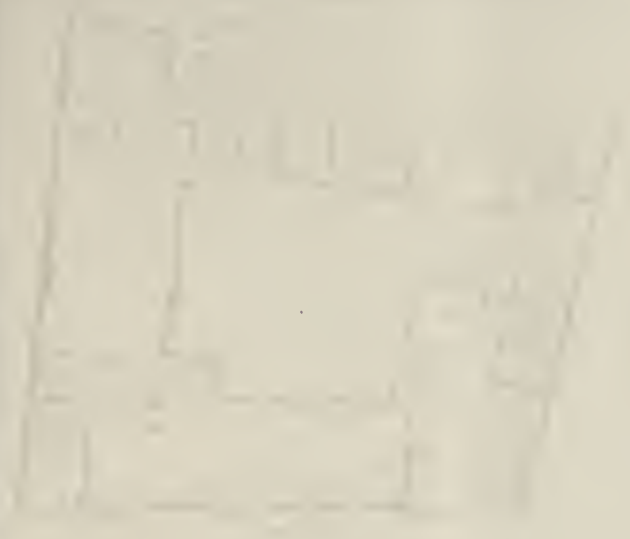
The scheme is based upon the life in vogue at our old universities. A set of two rooms, or a bed and sitting-room combined, is provided for each resident, and also a smoking-room, read-

ing-room, and dining-hall with lavatories, kitchens, and offices for the use in common of the members of Guy's Hospital Students' Club and the residents in the College. A gymnasium (not shown on the plans) has, through the generosity of a member of the medical staff, been constructed under the courtyard.

A subway connects the college with the hospital for the convenience of those engaged on night duty in the wards. The basement contains bath-rooms, and accommodation for the house-keeper and servants in charge of the institution.

The building, satisfactorily completed under the superintendence of Mr. Powell as foreman and Mr. Abbott as clerk of works, was formally opened on March 26 by the Right Hon. W. E. Gladstone.

Messrs. Shillitoe & Son, of Bury St. Edmunds, were the general contractors. Messrs. Berry & Sons, of Westminster, executed the oth cooking apparatus and hot-water work, and Messrs. Clark, Bunnett, & Co., the hydraulic lifts throughout the building.





Church Street
Lavenham.

Wayside Notes in
Lavenham Streets



Church St
Lavenham.



Church Street.

Barn Street



Prentice St

John S. Corder, 89.

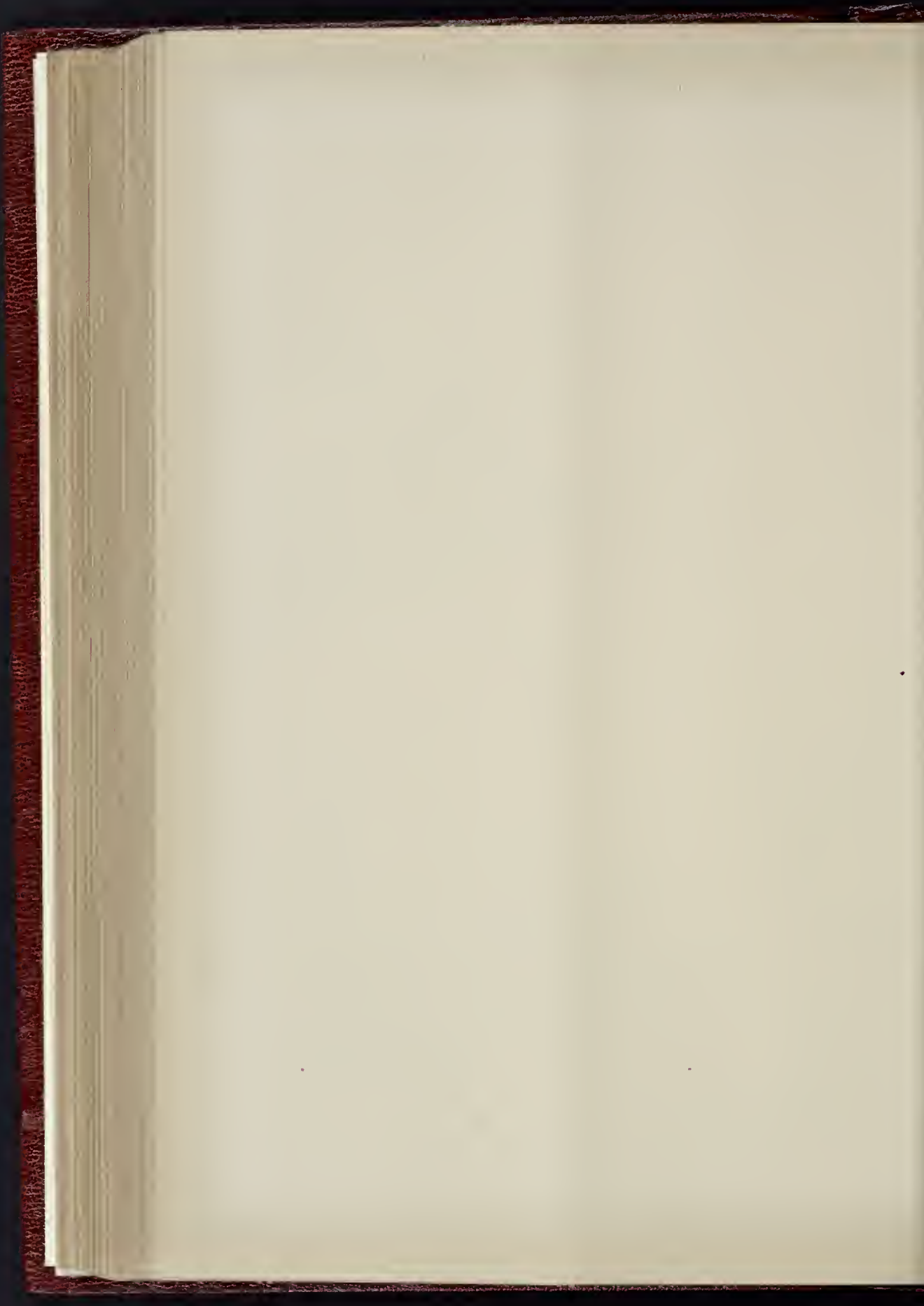
East Anglia

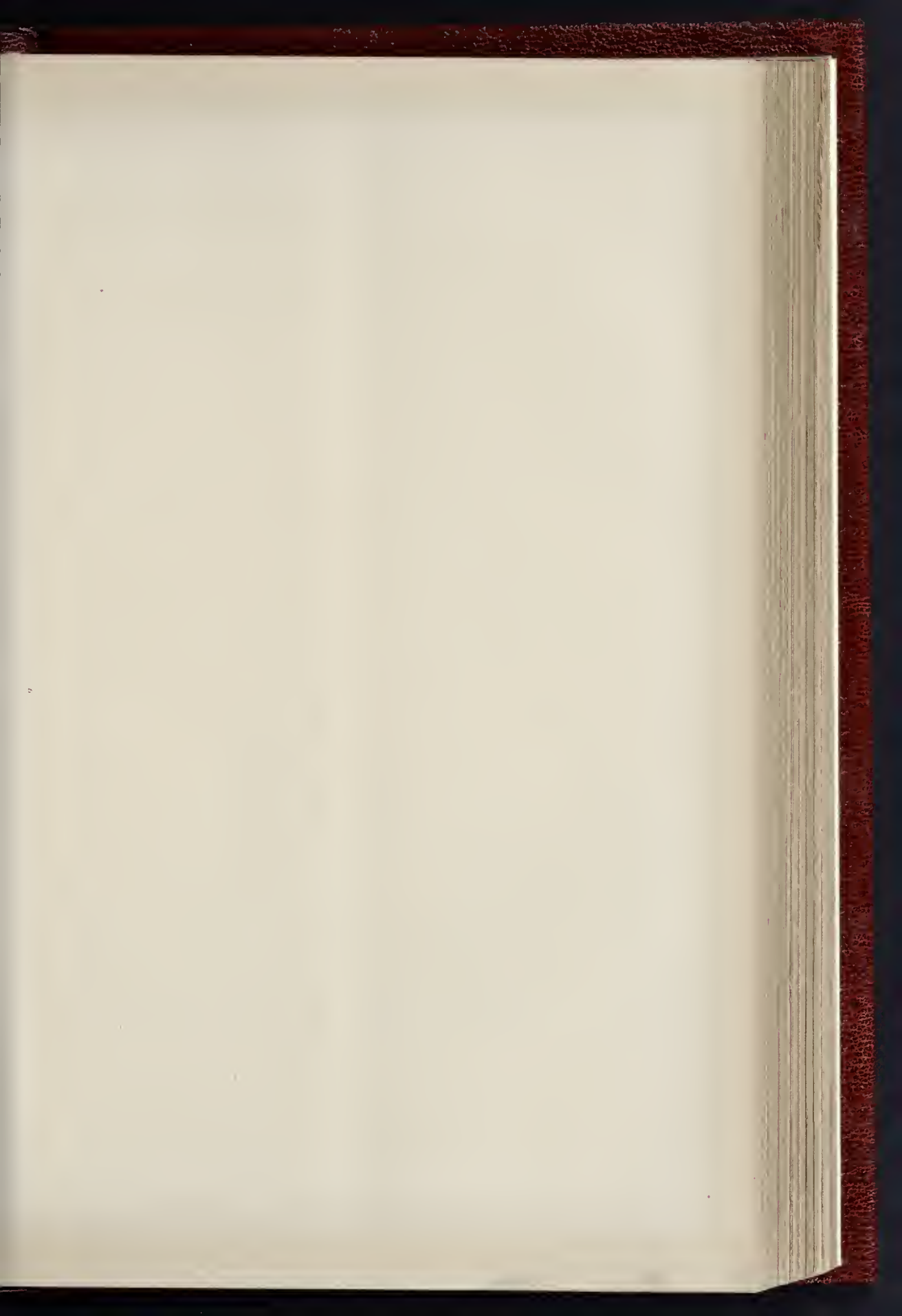
by John Shewell Corder

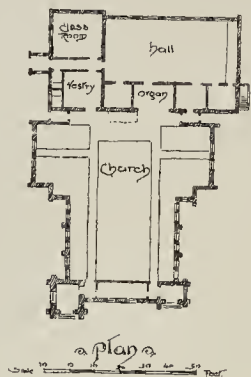


John S. Corder

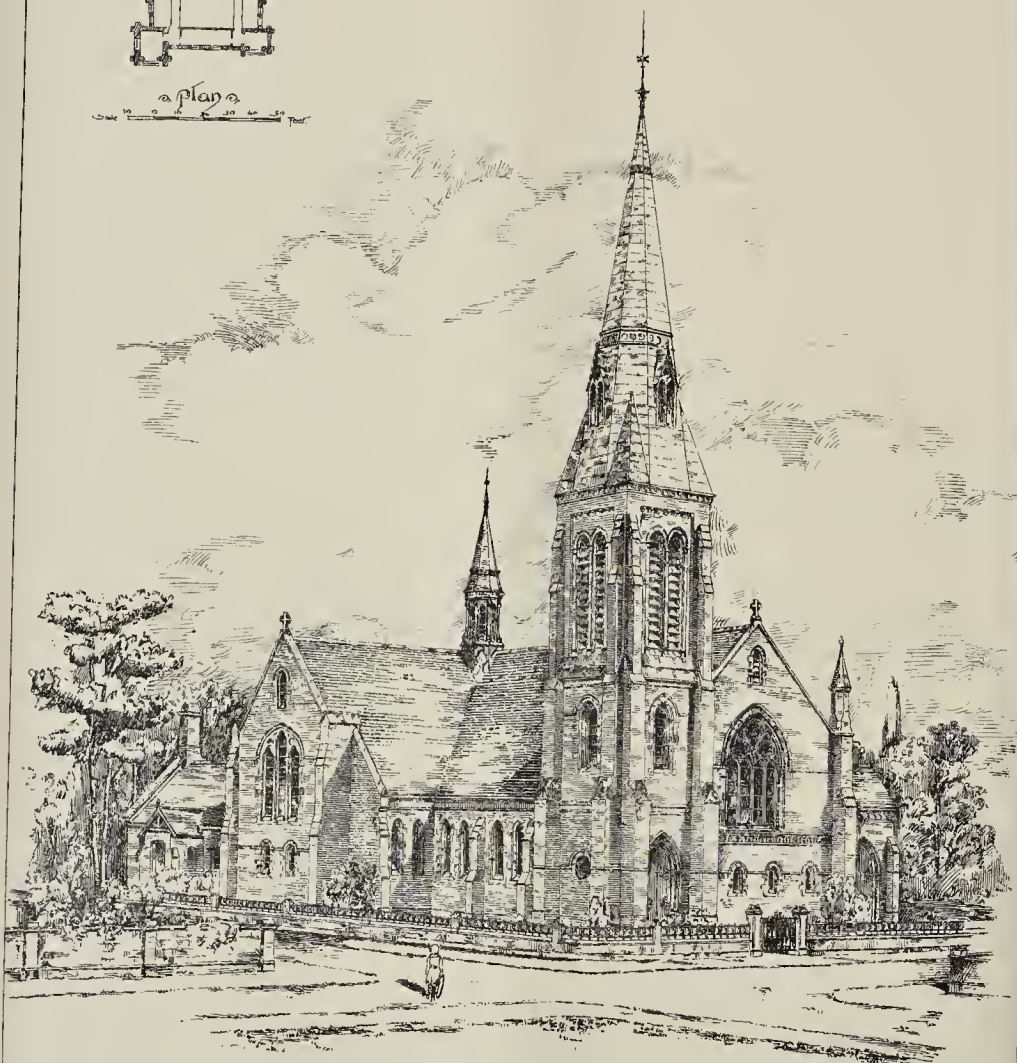
Lady Street



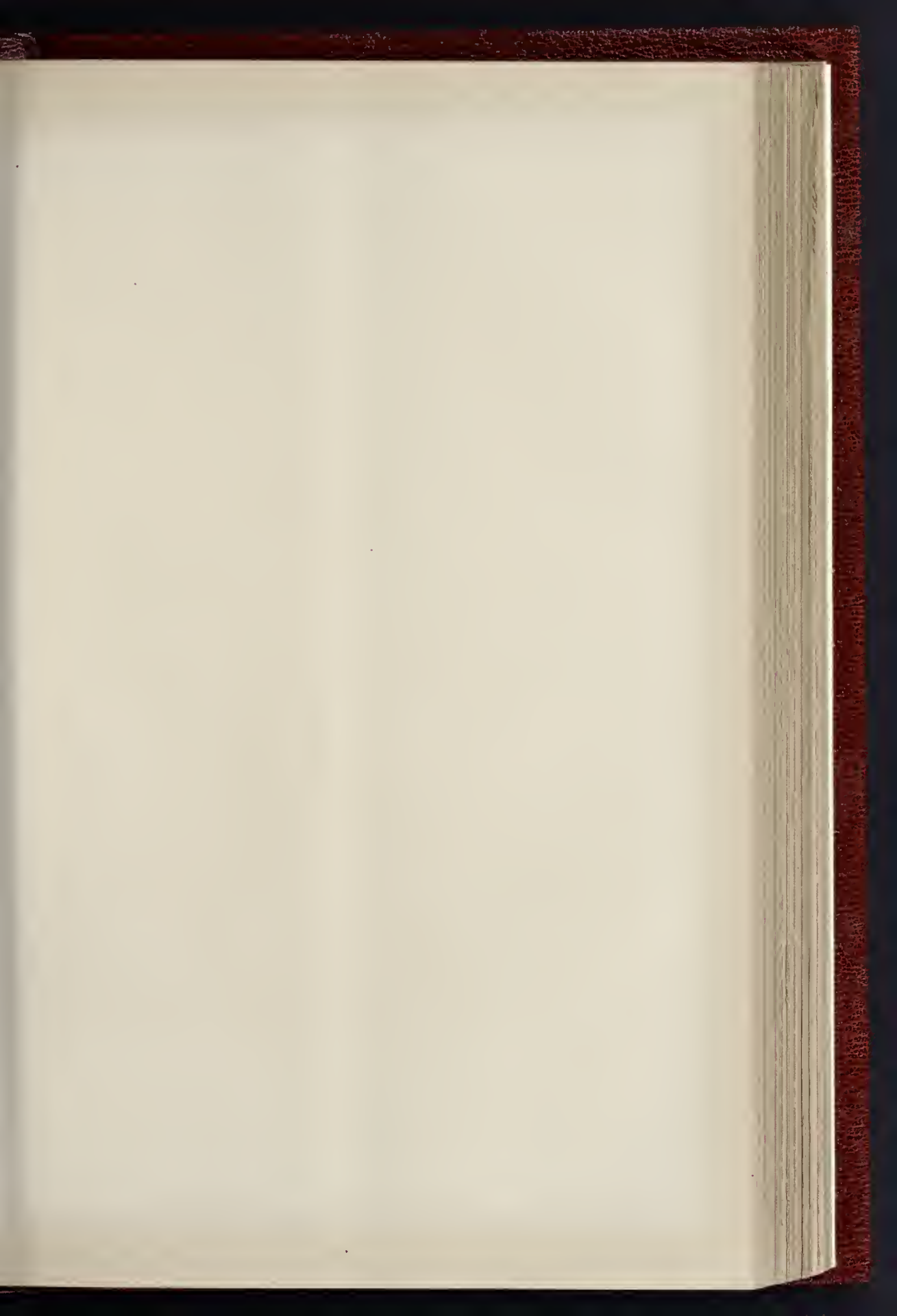




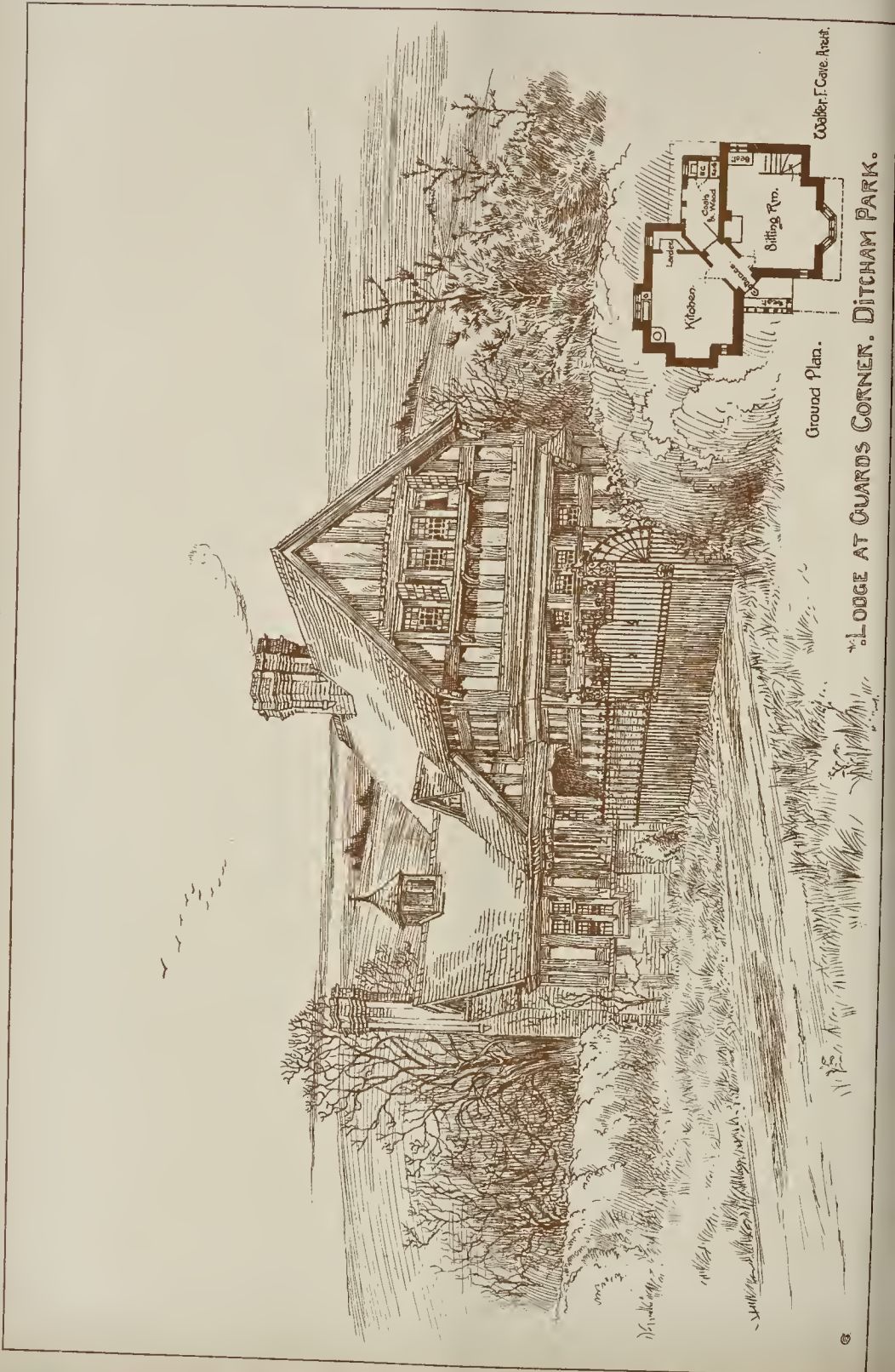
Christ Church - North Dulwich
- Presbyterian - Church -



Charles Barry
Architect



THE BUILDER, APRIL 12, 1890.

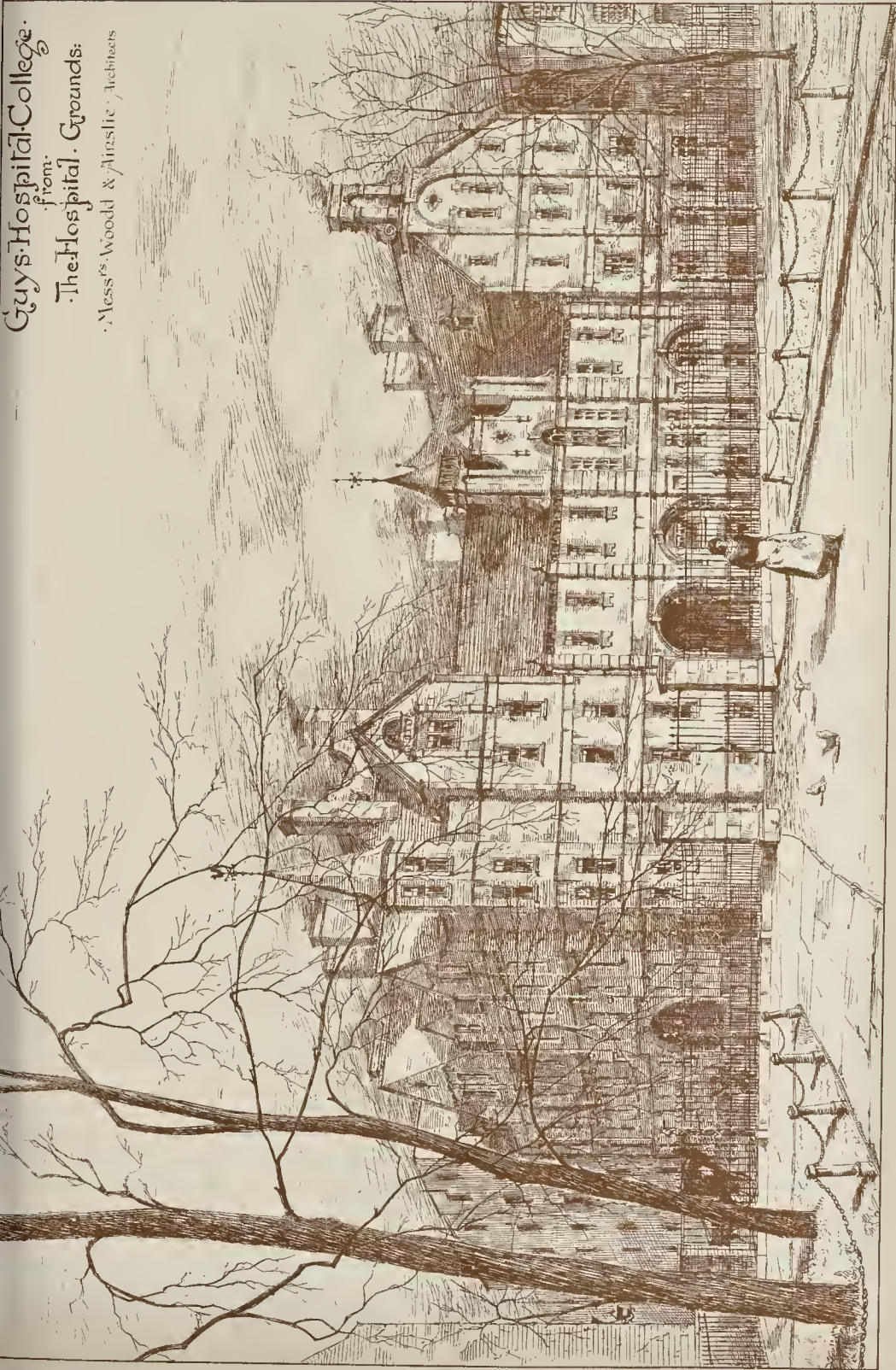


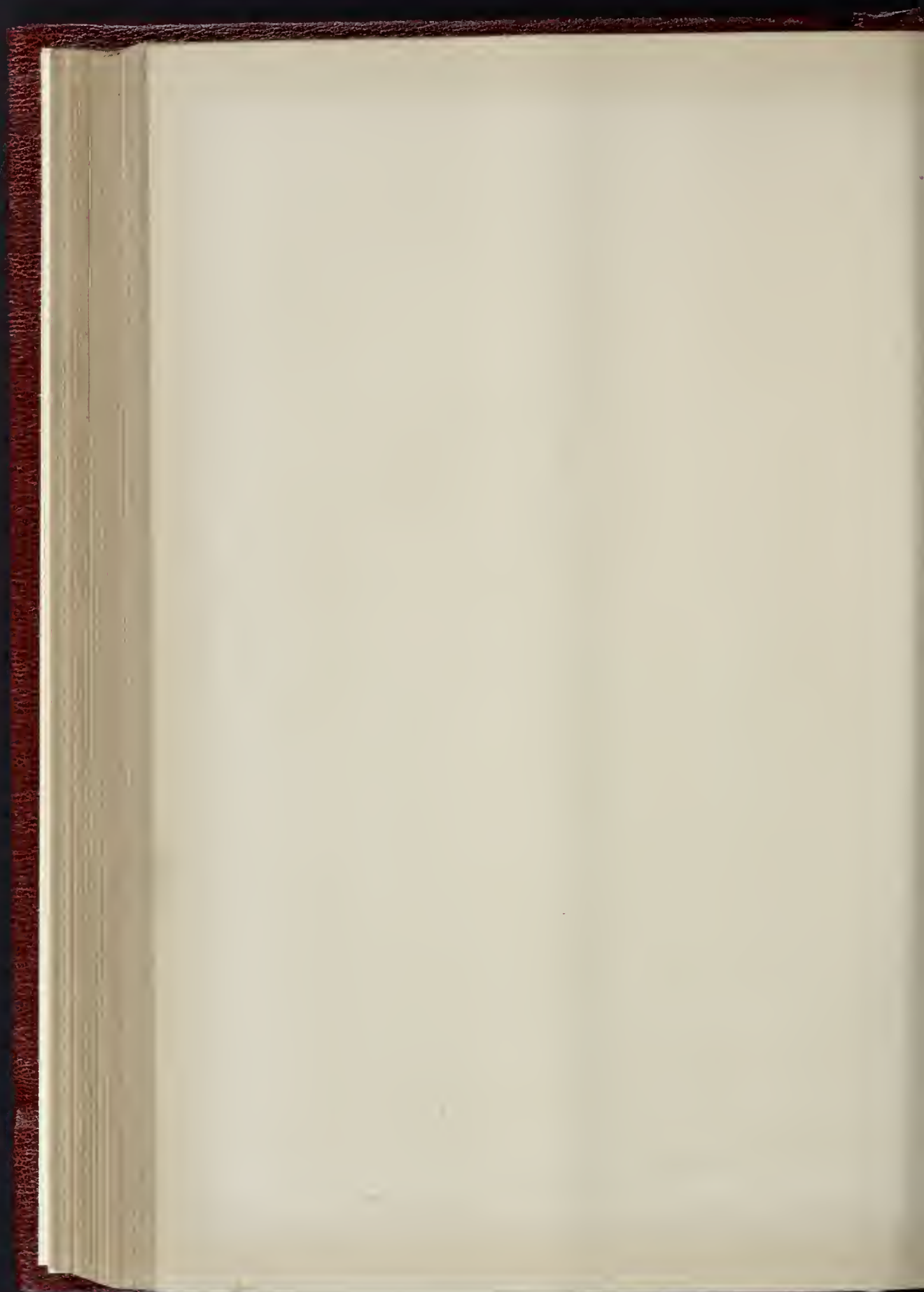
Walter F. Carré, Archt.

Ground Plan.

LODGE AT GUARDS CORNER, DITCHAM PARK.

Guys Hospital College.
from
The Hospital Grounds:
Messrs Wood & Ainslie Architects



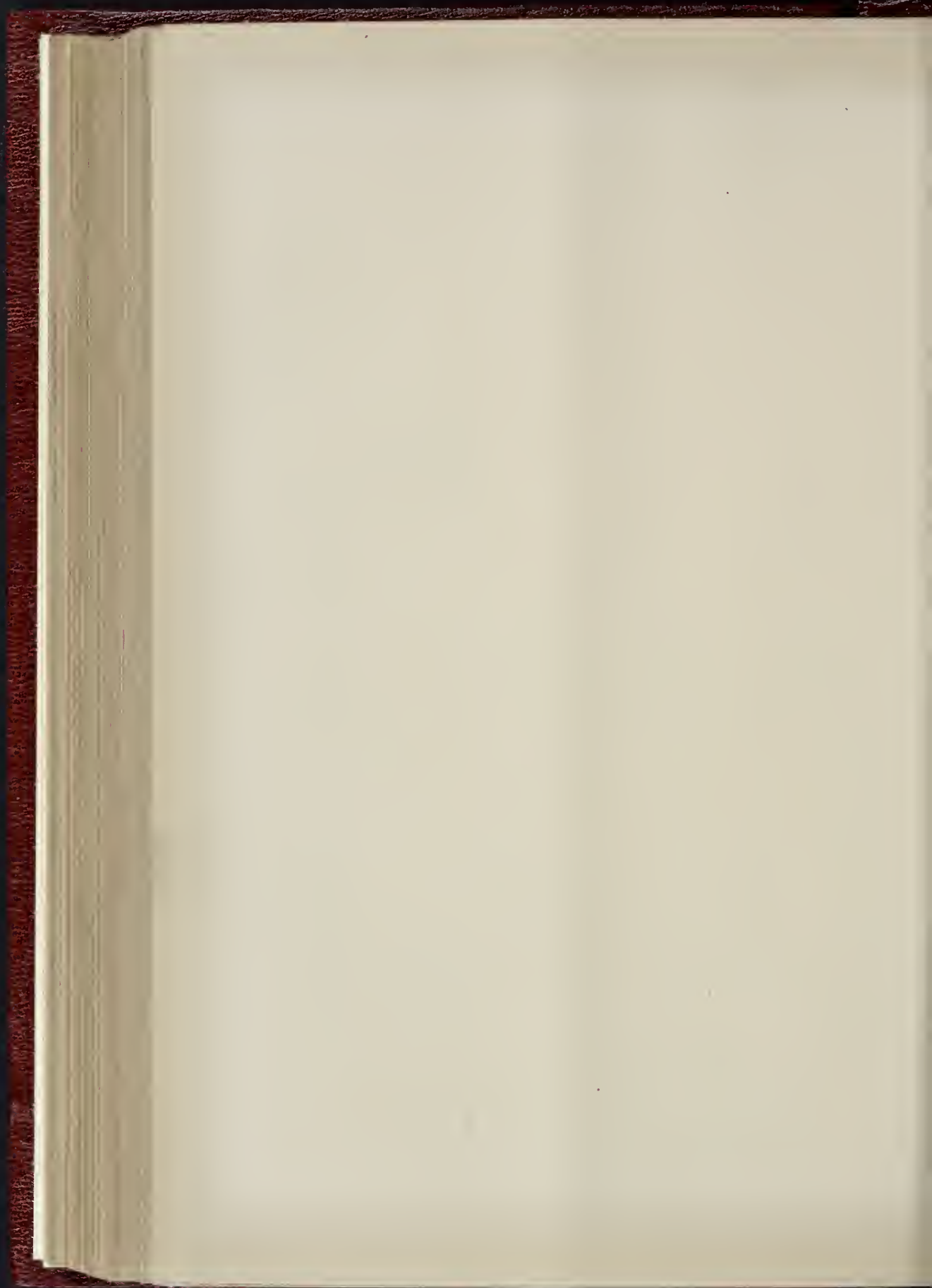


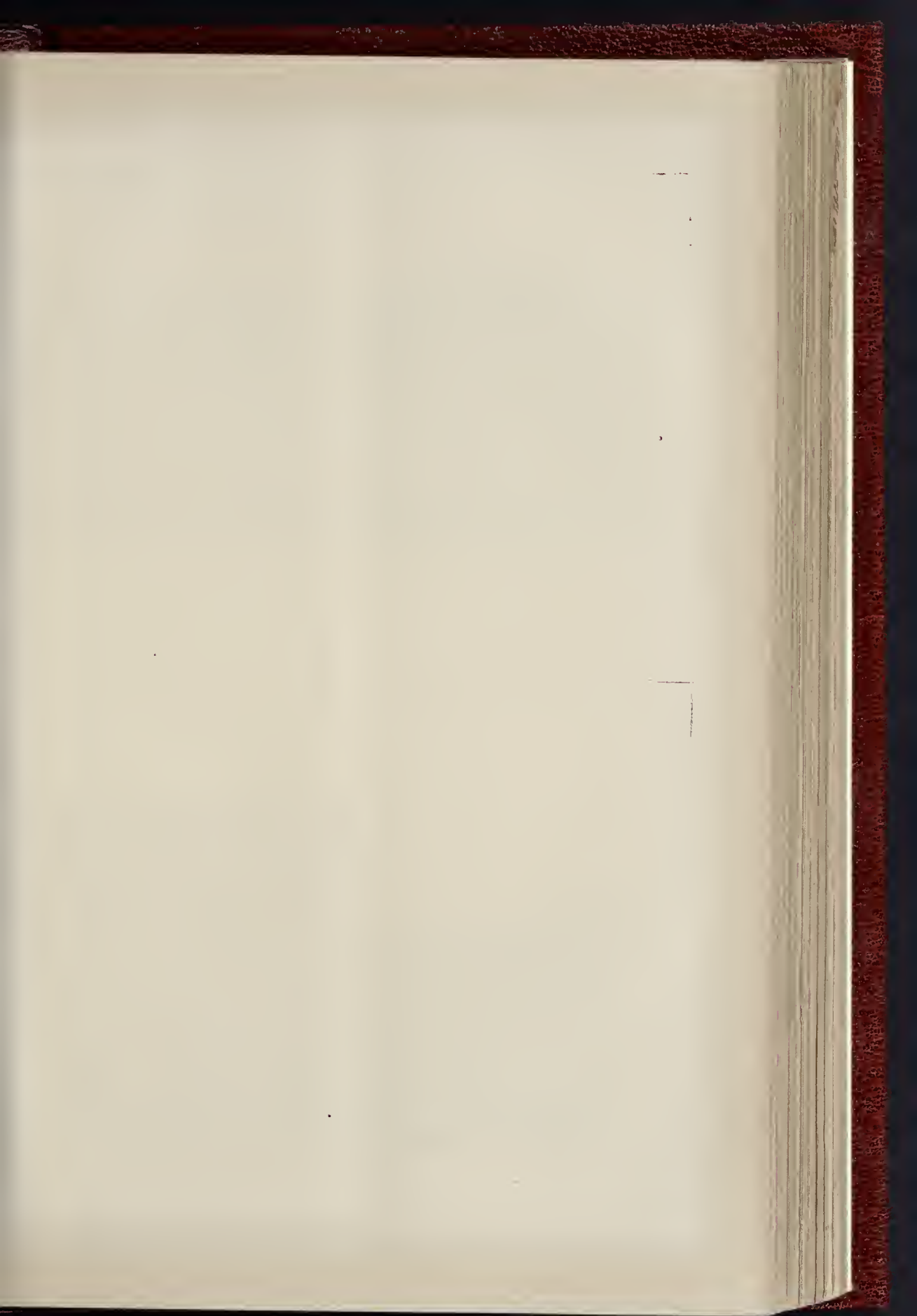


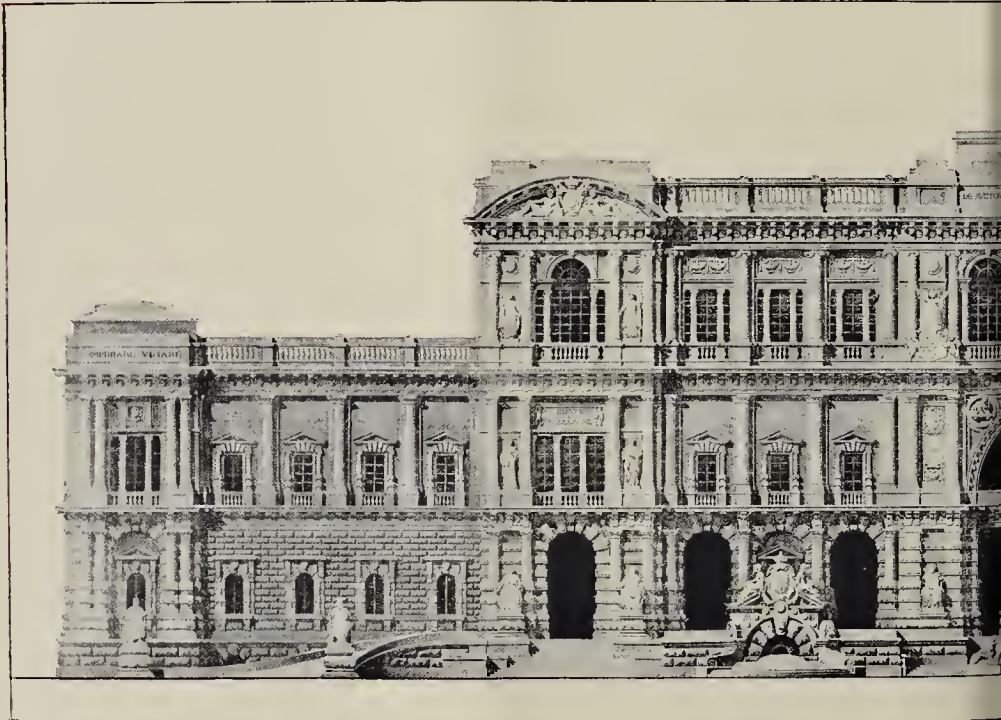
HOLY TRINITY
TOWER, COVENTRY.

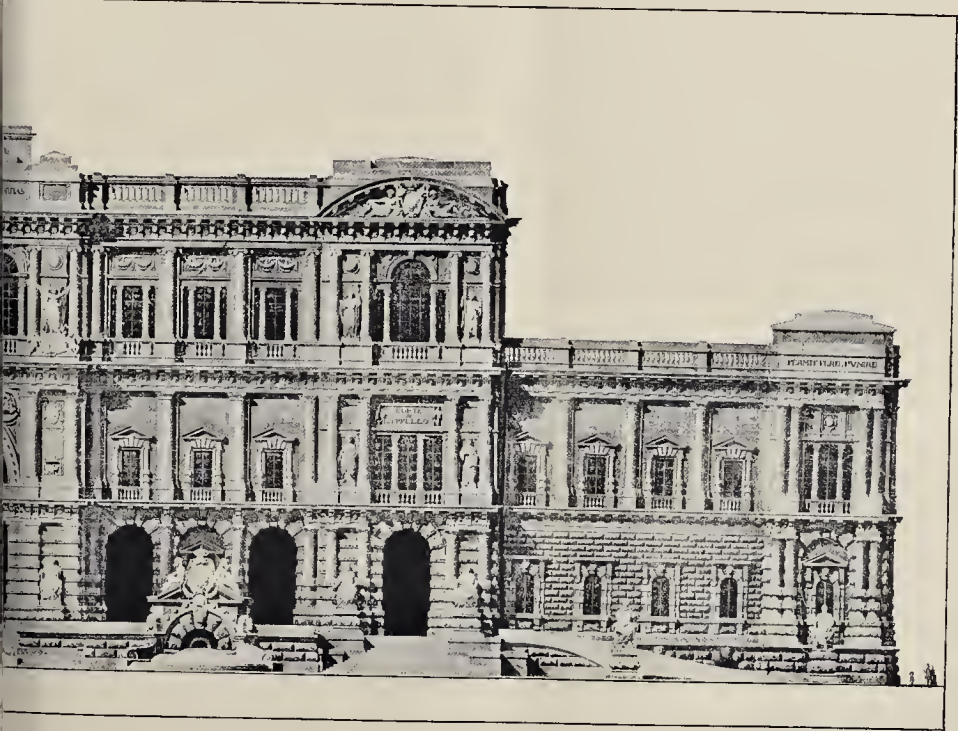
PHOTO LITHO. SHIRAZ & CO. 22, MARTIN LANE, CANNON STREET, LONDON, E.C.

HOLY TRINITY TOWER, COVENTRY.—FROM A SKETCH BY MR. C. E. MALLOWS.



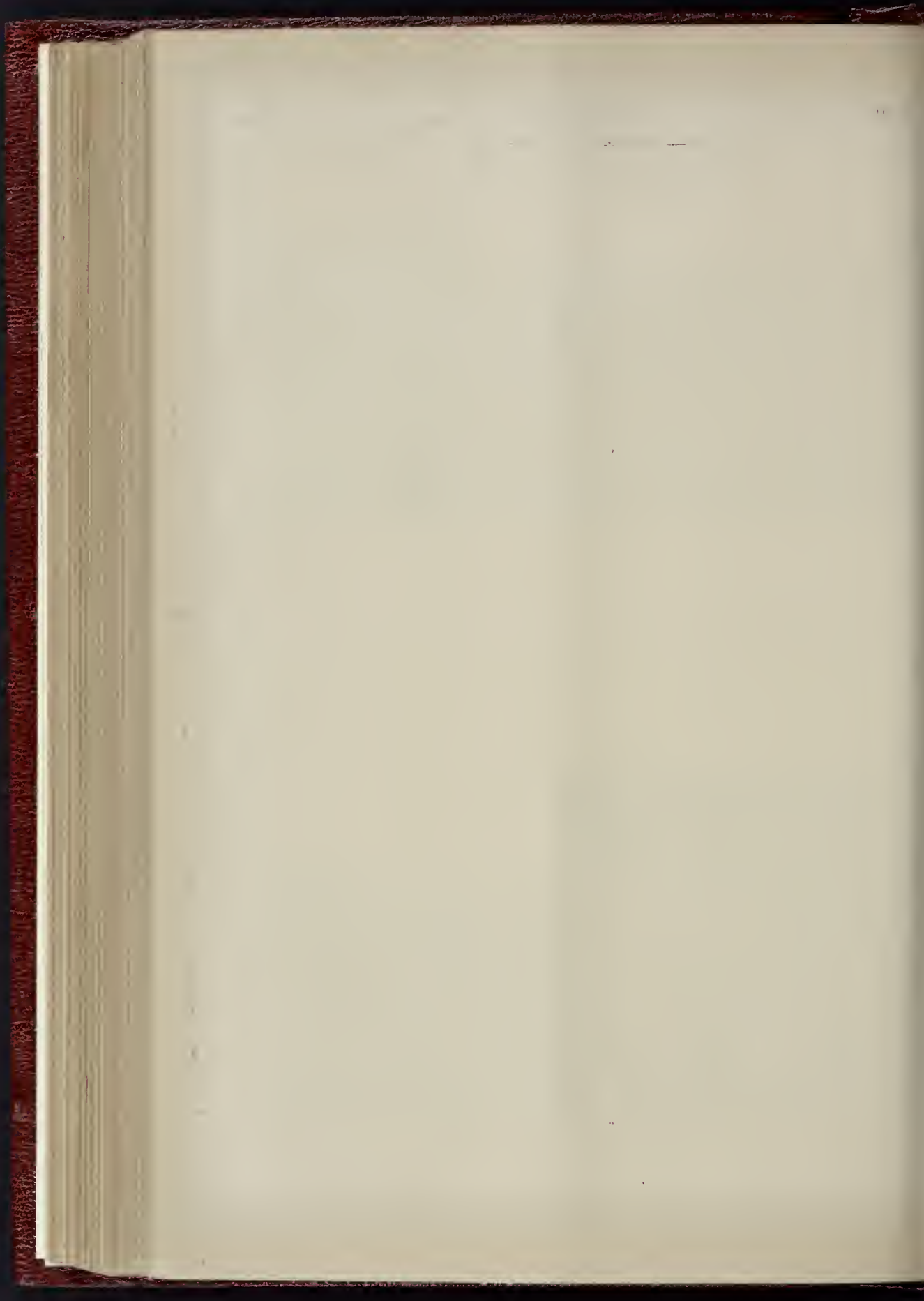






The Phototype Co., 33, Strand London.

PROFESSOR CALDERINI, ARCHITECT.



Red brick has been used throughout for external facings, and the roofs are covered with green Belgian slates.

WAYSIDE NOTES IN EAST ANGLIA:

LAVENHAM STREETS.

IN previous notes on Lavenham I have coated somewhat fully on the circumstances and causes of its rise and prosperity, so shall content myself with a few brief remarks upon the subjects I have depicted. One can but imperfectly realize, unless a visit be paid to the town itself, how rapidly it must have sprung into importance, the construction and design of its buildings exhibiting such a marked similarity. Only here and there we see the out-of-line of jetty-houses broken by the insertion of a red or white brick front, erected in later times by some ambitious owner over the old timber framing, causing a certain disagreeing break in the restful freedom of the old outlines. The houses remain little altered, whilst the undulating nature of the situation (for there are no level streets), combined with the quaintness of the architecture, constitute at every turn views full of picturesque completeness. The ugly sash window has supplanted the original casement, the ledged door has gone down before the four-panel trade mould invention, and the chimneys are crippled and mutilated beyond recognition. All the outlines of the post-and-pan walls and high-pitched roofs remain, whilst the interiors are rich with carved and moulded beams and joists, to the beauties of which the present humble occupants are strangely insensible, unthelssly covering them over with plaster.

The sketch in the centre of the sheet shows a mediæval house almost complete in all its details, excepting that the chimney and the portion to the left have been taken down.

There is a large entrance door, with a smaller one opening in the centre of it, leading into a hall, about 5 ft. wide, running the whole length of the building, with a small door at the end communicating with the garden. From this hall all two Tudor-headed doors, separated by an upright stud, lead into two reception-rooms, and the staircase was placed at the garden end of the hall, and gave access to two rooms overhead, partly in the roof. The kitchen and room over, which would be to the left of the building, have been taken down, and the building is now used as a stable and coach-house.

The overhang is only carried out to the street, and the bay windows, the lower one of which is perfect, finished under the overhanging on each floor. On the ground-floor the small lights above the transom of the bay were continued along the front on each side, after the manner of the Old Guildhall. This house is an excellent example of timber-framed construction, and is worthy of a careful study. The stud-work inside and out, for at this period raftering was unknown. The fireplaces were large open ones, with just a chambered and moulded oak beam over the opening. Doors were simple in construction, being formed of moulded upright boarding nailed to ledges, and hung on wrought-iron band hinges. The floor boards were laid in rebates in the joists, and in the same way as the joists themselves, the back of each joist forming part of the floor.

The value of passages as a means of communication was little appreciated, as we fail to find them in houses of this date, all the rooms communicating one with another. Stairs either went up straight between walls, or were constructed round a centre newel. Balusters had not come into use, the stairs themselves were solid balks cut through diagonally and resting on strong bearers.

Another feature introduced at a subsequent date was the plastering over of the external face, which was largely practised in Elizabethan and Jacobean times, the shrinkage of the clay filling from the oak studs giving an unbecoming access to the weather. The Tudor rose, the fleur-de-lis, and the bishop's mitre, supposed to be in honour of St. Blaize, patron of the wool trade, are frequently to be met with on the Lavenham houses, and on several the rose has six petals, instead of five, as is most usual.

Pentice-street gives a good idea of the hilly nature of the streets. It is the steepest gradient in the town, and the stepping of the houses with the prospect of the open country beyond is a fine subject for an artist's pencil. In conclusion, I would advise those who are interested in old timber construction to visit

this place; they will find much to attract their attention in rambling through the streets, whilst an inspection of the interior of some of the more perfect structures will reveal unsuspected beauties in the shape of carving and moulding which will excite at once their wonder and admiration.

JOHN SHEWELL CORDER.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.

THE monthly meeting of this Society was held at the Montgomery Hall on Tuesday evening last. Mr. F. Fowler, the President, occupied the chair, and there was a good attendance of members, including Messrs. C. J. Innocent, Vice-President; C. Hadfield, Hon. Secretary; J. B. Mitchell-Withers, J. D. Webster, W. F. Hemsoll, J. Smith, J. Fawcett, W. C. Fenton, H. W. Lockwood, J. T. When, J. McInery, &c. Mr. W. Farrington was proposed by Mr. C. Hadfield and seconded by Mr. J. B. Mitchell-Withers for the Associateship.

Mr. Thomas M. Rickman, architect and surveyor of London, read an exhaustive paper on "The Present state of Questions Relating to Quantities." The object of the paper, he remarked, was to enable the Society to discuss the position which the quantities now take in estimates and contracts. Precise definition was desirable to avoid misunderstandings as to materials, designs, and mode of measurement. The variety of terms in use throughout the country, and their derivations, and the changes in design and style of architecture, and in the present purposes of buildings, have all complicated the subject. The custom for architects to prepare quantities for their own works, implied that the preparation of quantities was part of an architect's education. The position of the Royal Institute of British Architects, as regards this practice, had somewhat changed of late. The lecturer described the different duties required of an architect, and enlarged on the value of a surveyor's services as regards the more important class of work. The appointment of the measuring surveyor, once usually made by the builder, was now commonly made by the architect for his client. The appointment of a surveyor, who from his position could insist on justice for both parties, which, in some instances, the architect was unable to obtain, was of great importance. The growing practice of making the quantities part of the contract was considered, and the arguments on both sides of the question. The present position of the Builders' Institutions, and of those of architects and surveyors with reference to the appointment of quantity takers, were explained, and the extent of responsibility resting with the supplier of quantities considered. The report of the committee appointed by the Conference of Architects held in London in 1871 was given in detail. The position of architects supplying quantities for their own works was gone into by the lecturer, who pointed out the special difficulties which they must encounter in the settlement of accounts, which had led the committee before mentioned to recommend that quantities so supplied should form part of the contract. The complications arising from a course occasionally taken of throwing on the builder the onus of testing the quantities so furnished, and the consequences to the employer from the insertion of such a clause, were obvious. In conclusion, Mr. Rickman recommended a uniform system of measurement, and the diffusion amongst employers and their solicitors of a larger amount of knowledge as to the bearings of all these questions upon their own interests. An interesting discussion took place, and on the motion of Mr. Innocent, seconded by Mr. McInery, and supported by Messrs. C. Hadfield, J. B. Mitchell-Withers, W. C. Fenton, H. W. Lockwood, and the President, a hearty vote of thanks was awarded to Mr. Rickman for his paper.

Window, Ranmoor Church, Sheffield.—We find that the design for the window by Messrs. Shrigley & Hunt, published in our last, is not, as we supposed, the one executed, but was a design submitted in competition. The actual window placed in the apse of the church was executed by Messrs. Heaton Butler & Bayne from a design by Mr. G. Moore McDowell.

THE INSTITUTION OF CIVIL ENGINEERS:

LOUGH ERNE DRAINAGE.

AT the sixteenth Ordinary Meeting of the Session, on Tuesday, March 18, Sir John Coode, K.C.M.G., President, in the chair, the Paper read was on the "Lough Erne Drainage," by Mr. James Price, jun., M.Inst.C.E.

The physical characteristics of the Lough Erne district, comprising 1,056,160 acres, were first described, and the various schemes proposed at different times for effecting the drainage of the district, without lowering the navigation level, were referred to. The works which had been carried out were designed by Mr. James Price, sen., M.Inst.C.E., in 1878, and consisted in cutting a channel through a rocky barrier at Belleek, on the River Erne, below the Lower Lough Erne; controlling the discharge through this channel by large sluice-gates; and improving the channels above Belleek and between the two lakes. The sluice-gates, when closed, retained the water at its normal summer level; whilst the raising of the gates, on the first intimation of heavy rain commencing in the upper districts, enabled the large water-surface, of 27,643 acres on the lower lake, and 9,453 acres on the upper lake, to be drawn down 6 inches, so as to make provision for a flood in anticipation of its arrival, and thus prevent the flooding of the adjacent lands. The works were commenced in 1882, at the lower end, and the sluices were completed in September, 1883, the upper works being subsequently carried out. The channel at Belleek was excavated under the protection of clay dams; and the upper channels were mainly improved by dredging. The four sluice-gates* designed by Mr. F. G. M. Stoney, M.Inst.C.E., sliding against a train of 8-inch live rollers, were 29 ft. 2 in. wide and 14 ft. 6 in. high, and capable of being raised 9 ft., and had been working most satisfactorily for the last six years. Each gate weighed 13 tons, and could be easily raised by one man to its full height in forty-five minutes; or the four gates could be lifted simultaneously by a turbine in half-an-hour. Their total cost, exclusive of masonry, was 4,000*l.* Large compensation had to be paid for anticipated injury to the fishery-rights, though the works had actually improved the salmon fishery. The total cost of the works was 180,000*l.*, of which 30,000*l.* was for navigation and 150,000*l.* for drainage. The author was the Resident Engineer for the whole of the works, and the lower works were carried out under his supervision; whilst the works between the lakes, and in the upper lake, were executed by contract. Observations of the rain-fall, lake-levels, and sluice-discharges, for the years 1885-88, had been put in the form of a diagram. Allowance had been made for a discharge of 600,000 cubic feet per minute, of which 400,000 cubic feet had been provided for by enlargements of the channels; but it appeared from the diagrams that, owing to the power of anticipating a flood by means of the sluices, a discharge of 500,000 cubic feet per minute would have sufficed to prevent flooding, without unduly lowering the navigation level of the lakes. The Erne diagrams showed how little the storage in the lakes affected the summer flow, and indicated that the great store for the summer yield of a river was the ground-water. The general effect of the Erne drainage had been to render the water-level of the lakes more uniform—higher in summer and lower in winter. The bad effects of the flooding, during a wet summer, of the extensive flat lands bordering Lough Erne, which extended in an unbroken sheet of water for fifty miles, were not confined to the loss of the year's crop of grass, for the decayed grass affected the next year's hay crop; whilst large tracts of undrained land, by exposing large surfaces of spongy grass to evaporation, chilled the air, preventing or delaying the ripening of corn; and the damp chilled air, mixed with the products of decaying vegetation, fostered disease. In some cases, occasional flooding might be beneficial to land, owing to the manurial qualities of the flooded deposits; and sluices enabled such flooding of flat lands to be effected for short periods, at suitable seasons.

The author advocated the following general principles in designing drainage works:—(1) That the cross section of the enlarged channels should be hyperbolic instead of trapezoidal, increasing the discharge in proportion to the

* *Engineering*, September 19, 1884, Vol. xxxviii, pp. 268-270 and 272. *The Engineer*, September 19 and October 10, 1884, vol. lviii, pp. 218 and 222-224.

section, obviating slips by flattened slopes next the land, facilitating dredging, and confining the low-water-channel so that the sides could be cleaned; (2) that the channels should be given a fall of only 1 ft. or 2 ft. per mile, with embankments and back drains where necessary, and accumulating any excess of fall at certain points where the discharge might be effected along paved channels. Embankments were generally avoided in Ireland; but it was clearly a mistake to lower a large river in order to preserve a small area of land from flooding. Though not applicable to the Erne, embankments should be used for the Barrow drainage. The extension of arterial drainage in Ireland would render large areas of land available, and would raise the mean summer temperature, which at present was only 53 deg. Fahr. Amended laws, however, would be required for carrying out any large drainage works in the future, and the initiation of the schemes could no longer be left to the landowners who, under their altered conditions of tenure, had lost their former interest in the improvement of their estates.

THE BARRY DOCK-WORKS.

At the eighteenth ordinary meeting of the session, on Tuesday, April 1, Sir John Coope, K.C.M.G., President, in the chair, the paper read was "On the Barry Dock-works, including the Hydraulic Machinery and the Mode of Tipping Coal," by Mr. John Robinson, M.Inst.C.E.

Barry Dock was situated on the north shore of the Bristol Channel, between Barry Island and the mainland of Glamorganshire, seven miles in a direct line south-west of Cardiff. The site chosen for the dock occupied the eastern portion of the channel which formerly ran between the island and the mainland. An Act of Parliament to authorise the construction of the dock, and the railways connected therewith, obtained the Royal Assent on August 14, 1884. The undertaking comprised a tidal basin of 7 acres, a dock of 73 acres, and a timber-pond of 24 acres. The entrance to the dock was at the eastern end of the island, under the shelter of the high land of Nell's Point. This excellent natural shelter was supplemented by two outlying converging breakwaters. The tidal range was 36 ft. at ordinary spring-tides, increasing to 40 ft. at extraordinary springs; and 19 ft. 6 in. at ordinary neaps, diminishing to 16 ft. at extraordinary neaps. The dock was not fed with water from any river. The width of the entrance between the masonry walls was 80 ft., and gave access to the basin. In the entrance was placed a single pair of wrought-iron gates, and the dock not being exposed to heavy seas, there were no gates pointing outwards. The passage between the basin and the dock also had a width of 80 ft.

The dock was 3,400 ft. in length, the maximum width being 1,100 ft., divided at the western end by a mole into two arms, the full width being left at the eastern end for a length of 1,600 ft., where vessels of the largest class could swing. The bottom of the dock, which was not puddled, was 20 ft. below mean sea-level. The mole was 1,300 ft. in length and 200 ft. in width, with pitched slopes of $1\frac{1}{2}$ to 1 on the north side, and of 2 to 1 on the south side. Along the northern side of the dock were eleven high-level tips, and on the northern side of the mole were three low-level fixed tips, and masonry towers for two others had been built. Two more low-level tips were stationed on the south side of the dock, and one at the western end. To prevent the basin and docks being flooded whilst the temporary stone dam was removed, a caisson was erected, which could be used for future requirements.

The breakwaters were formed of rubble excavated from the basin and railway cuttings, and the sea slope was protected by blocks of mountain limestone, weighing from four to seven tons each. At the head of the west breakwater there was erected a cast-iron tower, 30 ft. in height, the diameter at the base being 7 ft. 9 in., and at the top 6 ft. 6 in. with a spiral staircase inside. In the tower was placed a fourth-order dioptric occulting white light, visible in clear weather at a distance of ten miles.

The hydraulic power was obtained by means of two pairs of compound horizontal condensing pumping-engines of the tandem type. The boiler pressure was 80 lb. per square inch, and condensing water was obtained from, and returned to, the dock through pipes 15 in. in diameter, by the circulating-pumps. Another

hydraulic engine-house was in course of construction at the north-west end of the dock.

The entrance from the sea into the basin, and the passage between the basin and the dock, were each provided with a pair of wrought-iron gates, having a span of 80 ft. and a rise of 20 ft. There were six sluices in each leaf, having a combined area of 100 square ft. These were worked from the top by direct-acting hydraulic cylinders and pistons. The gates at the entrance were opened and closed by hydraulic power, chains being dispensed with. The water was admitted to a direct-acting hydraulic cylinder, having a piston 2 ft. 5 $\frac{1}{2}$ in. in diameter, and a ram 1 ft. 9 in. in diameter, with a stroke of 25 ft. 9 in., attached direct to the gate, the cylinder being in three parts of cast steel. Trunnions were cast on the cylinders, projecting above and below, and pivoted in saddle bearings, which also had trunnions on their sides, and these pivoted in bearings fixed to the walls of the ram-chamber, thus permitting the cylinder to oscillate both horizontally and vertically. The hydraulic rams were of sufficient strength to resist shocks of waves, and to hold the gates rigidly during movement. The passage gates were worked in the same manner as those at the entrance; but in this case the ram was attached to a radius arm near the top, with a slide against the back of the gate, the other end of the arm working on a pin in the holding-down bracket over the top of the heel-post. As the power required was less, the diameter of the piston was only 2 ft. 1 $\frac{1}{2}$ in., and that of the ram 1 ft. 6 in., with a stroke of 16 ft. 7 in. The cylinder for the passage-gate machine was of iron, cast in one length, and tested to a pressure of 2,400 lbs. per square inch. The ram was also of cast-iron, and the whole machine was arranged in a similar manner to that for the entrance gates. For the protection of the gates stout chain-cables and wrought-iron box-hoofs were placed in front of the masonry. To prevent the gates rising and floating away, a cast-steel holding-down bracket was provided at the top of each heel-post. The ordinary time occupied in opening the gates was one minute and a-half, and the same in closing; but those at the passage occupied less than a minute in opening, and the same in closing.

The following modes were adopted at Barry for the shipment of coal, where it was shipped both from high and from low levels. On the high level the trains were hauled into curved sidings intended for full wagons, where the engine left them. These sidings were on gradients of 1 in 233. No stop-checks were employed, neither had they been found necessary. The loaded wagons were sent from the collieries with the doors up-hill, to prevent their opening on some of the steep inclines in the valleys, and did not therefore require to be turned for tipping when shunted into the sidings, thereby saving both time and labour. The wagons were drawn forward, and run one by one on to the weigh-bridge, and afterwards drawn on to the coal-tip by means of another hydraulic cylinder. The coal-tips consisted of masonry towers, 30 ft. square, on which were erected wrought-iron framings, braced together by angle, tee, and har irons. This framing served to support the wrought-iron guides for the cradle. The latter was provided with the necessary tip-up table, hinged in front, and worked by hydraulic power, by means of a cylinder hung on trunnions to girders underneath the cradle, which travelled with it, and capable of tipping loads up to 19 tons. The tips were provided with coal-shoots, anti-breakage cranes, boxes, &c. The shoot was tapered towards the point, to check the sliding of the coal, and had a single door across near the end for regulating the same. In the bottom plate of each shoot were two iron bar screens for separating the small coal when required. On the underside of the shoots, immediately below the screens, were hinged doors to allow of single-screening, double-screening, or the passage of the coal unscreened. At one of the high-level tips 400 tons had been shipped in one hour in the ordinary course of working.

The tips on the low level differed from those on the high level, inasmuch that wagons were received into the hoists at quay level, and the empty wagons were returned from the tip at the same level. The wagon had thus to be lifted the required height for tipping. A movable tip was in course of construction for the high level, which would run on rails along

the quay for a distance of about 50 ft. each side of the centre of approach, and could be used in connexion with a fixed tip. The tip was moved by a hydraulic engine geared to the travelling wheels. There was also a movable tip in course of construction for the low level. The passage was crossed by a rolling bridge, worked by hydraulic power, carrying a single line of railway and forming part of a roadway. There were eleven movable cranes, capable of lifting from 30 cwt. to 4 tons, for loading and discharging cargoes of vessels lying along the quay wall and against the timber jetties at the east end of the dock. The cranes were of the elevated type, and constructed on a pedestal of wrought-iron plate, with an arch underneath for the wagons to pass while the cranes were at work. The dock and sidings were lighted by electric light. The engineers of the dock works were Mr. John Wolfe Barry, Mr. T. Forster Brown, and Mr. H. M. Brunel. The author was the resident engineer.

The discussion upon the foregoing paper was commenced, but not concluded when the time for adjournment arrived. It will be resumed after Sir Frederick Bramwell's paper, to be read on Tuesday next, has been disposed of.

THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS OF GREAT BRITAIN.

At the monthly meeting of this Association, held at Carpenters' Hall, London-wall, on Saturday evening last, Mr. Hugh Alexander presiding, a paper on "Social Environment" was read by Mr. F. T. Poulson (Chief Inspector, Chelsea). In regarding man as a gregarious animal, the lecturer found his leading characteristic to be voracity. He had an insatiable and omnivorous appetite, both as regarded what he ate and what he drank. Another characteristic of man as animal was his indifference to the quality of what he consumed, and the urgency he displayed in vitating even the breath of life itself. In many dwellings every inlet and outlet for air was carefully hoked, the occupants being in consequence pale, weakly, and anemic. The method of introducing currents of warmed fresh air, by admitting them through flues behind the fireplace, as advocated by Sir Douglas Galton, was commended in this connexion. Some good had followed such revelations as those in "How the Poor Live;" but immense was the ignorance that still prevailed on the subject of sanitation and the use of such sanitary appliances as were now commonly applied to dwelling-houses. Wherever the surroundings, whether dampness of sites, or walls, or other defects, were the cause of fungoid growths on the walls, similar growths in the animal membrane were to be feared in the fearful form of diphtheria, the worst zymotic of whose existence the lecturer was aware. On the question of water-supply, "a compulsory constant service" was advocated, and the withdrawal of the power of cutting off a service for any cause. An intermittent service was liable to constant pollution from the sucking in of noxious matter from water-closet, soil-pipe, house-drain, or other sanitary arrangements of the dwelling to which the fittings might be connected. As an illustration of this danger, he exhibited a small sketch, showing how a kitchen-boiler was supplied with sewage in his district, owing to the overflow-pipe of the feed-cistern being connected directly to the house-drain. The drain becoming obstructed, and the water-closet being at a higher level than the top of the overflow-pipe of the cistern, when the closet was used the sewage was forced up the overflow-pipe into the cistern, and thus sent into the kitchen-boiler. This showed how easily a family might be poisoned by a plumber's defective work. With regard to the removal of refuse, the lecturer preferred to see it carried away in closed vehicles to be applied to the soil as manure, in place of burning it in "destructors." The paper next touched upon the disposal of the dead, and, without absolutely declaring it, the principle of cremation was upheld, with a recommendation that the residuum should be ground to powder for agricultural uses. The environments of childhood would never be what they should until mothers had more knowledge of the physical necessities of their children. The lecturer concluded by applying the Darwinian phrase, "the survival of the fittest," to the environments of man, and showed that a completer knowledge of physiology and sanitation meant for the work-

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—XV.

SEPARATELY-EXCITED DYNAMO-MACHINE.

If there were no reaction between the armature of a dynamo-machine and the field, the current which a separately-excited machine would send through any external resistance, when the armature was revolving at a known speed, could be calculated as easily as for an ordinary voltaic battery.

A set of working drawings of the machine, together with a knowledge of the materials from which it was constructed, would enable us to estimate the flux that would be sent through the armature, when the exciting current flowed in the field magnet coils (article X.), and the flux being known, the electro-motive force set up in the armature, if it revolved once in a second, could be immediately calculated (article XI.).

Let e = E.M.F. set up in armature when revolving once in a second; n = number of revolutions per second; r = resistance of armature from brush to brush; R = resistance of external circuit; C = current. Then:—

$$C = \frac{ne}{r + R}$$

Since, however, owing to armature reaction, the value of e depends upon that of C , the above equation gives results very far from the truth when C approaches its ordinary working value. In the very simple case under consideration it would not be difficult to find an equation that would give, with considerable accuracy, the current produced by the machine under varying conditions of speed and external resistance. Graphical methods, however, afford means of dealing with machines in which the winding is complicated as easily as with the simpler forms; we shall, therefore, at once have recourse to curves.

A curve which shows the connexion between the electromotive force produced in the armature of a machine, the speed being constant, and the current flowing, is called a "characteristic curve." This curve is to the dynamo-machine what the indicator diagram is to the steam-engine. The characteristic curve, or briefly the characteristic, of a machine can be got experimentally by connecting it to a circuit consisting of an ammeter and a variable resistance, while a voltmeter is in connexion with its terminals. The readings on the ammeter are laid off as abscissæ to the curve; the current indicated by the ammeter is multiplied into the resistance of the armature, and the quantity so obtained added to the corresponding voltmeter reading, thus giving the actual number of volts set up in the armature, and these results are then laid off as ordinates. If a sufficient number of points have been determined in this way, the characteristic curve for the machine, when running at the speed at which the experiments were carried out, can be drawn through them. As the method of constructing a curve for a similar purpose has already been described in article X., no further description need be given here. The brushes are naturally shifted into the proper position before each reading is taken.

The main reasons why the characteristic curves of different kinds of dynamo-machines consist of the shapes they do, may be easily seen by constructing their general forms theoretically, having regard merely to the components of the field due to the field magnets and to the currents circulating in the coils of the armature.

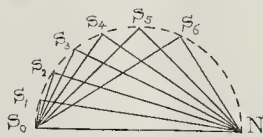


Fig. 38.

A construction was given in fig. 36 for finding the actual field, in magnitude and direction, for different positions of the brushes; in fig. 38 the same construction is used, but the diameter of commutation is always at right-angles to the resultant field. Draw NS_0 equal, on a suitable scale, to the field produced by the field magnets. As the machine is separately excited,

this quantity has always the same value; with NS_0 as diameter, describe the dotted semi-circle and draw the chords S_0S_1, S_0S_2, \dots to represent the fields produced by the armature when the currents c_1, c_2, \dots flow from it, then NS_1, NS_2, \dots will be the resultant fields in each case.

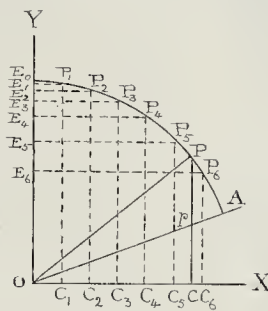


Fig. 39.

To construct the characteristic curve, fig. 39, on OX lay off lengths OC_1, OC_2, \dots equal to the currents c_1, c_2, \dots they will be proportional to S_0S_1, S_0S_2, \dots . On OY lay off OE_0, OE_1, \dots equal to the electromotive forces produced at the particular speed at which the armature is running; these lines will be proportional to NS_0, NS_1, \dots . Taking these two sets of values as abscissæ and ordinates, the points P_1, P_2, \dots, P_6 are obtained, through which the characteristic curve can be drawn.

The characteristic curve, while primarily showing the relations between electromotive force and current under all conditions, can be used for determining many other quantities connected with the complete circuit. Let P be the point on the characteristic of a machine showing the electromotive force and current being produced. Join OP. If R is the total resistance in circuit:— $R = \frac{E}{C} = \frac{OP}{OC} = \tan POC$.

When, therefore, it is necessary to know what the machine will do when a certain resistance is placed in the circuit, from O draw a line so that the tangent of the angle it makes with OX is equal to the given resistance, and where this line cuts the characteristic at P, will be the point showing the behaviour of the machine under the given conditions.

In the figure, OA is the line of the armature resistance, so that the characteristic stops short at A, the machine being then short-circuited. This line is of great use in showing the electromotive force absorbed by the armature itself, and hence the balance left for use in the external circuit. In the case just considered, PC is the total E.M.F. developed, OC is the amount absorbed in the armature, and hence PP_0 the difference of potential between the terminals of the machine. Many other uses of characteristics might be catalogued here, but such uses as we shall require to make of them will be described when considering other kinds of dynamo-machines.

It may, however, be pointed out that if the characteristic (fig. 39) be that for which the armature is running at n revolutions per second, the characteristic at n_1 revolutions per second can be at once drawn by multiplying the ordinates by the constant $\frac{n_1}{n}$.

Civil and Mechanical Engineers' Society.—On the 2nd inst., Mr. Ernest Spon, Assoc. M.Inst. C.E., read a paper before the Civil and Mechanical Engineers' Society, the President (Mr. Henry Adams) in the chair. After describing bygone blasting-powders and the early forms of gun-cotton and nitro-glycerine, the author came to modern explosives, which he described in detail. These included dynamite, blasting gelatine, Rohrbitt, Securite, smokeless blasting-powder (S. B.), and others. While speaking of the manufacture of gun-cotton, the author said that in one manufactory there is an annual output of 3,500 tons. The picrate compositions were touched upon, with the various forms of detonators, and their practical effect was discussed.

man and workwoman the retention of the earning and enjoying faculties for a longer period, and for the nation and the commercial world more profit, thrift, and industry, and therefore more peace and contentment both for capitalist and labourer.

A discussion followed, in which Messrs. Tidman, Dee, Fairchild, Wootton, West, Young, and the Chairman and other members took part. Some criticism was offered on minor points, but a general agreement with the views of the paper was expressed. Among other suggestions made in the course of the discussion was a recommendation to make the teaching of hygiene and physiology compulsory in all schools, and the abolition of cisterns, on account of their liability to get foul and to pollute the water available for drinking purposes.

A cordial vote of thanks was given to Mr. Poulson, who briefly replied, and the proceedings closed.

We understand that by invitation of the Mayor and Corporation of Leamington, the fifth annual provincial meeting of the Association will be held in that town on Saturday, May 24. The President and Sir Douglas Galton, K.C.B., have promised addresses on that occasion.

ST. SAVIOUR'S CHURCH, SOUTHWARK.

SIR,—You expressed a hope some weeks ago that something more would be done with the nave than to make an imitation, as nearly as possible, of what was done in the thirteenth century. Seeing that was done in the nave of the present congregation, would it not be better, when the ugly nave is pulled down, not to rebuild at all, but to utilise the space as a garden? With the money thus saved a good church could be built elsewhere. But if a new nave is built, I hope, as you do, that something more will be the result than a mere copy of what has been done in the past. When the late Chaplain (Mr. Benson) wrote the Guide to St. Saviour's, everyone was quite satisfied with a copy of the old masters, as the following words from the guide will tend to show:—"A very appropriate window has been introduced in the north wall (of the north transept), the original of which may be found in Westminster Abbey; and speaking of the south transept:—"The principal window having been destroyed, a new design, formed on the model of an exquisite circular window remaining in the ruins of the adjacent episcopal palace, was introduced." And it was not only in Gothic architecture that this want of originality was shown. The front of the Reform Club in Pall Mall resembles the Farnese Palace in Rome; and the Travellers' Club is supposed to be an improved version of the Padofini Palace, Florence; and in the Carlton Club, Sidney Smirke copied the east front of St. Mark's Library, Venice.

I was hoping that the day for this kind of thing had passed, but it does not appear to have died out in church work yet. CHARLES F. MOXON.

STAINED GLASS.

Brecon.—The stained-glass window, from the studio of Mr. Taylor, of Borneo-street, given by the South Wales Borderers (24th Regiment) in memory of their comrades who fell in the Burmah Campaign, has been erected in the Priory Church, Brecon, the territorial district of the Regiment. The memorial brass beneath it records the name of every man (fifty-one in all) who fell in action or died of disease during the campaign—1886-7-8.

Whitechurch.—On Sunday afternoon last the stained-glass window in the south aisle of Whitechurch parish church, in memory of the Rev. John Carter, who was vicar of Whitechurch or over ten years, was dedicated. The window is painted in two lights, with tracery, and the subject is "The Incredulity of St. Thomas." The central figure is that of the Saviour showing the prints of the nails in his hands and feet to Thomas and two other disciples. Under the two groups, which are surmounted by canopies, are the following inscriptions:—"Peace be unto you," and "My Lord and my God." At the base of the window is written the following:—"In memory of John Carter, M.A., LL.B., 10 years vicar of this parish, who died 13th of April, 1888, aged 51 years." The work has been carried out by Messrs. Bell & Sons, of Bristol.

Aachen.—The restoration of the Municipal buildings is to be carried out according to the designs of Professor Frengen, the latter having in his latest scheme paid special regard to the suggestions made by the Academy of Public Works when discussing the matter, September, 1888.

Books.

Roofs and Bridges. Part II. Graphic Statics.
By MANSFIELD MERRIMAN and HENRY S. JACOBY. New York: John Wiley & Sons.

THIS work forms one of the text-books of the course of instruction given in Lehigh University, where one of the authors, Mr. Merriman, is engaged as Professor of Civil Engineering, and the other, Mr. Jacoby, acts as Instructor. In dealing with roofs and bridges, students at this University divide the subject into four parts:— 1. The computation of stresses in various styles of trusses. 2. The analysis of these stresses by graphic methods, as explained in the volume before us. 3. The design of a bridge, including the arrangement of details and preparation of working drawings. 4. The consideration of cantilever, suspension, continuous and arched forms. The "force polygon" (as the authors term it) is shown to be the foundation of the science of graphic statics, and the triangle of forces is treated as a particular case of a force polygon. For equilibrium to exist, not only must the algebraic sum of the components of the forces, measured in both a horizontal and a vertical direction, amount to zero, but the algebraic sum of the moments of these forces must also be zero, so that there may be no tendency to motion, either of translation or of rotation. To prove this the authors show the use of what they term an "equilibrium polygon," by means of which the exact line of action of the resultant of a number of forces acting upon a body is determined, the magnitude of the resultant being graphically found by the closing line of a force polygon. Equilibrium results when both the "force polygon" and the "equilibrium polygon" close. In all instances of non-equilibrium, where the force polygon closes, "a couple" is necessary to maintain equilibrium.

For any given number of forces it is clearly demonstrated that an infinite number of equilibrium polygons, or curves of equilibrium, can be constructed, varying according to the position of "the pole" of the force polygon from which point the rays, or the resolved components, of the given resultant forces are drawn. The pole may be taken either within or without the force polygon, as may be found most convenient for the solution of the problem under consideration. In dealing with parallel forces the pole must necessarily lie outside the force polygon. The resultant of any number of forces is a single force which would produce the same effect as the forces themselves, and may therefore replace them, whether the direction of these forces meet in a single point or not. The equilibrium polygon may be explained as consisting of an imaginary jointed frame, which holds the exterior forces in balance; and, viewed in this light, the authors show that when the equilibrium polygon does not close, the given forces cannot without the aid of additional force be held in equilibrium, but that if the force polygon closes, equilibrium may be effected by moving one or more of the given forces parallel to its direction, so as to bring its line of action through the angle of the equilibrium polygon, upon which it is necessary for the force in question to pass. The practical application of such graphic diagrams is shown in relation to various types of roof trusses and bridge girders, and the character of the stress in the individual members (tension or compression) of the equilibrium polygon is seen to be indicated by the component members of the force polygon. The book is well printed, and contains excellent diagrams. It is interleaved with blank pages for additional notes to be made by the student. Problems to be worked out are added at the end of each article, and answers to these problems are given in an appendix at the end of the volume.

Stone: How to Get it, and How to Use it. By Major-General C. E. LUARD (Retired), Royal Engineers. London: E. & F. Spon. 1890.

THIS little work is an introductory treatise on stone, adapted for the special use of students in architecture, engineering, surveying, and estate agency, it having been originally written for the Surveyors' Institution. It commences by briefly referring to the bibliography of the subject, and this portion is supplemented by a useful list of works in the first appendix. Alluding to geological works, the author says, "There is no more practically useful work in

the whole list than Professor Ansted's Lectures on the Application of Geology to the Arts and Manufactures." This is quite true, but at the same time that work is rather antiquated, whilst it does not profess to be more than an outline. As a matter of fact, no really good work entering exhaustively into the different kinds of stone from both scientific and practical points of view, has yet been published in England: we have special treatises, but not general, and we heartily endorse the author's belief that the different kinds of stone have not yet been studied in a manner commensurate with the practical and pecuniary importance of the subject. A general account of the localities is then given, in which a few new openings are mentioned, whilst the next section deals with the renting and leasing of the same. This is by far the most important and original part of the work. The author explains the various methods of leasing quarries, of fixing minimum and "further" rents, and sums up the main causes of dispute, which he says "chiefly arise on whether the lessee was or was not making the most of the land entrusted to him." It is mentioned that people are too apt to treat the receipts from stone quarries as income in place of capital, and that in the case of entailed estates, a portion of this should be invested for the heirs to the estate, who are otherwise deprived for ever of this part of its value. Some of the principal steam-saws, tooling, and moulding machines are shortly discussed, after which the author devotes a few pages to the consideration of the comparative wear of stone, pointing out the great pecuniary advantages attaching to a proper understanding of the matter in respect of the maintenance of roads. The preservation and seasoning of stone, and a brief mention of some of the principal artificial stones in the market, appropriately form the conclusion. The appendices include also a list of granite quarries, the comparative prices of some igneous road-metals, a note on Bath stone, a table showing valuation of some Yorkshire quarries, and a list of persons who furnished the author with information during the preparation of the work. We observe that in giving the principal quarries of Bath stone the well-known Monk's-park stone is not mentioned. Altogether the author is to be congratulated on giving a very fair introductory treatise on stone to the students of the profession, and the arrangement of the work and the suppression of unimportant details are manifest indications of the selective care with which it has been prepared. We might point out, however, that the title is not well chosen, for we do not find much in the book as to the methods of getting stone, and there are no particular instructions as to "How to use it."

Practical Plane and Solid Geometry, including Graphic Arithmetic. By H. J. SPOONER, Assoc. Mem. Inst. C.E. Third edition. London: Cassell & Co. (Limited).

An elementary treatise, forming one of the Polytechnic Series, written to meet the requirements of the Science and Art Department, South Kensington. Each chapter concludes with a series of examples to be worked out. Lines, angles, proportion, triangles, polygons, circles, and their combinations are dealt with, in addition to the construction of various conic sections, and a table of definitions with the derivation of the terms employed is introduced. The author very properly recommends that a student should first learn to draw accurately and neatly with his instruments, and he gives valuable suggestions as to drawing scales on a sheet of paper. He also adds useful hints to guide an inexperienced draughtsman in his work, with the object of obviating common errors. Graphic arithmetic, or the art of working by geometry various arithmetical processes, is dealt with. As a test of the students' reasoning powers in geometrical work the process is as ingenious as it is profitable, and it is useful in its application to graphic stresses in mechanics, but so far as ordinary arithmetic is concerned the numerical process is, in our opinion, preferable. In solid geometry the author deals at length with the question of simple projection, and argues that beginners frequently fail to make much progress owing to their want of this information. He asserts that the realisation of the projection of simple solids upon paper, according to special conditions, should precede that of the representation of

points and lines in various positions in relation to the planes of projection, notwithstanding the fact that points and lines constitute the simplest element of a solid, because solids, being more tangible, can be taught *objectively*, and afterwards the relation of traces of lines and points may be more comprehensively grasped, when the solid with which they are connected is realised in projection. The idea is novel and worthy the attention of teachers. The type of the book is good, and the volume contains sufficient practical geometry for the work of any ordinary drawing-office.

Forty Lessons in Carpentry Workshop Practice.
By CHALRS F. MITCHELL. London: Cassell & Co. (Limited).

THE author of this book is the lecturer on carpentry and joinery at the Polytechnic Institute, London; and the work, which is illustrated by eighty-nine well-drawn diagrams, has been revised by Mr. G. C. Pope, the teacher of practical carpentry at the same Institute. The contents include a list of tools necessary for use in a workshop, a description of means employed for grinding and sharpening, sawing, planing, preparing a straight-edge, preparing winding-strips, taking timber out of winding, making a square or plain joint, grooved and tongued joint, plough-grooving and cross-tongues, &c. The descriptions form a useful account of what every well-trained carpenter and joiner is fully conversant with, but which students who spend no time in actual workshop practice desire to know.

Forty Lessons in Engineering Workshop Practice.
By C. F. MITCHELL and A. G. DAVEY. London: Cassell & Co. (Limited).

THIS useful little manual, which forms one of the Polytechnic Series, has been prepared to assist students in the acquisition of such necessary technical knowledge as shall enable them to construct useful workshop tools. The lessons are arranged in a progressive manner, and the contents, which are clear and concise, have received the benefit of careful revision by Mr. J. Rogers, instructor in engineering workshop practice at the Polytechnic Institute. The book truly states that in these matters "experience is the best guide," but for all its statements the authors furnish reasons. The illustrations are clear and fully dimensioned. A perusal of the work by those whose duties are chiefly limited to the drawing-office, would prevent foolish questions being asked by inexperienced draughtsmen in the workshop. The book exhibits several details which require special attention in making "workshop drawings," and show a draughtsman what to observe as he walks through a manufacturer's yard and shops.

School Hygiene. By W. J. ABEL. London: Longmans, Green, & Co.

THIS little book contains clear, concise rules for the ventilating and warming of schools, the disinfecting of rooms, clothing, &c., and the periods of infectivity and length of quarantine necessary for all infectious diseases.

There is an excellent chapter on "Eyesight, and the Use of Test-types." Were this book in the hands of all school-masters and mistresses many a little scholar's sight might be saved the terrible strain to which it is often subjected by being given work to do and types to read which are too small.

There are also short rules for administering first aid in injuries; indeed the book is full of useful information, written so clearly that a child might understand. It is merely one of the army of hygienic hooks, but each one helps on the good cause. We do not hold to the doctrine that a little knowledge is a dangerous thing; provided the individual is aware that he knows but little, that little may prove a great boon to many. We hope that hooks on school ventilation may be unnecessary some day. There may be a happy time coming when a hill for "compulsory ventilation" will be passed, and every room in every house will have its fresh-air inlet, and its ventilated gas-ring as a foul air exit. Until that golden age shall come, and whilst children are growing up stunted and sickly in ill-ventilated rooms, let as many hooks be written on the subject as possible, and diffused throughout the country, so that "our sons may grow up as the young plants, and our daughters may be as the polished corners of the temple."

Blackie's Modern Cyclopaedia. Edited by CHARLES ANNANDALE, M.A., LL.D. Vol. V. London, Glasgow, Edinburgh, and Dublin: Blackie & Son.

The fifth volume brings this encyclopaedia down to the latter part of M., and it appears to keep up the good quality shown in the former volumes. Among the architectural subjects which come into this volume is "Impost" which is shortly and correctly treated and illustrated (time was when such a word, in its architectural signification, would never have found a place in a general dictionary); "Indian Architecture" has a short article with three or four rather inadequate illustrations, better than nothing; however, "Ionic order," &c. The subject of "Iron-rod Vessels" receives very good illustration for a popular general dictionary, and is accompanied by plans and sections to a small scale of two of the latest English iron-clads. Under the heading "Kaulhaeb" is a short but very just review of that painter's position in art, his merits and defects. We may add that good small-scale maps are given of the principal countries described in the dictionary.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

5,175. Ventilating Apparatus. T. F. G. Wintour.

According to this invention, in the spaces of the water cones of metal, gauze-wire, india-rubber, &c., are inserted. These are fixed with a free air-space between the cones, and, if required, a mica valve to prevent the ingress or egress of air, if wished. The ventilation is controlled by means of the valve.

6,838. Stoves. G. A. Jones.

The stove which is the subject of this patent has a chamber, into which the products of combustion have to pass before they can get away through one or more flues connected to the lower portion of the said chamber for that purpose. In order to absorb and utilise the greatest amount of heat from this chamber, it is surrounded with a jacket open at bottom and top, which induces an upward current of pure air, which becomes heated in its passage. If a damp air is desired, an open vessel is placed on the top of the chamber, and kept supplied with water, which is carried to the top of the chamber by a water-supply of a similar level, so maintained by an inverted vessel on the principle of a "fowl fountain." As the water evaporates, the vapour mixes with the pure hot air current, which is led in any direction by means of flues.

7,289. Improvements in Water-closets. B. R. Phillipson.

The form of water-closet which is the subject of this invention, and which may also be used as a slop-sink, is provided with two water-sealed traps in succession to each other. These have an air-space between them which is provided with a ventilation carried to the open air. An air-valve is fixed and so operated that when the water supply is open the air-valve is closed. When water is thrown into the basin from a pail or vessel it passes through the two seals without unsynphoning either of them, because the open ventilation between the two seals prevents syphonage. When water is sent into the basin from the cistern or supply, however, the air-valve is closed by a lever, and when a certain quantity of water has entered the basin, syphonage takes place, and the basin is discharged.

8,201. Window-sashes. W. Allenby.

According to this invention, in drop-windows, such as railway-carriage, tramcar, and other windows, the sash is held by the action of an inclined rubber covered roller pressing against it. A little force will, however, raise or lower it, the elasticity of the roller then allowing the frame or window to move up and down.

20,957. Improvements in Water-closets. S. Mayo (U.S.A.).

In the form of water-closet which is the subject of this invention, and which is a modification of the "wash-out" closet, mechanism is described which connects the cover of the seat with the valve and flushing apparatus by which two washes or heads of water are allowed to enter the basin and effectually flush and cleanse it.

NEW APPLICATIONS FOR PATENTS.

March 24.—4,572, J. Watson, Stoves.—4,579, A. Harris, Drain-pipes, &c.—4,580, W. Baker, Fire-grates.

March 25.—4,603, C. Mackoy, Roses of Door and other Knobs.—4,608, C. Longley, Wood-block Flooring.—4,692, J. B. Bewling Square.—4,678, H. Hinkley, Indicators for Doors.

March 25.—4,702, J. Mayoh, Steel or Iron Plate or Joist for Supporting Floors, Walls, &c.—4,705, G. Tweedy and B. Lawrence, Wood Blocks for

Roads and Pavements.—4,712, H. Doullon, Construction of Sewer.—4,718, A. Govan, Hanging Window Sashes.—4,735, F. Averill, Flush Bolts.—4,738, S. Haslam, Such as an Frame.—4,740, W. White, Sliding Sashes and Windows.—4,741, W. Gibbs, Cement Kilns, &c.—4,747, A. Richards, Draught Excluders for Doors.

March 27.—4,770, F. Botting, Actuating Outlet Valve of Valve Water-closet.—4,783, L. Grob, Screw Nail.—4,785, A. Stalker and T. Daye, Supply Valves to Water-closets.—4,807, F. Laesecke and C. Ridel, Scaffolding Trade.

March 28.—4,878, J. White, Door Springs.—4,882, J. Mason, Door Springs.—4,900, R. Roberts, Chimney Pots, &c.—4,907, Colthurst, Symons, & Co. and W. Pierce, Roofing Tiles.

March 31.—4,900, A. Booth, Sawing Machines.—4,935, G. Mansfield, Road Paving by Composite Block Process.—5,012, J. Thimble, Jun., and S. Heit, Planing Wood.

PROVISIONAL SPECIFICATIONS ACCEPTED.

1,782, R. Ashworth and W. Erana, Self-acting Door Closer.—2,808, W. Noad, Whitelad.—2,841, R. Wido, Dwelling and other Houses.—2,883, J. Collins, Sash-fastener and Lift.—3,215, R. Meredith, Fast-nung Door-knobs to their Spindles.—3,217, C. Spurr, Cutting Veneers.—3,336, T. Bihy, Saws, &c.—3,587, W. Thompson, Panel-doors, &c.—4,065, T. Tracy, Heating Rooms and Buildings.—4,150, T. Davis and A. Bouteher, Chimney Terminal or Cowl.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

6,953, J. Martindale, Cows.—8,572, C. Taylor, Plane Irons.—8,863, Edsalle & Co., and L. Tavener, Saw-sharpening Machine.—8,914, A. Tonks and F. Baker, Flush-bolts.—14,137, B. Malcolm and W. Pennington, Holding Sliding Windows in any desired position.—15,353, S. Hill and R. Hodges, Catch and Bolt for Double Doors.—16,373, J. Mandor, Sash-fastener.—16,781, C. Gabriel, Syphon-Cisterns for Flushing Water-closets, &c.—2683, J. Seketchazy, Framework for Bridges.—2,623, J. Stevens and T. Birch, Weather-hars for Casement-sills.—2,879, J. Lin, Paperhanger's Pattern-book.—3,021, J. O'Brien and J. Carow, Stone-cutting.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

MARCH 27.—By H. HAYWARD. Charlton, near Dover.—59, High-st., L. 4530 8 and 9, Tower Hamlets-st., f. 210 Buckland, near Dover.—66, London-rd., L. f. 431. 108 p. a. 400 1, 16, and 17, Herbert-st., f. 431 2, Dover, Hawkesbury-st.—"The Railway Inn," u. 6 37 yrs., g. r. 108. 1d. 560 57, 57A, and 59, Bulwark-st., u. 5 yrs., g. r. 24. 136 122

MARCH 31.—By SAM'L B. CLARK & SON. Notting Hill-st.—No. 24. 3675 Marylebone—L. g. r. of 456 p. a., u. 27 yrs. 614 Fitzroy-sq.—12, Upper Charlton-st., u. 31 yrs., g. r. 234. f. 430. 500 32, Chiswick-st., u. 32 yrs., g. r. 428. f. 4128. 148. 600 Manchester-sq.—20 and 21, North-st., u. 37 yrs., g. r. 440. f. 4226. 48. 1,090

By MESSRS. TROLOPE. South Kensington—4, Pelham-crescent, u. 23 g. r. 410. f. 4105. 900 4a, Pelham-st., u. 23 yrs., g. r. 42. f. 420. 270

By PHILLIPS, LEA, & DAVIES. Battersea, Home-rd.—E. g. r. of 4152, with reversion in 83 yrs. 3,665 Latchford-st.—E. g. r. of 420, with reversion in 75 yrs. 956

By MADDOX & SON. St. John's Wood—18, John-st., u. 12 yrs., g. r. 43 April 1.—By F. EILOART. Notting-hill—E. g. r. of 420, with Reversion in 71 yrs. 515

By G. BRINSLEY. Bermondsey—9, Star Corner, L. Yard, l. 730

By F. HOLSWORTH. Highgate—1 to 7 (odd) Twicken-rd., u. 83 yrs., g. r. 422 1,020

By PHYSECK & LOWE. Hamstead, Golder's Hill-rd.—Two plots of land 150

By DEBENHAM, TEWSON & CO. Hoxton—188 and 200, Hoxton-sq., f. f. 434 p. a. 1,370 Russel-sq.—39, Woburn-pl., and 7, Stabling, u. l. 30 yrs., g. r. 419. f. 4140 1,330

Becham Green—192, Green-st., f. f. 250 700 45 and 47, Moss-st., f. f. 457. 44 p. a. 490 23 and 25, Harold-st., and 6, 7, and 8, Type-st., f. f. 275. 88. 610 10, 12, and 14, Digby-st., and 26 and 28, Lansdell-st., u. 17 yrs., g. r. 48 140 16 and 18, Norton-st., and 6 and 7, Type-st., u. l. 41 yrs., g. r. 48. f. 465 350

Mill End—L. g. r. of 419, u. 14 yrs., at a g. r. of 412 165 to 171 (odd) Globe-rd., u. l. 18 yrs., g. r. 413. 168. f. 496. 48. 65 21, The "Lord Nelson" herbage in Globe-rd., u. 14 yrs., g. r. 411. f. 470. 335

By VAUGHAN & CO. Hamstead-rd.—43, Robert-st., u. 31 yrs., g. r. 47. 78. f. 455 595 Lambeth—L. g. r. of 436 p. a., u. 17 yrs. 540

By F. JOLLY & CO. Becham Green—30, 32, and 34, Cypress-st., u. 12 yrs., g. r. 46. f. 460 250

Ratcliff—23 to 29 (odd), Brook-st., and 1 to 6, Elizabeth-st., u. 10 yrs., g. r. 432 1,250

By WAGSTAFF & WARMAN. Highbury-crescent—No. 15, l. 1,000

[Contractions used in these lists.—E. g. r. for freehold ground-rent; l. g. r. for leasehold ground-rent; l. g. r. for improved ground-rent; s. g. r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e. r. for estimated rental; u. for unexpired term; p. a. for per annum; y. s. for years; at for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

MEETINGS.

SATURDAY, APRIL 12. Edinburgh Architectural Association.—Special Visit to the Buildings of the Edinburgh International Exhibition.

MONDAY, APRIL 14. Royal Institute of British Architects.—(1) Special General Meeting for Members only, to receive and consider a recommendation of the Council that Mr. Alfred Waterhouse, R.A., President, be requested to allow himself to be nominated as President for the ensuing year of office. (2) Tenth Ordinary General Meeting of the Session. Paper by Mr. John F. Seddon on "Church Fittings." 8 p.m. Surveyors' Institution.—Adjourned discussion on Mr. T. W. Wheeler's paper on "Retirements." 8 p.m. Society of Engineers.—Mr. W. H. Brothers on "Weighing Machinery and Automatic Apparatus in connection therewith." 7.30 p.m. Clerks of Works Association (Carpenters' Hall).—Eighty Annual Meeting. 8 p.m. Liverpool Architectural Society.—Mr. W. E. Hill on "Ormskirk Parish Church." 7 p.m.

TUESDAY, APRIL 15. Society of Arts (Applied Art Section).—Mr. C. Purdon Clarke on "Modern Indian Art." 8 p.m. Institution of Civil Engineers.—Sir Frederick Bramwell, Bart., F.R.S., on "The Application of Electricity to Welding, Stamping, and other Cognate Purposes." 8 p.m.

WEDNESDAY, APRIL 16. British Archaeological Association.—(1) The Rev. Dr. Hoopwell on "Excavation of the site of Vinovium, Durham." (2) Mr. Jas. H. Macmahon on "Baynard's Castle, and antiquities found on its site, 1880-90." 8 p.m. Cleveland Mechanical Engineers' Society.—Mr. Ambrose A. Myall on "Recent Improvements in Dredging Machinery." 7 p.m.

Thursday, April 17. Guild and School of Handicraft.—Mr. W. B. Richmond, A.R.A., on "Oesso." 8 p.m. Royal Archaeological Institute.—(1) Mr. R. H. Bask on the "Sixth Centenary of Dante's Beatrice." (2) Mr. J. J. Doherty on "Bells: their history, uses, and inscriptions." (3) Mr. F. Haverfield on "Roman inscriptions found in Britain." 4 p.m.

Society for the Encouragement of the Fine Arts.—The Second Conversazione at the Galleries of the Royal Institute of Painters in Water Colours, Piccadilly. 8 p.m.

FRIDAY, APRIL 18. Architectural Association.—Members' Soiree. 8 p.m. Royal Institution.—Sir Frederick Bramwell, Bart., F.R.S., on "Welding by Electricity." 9 p.m.

SATURDAY, APRIL 19. Royal Institution.—Captain W. de W. Abney, F.R.S., on "Colour and its Chemical Action." 8 p.m. Edinburgh Architectural Association.—Visit to Tantallon Castle.

Miscellanea.

Docks and Harbour at Mobile.—From a recent report of the British Vice-Consul at Mobile we learn that the long-talked-of scheme—the Mobile and Dauphin Island Railway and Harbour Company—is about to be carried out by an English Company, which is convinced that Mobile Bay, on account of its geographical position, depth of water, and ample ship room, should be the great port of the gulf. Ample docks will be built at deep water at the terminus of the railway, with all modern facilities for handling ocean freights. Mobile is the nearest gulf port to St. Louis, Cincinnati, Memphis, Chicago, and Kansas City, and a large part of imports and exports to and from these places will pass through Mobile when such terminal facilities are made.

Appointments.—Mr. J. D. Lewis, from the offices of Messrs. John Wballey & Son, surveyors, Chester and Birkenhead, has been appointed Assistant Road Surveyor of the Borough of Birkenhead, at a salary of 150*l.* per annum. The applications were very numerous.—Mr. W. H. Radford, C.E., Nottingham, has been appointed representative and consulting engineer in England for the Corporation of Durban in South Africa. He will, we understand, act conjointly with the London agents in ordering and testing the materials required for the waterworks extension. The cost of the new works when finally completed will be about 120,000*l.*

Strikes in the Building Trade Abroad.—Telegrams from Toronto state that a general strike for higher wages among the men employed in the building trade is in progress in that city. The stonemasons struck last week, and the bricklayers went out on Monday. About 2,000 men altogether will be affected. The men's demands are endorsed by the International Union, and some masters have conceded an advance to their men to induce them to continue at work. The carpenters and joiners are expected to strike in a few days. The strike of masons continues in Vienna, and building has been brought to a standstill.

The Lock-out of Kentish Brickmakers.—The dispute between the Kentish hargemen and the brickmakers assumed a new phase on Saturday, one which aroused hopes in many quarters that at last a way to a settlement was opened. Following a demonstration held on Good Friday, a meeting of bargemen and mates in the Sittingbourne district was held, at which representatives from Faversham, Rainham, Halstow, Conyer, and other places were present. A suggestion was put before the hargemen to withdraw their lists, one of the conditions which the brickmasters have insisted upon from the first. The matter was discussed at some length, and ultimately the following resolution was passed unanimously:—"That we withdraw the list issued by our society provided that the whole question be submitted by the Brickmasters' Association to the conciliation committee of the London Chamber of Commerce, such question to be settled by May 1, and that the prices laid down by the Chamber of Commerce shall be paid from the time of resuming work, and that every member of the Bargemen's Union shall be reinstated in the position previously held by him." A copy of the resolution was at once forwarded to the Kent and Essex Brickmasters' Association, who held a meeting at Cannon-street Hotel on Monday, when it was resolved—"That the Association insists upon the absolute and unreserved withdrawal of the lists issued by the bargemen, and upon the hargemen returning to work at the old prices." And it was also resolved—"That moulding shall cease not later than August 31, and that the make of bricks be reduced by 20 per cent.; that is, that one stool out of every five now worked be stopped." In consequence of the dead-lock, brickmasters have had to refuse large orders for bricks, and they are consequently losing custom that may perhaps never be recovered.

Portsea Synagogue.—The Hebrew Synagogue at Portsea was re-opened on Sunday, the 23rd ult., by the Delegate Chief Rabbi (the Rev. Dr. H. Adler), after restoration. The architect for the work was Mr. Harry A. Smith, of Gosport, and the contractor Mr. J. Dugan, of Portsea; the total cost has been 1,100. A new porch has been erected, to avoid the panic which might otherwise ensue in the event of a hurried exit from the ladies' galleries. The reading-desk has been rebuilt, and the whole of the interior resetated. The ark, which was opened in the synagogue 175 years ago, has been carefully restored and preserved. The floor is laid in mosaic, by Mr. Ebner, of Old-street, London. The ark is surmounted by the first two letters in the Decalogue, in Hebrew, symbolical of the two tables of stone delivered to Moses on Mount Sinai, and stands on new circular polished marble steps, in lieu of the original wooden steps, a brass pulpit rising from same.

Technical Scales.—Messrs. Cassell & Co. issue a series of scales printed on slips of glazed cardboard and with a case to keep them in, under the name of the "Polytechnic Series Technical Scales." These give a number of scales, two on each strip on the opposite edges, each defined as the proportion of an inch to a foot and as the proportion to full size, thus: "Scale of one-fifth of an inch to a foot, or $\frac{1}{5}$." A scale of chords is added on each slip. They make a useful set, comprising a greater variety of scales than can be shown on any single scale of the ordinary make.

Association of Municipal and Sanitary Engineers and Surveyors.—The Council of the Association of Municipal Engineers have transferred the following Graduates to the class of Members, they having obtained chief appointments, viz., Messrs. M. Aspinall, Town Surveyor, Stroud; C. H. Cooper, Surveyor to the Local Board, Wimbledon; J. Cook, Borough Surveyor, Lancaster; and H. W. Jamieson, Surveyor to the South Hornsey Local Board.

British Archaeological Association.—At the meeting of this Association on Wednesday, April 2, Mr. J. W. Grover, F.S.A., in the chair, the arrangements for holding the congress at Oxford, to commence on July 7, were detailed. Mr. Loftus Brock, F.S.A., to illustrate Mr. Cust's lecture, exhibited a copy of "Le Bruin's Travels in the East," which contains curious seventeenth century panoramas of Smyrna and other places which were referred to. The chairman described two gold British coins, the obverses being imitations of the statue of Philip of Macedon, and the reverse of one of the coins a plain convex surface. Mr. Ronilly Allen, F.S.A. (Scot.), described a remarkable base of a stone cross which exists in the churchyard at Hasrick, Yorks. It is covered with Late Saxon interlaced work and scroll of the same period, but very like some decorations of the thirteenth century. While there are many remains of the shafts of Saxon crosses, the bases do not frequently occur. The Rev. R. G. Irving, vicar of Hasrick, exhibited full-sized rubbings of the ornamentation. Mr. R. Peters rendered a description of further discoveries on the site of Launceston Priory, where, to erect a new gasholder, the site of the chancel of the Priory church was excavated. The plans exhibited show this to have been 66 ft. long from east to west within the walls, and 19 ft. wide. There are transept chapels to the west of the chancel. A paper was then read on "Gokewell Nunnery, Lincolnshire," prepared by Mr. E. Peacock, F.S.A., and read by Mr. W. de Gray Birch, F.S.A., in the author's absence. The buildings stood to the west of the village of Broughton, on a site where a farmhouse now exists, but the remains which were noted in the seventeenth century have been entirely swept away, and the site has been a matter of conjecture. The Rev. Henry Cust then proceeded to describe his journey to Smyrna and Ephesus, where he visited the principal remains, and found that Mr. Wood's excavations of the Temple of Ephesus were getting covered up, and will soon be difficult to trace. A fine series of photographs were exhibited, and also of the supposed columns from the Temple of Diana, now in Sta Sophia, Constantinople. Mr. G. Patrick exhibited an Ionic volute which he found at Ephesus several years ago.

The Wenham System of Lighting and Ventilating.—Early in the current year the *Journal of Gaslighting* noticed the adoption of the Wenham system of regenerative ventilating lighting at the Nottingham Free Library, under the direction of Mr. W. R. Chester, the Gas Engineer to the Corporation. The Library forms one wing of the Natural History Museum, which has for some time been undergoing repair. The work, however, the *Journal* reports, is now finished; and arrangements were made for the opening ceremony to take place on the 31st ult. As the museum will be open in the evening, the question of lighting had to be considered; and the experience of the Wenham system in the reading-room, where it had worked very satisfactorily, led to its extension to the museum. As in the installation in the other part of the building, any danger of heat from the lamps carrying the beams of the ceiling has been avoided by the construction of four shafts running the whole length of the room. The heat of the lamps will be carried into the open air by tubes which also form ducts for the removal of vitiated, or partly vitiated, air from the room. This new lighting arrangement has been entirely carried out by the workmen of the Corporation, under Mr. Chester's supervision. The Wenham Company, we are asked to mention, have now added to their business in gaslighting and ventilation an electrical department, with especial reference to electric lighting.

Gift to Reading.—Mr. George Palmer head of the Reading biscuit firm, and formerly M.P. for the borough, has just announced to the Town Council that he will give a park of 49 acres at the east end of the town for the public benefit of the inhabitants. He has promised to fence in the land, plant trees, and lay it out for cricket, tennis, football, and other games, and for public gardens. He asks that no intoxicating liquors should be sold upon the ground. Mr. Palmer has already given over 20 acres in another part of the town for a public recreation-ground near the Thames. The Town Council passed a vote of thanks to Mr. Palmer for his gift. Previous to his last generous offer a movement was initiated to erect a memorial to Mr. Palmer's munificence.—*Times*.

A Bristol Newspaper Office.—The *Printers' Register* describes the new office of the *Western Daily Press* at Bristol, now nearly completed. Part of the building has been occupied since 1886. The facade is of fine red brick, with freestone courses and window-frames. The building stands at the corner of Baldwin-street,—the widest central thoroughfare in Bristol—and St. Stephen-street. For about a quarter of a century the *Daily Press* offices were situated in Broad-street, adjoining the chief municipal building, the Council House, but after several additions had been made to the original premises Mr. Maciver, the proprietor, decided to build new offices which would be fitted up to meet the modern requirements of newspaper work. A site was purchased from the Corporation at a cost of about 8,000, and on this the new building has been erected. On the ground-floor (there are no cellars) are the advertisement office—a splendid apartment—a publishing office from which the trade is supplied with papers, a machine-room, engine-room, and paper-store. The machine-room contains three Victoria machines, and on these are printed the *Western Daily Press*, the *Bristol Evening News*, and the *Bristol Observer*. On the first floor are a suite of offices, including artists' room and store-rooms; the second floor accommodates the editors, sub-editors, and reporters; and on the third floor are the composing-room—which is lighted from two streets and from the roof—and the stereotyping-room, which contains, besides the usual appliances for stereotyping, a gas engine and a Shanks' engraving machine. The whole of the building is heated by one fire and hot-water pipes. As a precaution against fire, all gas-pipes are of iron and the brackets are not movable. On each floor there is a hydrant and hose, by Merryweather & Sons, London, with a very copious supply of water always under pressure. Pneumatic tubes, by Cooke, of York, communicate between the publishing and advertisement offices and the composing room and sub-editors' room. All telegrams are delivered by these tubes to the sub-editors without using a messenger, and by the same means advertisements are despatched from the advertisement office to the desk of the foreman in the composing room. The whole arrangements are planned to ensure despatch and the convenient working of the various departments, which are nine in number—namely, editors and sub-editors, reporters, readers, compositors, stereotypers, machinists, publishers, and commercial staff. No doubt the arrangements are very complete, but the *Printers' Register* omits to give the name of the architect.

Industrial Exhibitions.—In addition to the workmen's exhibition to which we have referred in one of our "Notes" two other exhibitions of the kind have been opened this week. On Tuesday the Duchess of Teck opened the fourth annual exhibition of the Hammersmith Industrial Exhibition Society, at Flora-gardens Board School, Hammersmith. The object of the society is to encourage the young to employ their spare time in the pursuit of industrial art. There are six hundred exhibits of work done by children, and for the best results one hundred prizes are awarded. On the previous day an industrial and art exhibition was opened at Bournemouth. It is described as the first venture of the sort in that fashionable watering-place.

Society of Arts.—The papers for the Wednesday evening meetings after Easter to the end of the session have been fixed as follows:—On April 16, "Old and New Fashions in Typography," by Talbot B. Reed; April 23, "Coal in the South-East of England," by William Whitaker, F.R.S.; April 30, "Photographic Lenses," by T. B. Dalmeier; May 7, "The Aim and Scope of Higher Technical Teaching," by Dr. Percy F. Frankland; May 14, "Professor Blunt Thomson's Electro-Magnetic Induction Experiments," by Dr. J. A. Fleming; May 21, "The Mannesmann Process for making Seamless Tubes," by J. G. Gordon.

Reported Collapse of a Parish Church.—The newspapers report that the parish church of Helpringham, Lincolnshire, has been partially destroyed. Two large beams, each weighing more than a ton, supporting the east end of the nave, fell into the body of the church, smashing the pews and injuring the vault beneath. The roof, on losing the support of the beams, became displaced. No one was in the church at the time. In 1854 the spire was half destroyed by lightning.

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 North Wales University and Public Library.

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 Great Western Ry. Co., London County Council, and various engineering works.

PUBLIC APPOINTMENTS.

Table with 5 columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Includes entries for Assistant Surveyors and Waterworks Clerk.

The English Iron Trade.—The English on market shows in somewhat better form this week, but the business doing is small. The prices of pig-iron are stronger, and this is partly due to the improved nature of the Cleveland ironmasters' returns for March, but partly so to a recovery in warrants. Middlesbrough pig-iron has gone up 3s. a ton. Scotch-makers on has also improved slightly for some brands, assemer iron is steady at former rates. There is less firmness in Lancashire pig-iron, but her districts report fair strength. Business ill continues moderate in finished iron, and steel is also quiet. Rails are 5s. a ton lower, and steel plates are easier. Shipbuilders are not booking fresh work, while engineers are not receiving many new enquiries; still, both branches of trade keep fairly busy.—Iron.

PRICES CURRENT OF MATERIALS.

Table listing prices for various materials including timber, iron, and other goods. Columns include item name, quantity, and price.

METALS.

Table listing prices for various metals and alloys.

OLDS.

Table listing prices for various oils.

TENDERS.

Communications for insertion under this heading to reach us not later than 12 noon on Thursdays.
HANSTEAD (Surrey).—For extension of tailors' shop the cottage home, for the Managers of the Kenzen and Chelsea School District, Messrs. A. & C. Crston, architects, 15, Leadenhall-street, E.C. Quantities not supplied:—
W. F. & W. Small & Co. 2468 12 0
J. E. Potter 387 0 0
W. Taylor 399 0 0
Barton & Son, Croydon (accepted) 336 0 0
BRISTOL.—For the completion of St. Francis's arch, extensive of upper part of tower. Mr. John Arn, architect.
A. J. Beaven (accepted) £2,600 0 0
[No competition.]

CLACTON (Essex).—For detached house on site adjoining the Valley Farm, Clacton, near Colchester, for Dr. J. C. Burnett, Mr. Alfred Broad, architect, 27, Dingwall-road, Croydon. Quantities by the architect:—
Chambers, Colchester 2,692 0 0
Smith & Bulled, Croydon 913 0 0
Dias, Colchester 885 0 0
Dobson, Colchester 570 0 0
Everett & Son, Colchester (accepted) 810 0 0
Orfeur, Colchester 816 0 0
Allen, Clacton 807 0 0
Ambrose & Co., Colchester 794 0 0
Sergant, Clacton 761 0 0
[Architect's estimate, £850.]

CLACTON (Essex).—For detached cottage, Foots Farm, for Dr. J. C. Burnett, Mr. Alfred Broad, architect, 27, Dingwall-road, Croydon. Quantities by the architect:—
Chambers, Colchester 2,553 0 0
Smith & Bulled, Croydon 504 0 0
Dobson, Colchester 475 0 0
Allen, Clacton 447 0 0
Dias, Colchester 441 0 0
Everett & Son, Colchester (accepted) 436 0 0
Orfeur, Colchester 420 0 0
Ambrose & Co., Colchester 409 0 0
Sergant, Clacton 366 0 0

CROYDON.—For detached cottage, Warrington-road, Mr. Alfred Broad, architect, 27, Dingwall-road, Croydon. Quantities by the architect:—
Walker 2,480 0 0
Gould & Glasscock 449 0 0
Knight 429 0 0
Docking 425 0 0
Page 415 0 0
Smith & Bulled 414 0 0
E. J. Saunders* 410 0 0
[all of Croydon.]
* Accepted, subject to revision.

DENFORD (Northamptonshire).—For erecting Wesleyan Chapel. Mr. John Wills, architect, Derby:—
W. Coates & Son, Thrapston 2,500 0 0
Smith & Son, Beaudesert 465 0 0
Freeman & Son, Denford (accepted) 439 15 0

FAIRFIELD (Lancs.).—For the erection of one pair of semi-detached houses at Fairfield, for Mr. Geo. Swindells, Mr. J. H. Barton, architect, Warrington-street, Ashton-under-Lyne:—
Robinson & Co., Hyde 2,201 0 0
Hansb. Fielding, Bolton 2,121 0 0
Hy. Gardner & Co., Ashton-under-Lyne 1,990 0 0
J. W. Williamson, Ashton-under-Lyne 1,920 0 0
Lyne 1,906 0 0
Washington Hurst, Droylsden 1,860 0 0
Jabez Gibson, Dukinfield 1,830 0 0
R. White, Manchester 1,800 0 0
Jas. Robinson, Ashton-under-Lyne 1,758 0 0
E. H. Both, Stalybridge 1,784 10 6
Allen Holmes, Ashton-under-Lyne 1,779 14 1
T. G. Shaw, Stalybridge 1,770 13 0
Underwood and Bro., Dukinfield 1,751 12 0
E. & C. Jackson, Openshaw 1,746 0 0
C. Wallworth, Gorton (accepted) 1,710 0 0
Theas. Dean, Ashton-under-Lyne 1,677 0 0

KILBURN.—For preliminary contract for basements, &c., to business premises, High-road, for Mr. George Nesbitt, Mr. R. D. Hanson, architect, Kilburn. Quantities by architect:—
J. Anley 2,221 0 0
Gould & Brand 2,177 0 0
G. Neal 2,168 0 0
W. Brass & Son 2,147 0 0
H. B. Oldrey (accepted) 2,145 0 0

LONDON.—For enlarging the Rotherhithe Infirmary, for the Guardians of St. Olave's Union. Messrs. Newman & Newman, architects and surveyors, 31, Tooley-street, London Bridge. Quantities supplied:—
Shillitoe & Co. 236,500 0 0
J. Bullers 35,300 0 0
Hart Bros. 34,602 0 0
Bottrill & Sois 34,599 0 0
J. Greenwood & Son 34,286 0 0
H. L. Holloway 33,977 0 0
Erik & Randall 33,021 0 0
G. E. Todd 33,890 0 0
J. & W. Pattinson 32,978 0 0
Longley & Co. 32,900 0 0
Deacon & Co. 32,700 0 0
Brass & Son 32,553 0 0
Spencer & Co. 32,250 0 0
Balanam, 31,566 0 0
J. O. Richardson* 29,857 0 0
* Accepted, subject to inquiries.

LONDON.—For the erection and completion of two new warehouses and river wall at Wapping, for Sir Andrew Lusk & Co. Messrs. T. Chatfield Clarke & Sons, architects. Quantities by Messrs. H. H. Leonard & Clarke:—
Brown 213,245 0 0
Woodward 13,187 0 0
Eider & Sons 12,690 0 0
Ashby Bros. 12,690 0 0
J. & J. Greenwood 12,830 0 0
Colls & Son 12,780 0 0
J. Morter 12,685 0 0
Lawrence & Sons 12,240 0 0
B. E. Nightingale 11,240 0 0
Higgs & Hill 10,980 0 0
Hainway Bros. (accepted) 10,768 0 0
Mattock Bros. 10,383 0 0

LONDON.—For erecting new Congregational Church at Barry-road, East Dulwich. Mr. W. D. Church, architect, 12, South-place, Finsbury, E.C. Quantities by Messrs. C. Stanger & Son, 21, Finsbury-pavement, E.C.:—
H. Everitt & Son, Colchester 212,228 0 0
W. Sharrum 12,099 0 0
Woodward & Co. 11,770 0 0
Perry & Co. 11,767 0 0
Staines & Son 11,623 0 0
Dove Bros. 11,215 0 0
Hart Bros. 11,083 0 0
Colls & Sons 10,240 0 0
F. & H. F. Higgs 10,049 0 0
Kilby & Gayford 10,000 0 0
Higgs & Hill 10,436 0 0
J. & C. Bowyer 10,155 0 0
Holloway Bros.* 0,649 0 0
* Accepted at revised estimate, 47,121.

LONDON.—For new lecture-theatre, museum, &c., for the Royal Veterinary College, Camden Town. Mr. Arthur Vernon, architect, 26, Great George-street, Westminster:—
Holland & Hannau 25,653 0 0
Aikin Bros. & Davies 5,300 0 0
Dove Bros. 4,975 0 0
Bywaters 4,818 0 0

LONDON.—For re-building a warehouse in Wornwood-street, E.C., for Messrs. Fitch & Son. Messrs. Hamnack & Lambert, architects, 59, Bishopsgate-street, E.C.:—
J. Hearle & Son 43,550 0 0
Dove Bros. 3,776 0 0
E. Lawrence & Sons 3,593 0 0
Thomas Boyce 3,541 0 0
Higgs & Hill 3,494 0 0
Colls & Sons 3,469 0 0
Holland & Hannau 3,450 0 0
Ashby & Horner 3,295 0 0

LONDON.—For alterations and additions to Nos. 29 and 30, Beaumont-street, W. Mr. Thomas Durran, architect, 44, Upper Baker-street, W. :—
 Ward, Clarke & Co. £1,069 0 0
 Clifton 1,680 0 0
 Turtle & Appleton 1,560 0 0
 Alchison 1,492 0 0
 White (accepted) 1,439 0 0
 Higgs (withdrawn) 1,195 0 0

LONDON.—For alterations at "The Lyric" Tavern, Windmill-street, Shaftesbury-avenue. Mr. John Cox Bear, architect, 117, Great Russell-street, Bloomsbury. Quantities by Mr. John Leaning, 11, Poultry, E.C. :—
 Drew & Cadman £1,470 0 0
 Patman & Fotheringham 1,463 0 0
 Lascelles 1,430 0 0
 Tysman 1,300 0 0
 Chappell 1,296 0 0

LONDON.—For alterations and additions to 8, Springfields, Upper Clapton. Mr. J. Hamilton, architect :—
 Fox & Co. £720 0 0
 Kellaway 640 0 0
 S. Hayworth & Son 547 0 0
 Beal 542 0 0
 Snewin Bros. & Co. 495 0 0
 Godfrey & Co. 474 0 0

LONDON.—For new fittings, &c. to the "George and Dragon," St. John's Street-road, Clerkenwell, E.C., for Mr. W. Pierpoint. Mr. H. I. Newton, architect, 49, Victoria-street, Westminster, S.W. :—
 T. Heath, Goswell-road (accepted) .. £515 0 0

LONDON.—For alterations and restorations after fire to internal portion of premises at 101, Queen Victoria-street, E.C. Mr. J. Williams Dunford, architect :—
 F. J. Coxhead, Leytonstone £909 0 0
 Accepted.

LONDON.—For pulling down and rebuilding premises, No. 2, High-row, Clapton, for Mr. G. Charlton. Mr. T. Laurie, architect :—
 F. J. Coxhead, Leytonstone £621 0 0
 Accepted.

LONDON.—For erecting timber-shed at Plough-road, Rotherhithe :—
 F. J. Coxhead, Leytonstone £184 0 0
 Accepted.

LONDON.—For painting and general repairs at "The Sir Robert Peel" public-house, Shrubland-road, Dalton, N.E., for Messrs. Watney & Co. Mr. J. O. Enson, architect :—
 Onley & Co. £167 0 0
 Anley 153 0 0
 Spencer & Co. 135 0 0
 Jocelin & Young 130 0 0
 Robert Eddie 128 10 0

LONDON.—For new office and alterations to saloon bar at "The Clarence" public-house, Seven Sisters-road, N., for Mr. James Kirk. Messrs. Wylson & Long, architects, 15, King William-street, Strand :—
 Robert Eddie, 17, Tyndal place, Upper-street, N. (accepted) £600 0 0

LONDON.—For new shop front, &c., at 14, Brewer-street, Regent-street, for Mr. G. W. Austin. Messrs. Wylson & Long, architects, 15, King William-street, Strand :—
 Robert Eddie (accepted) £188 0 0

ORPINGTON.—For alterations and additions to High Elms, Orpington, for Sir John Lubbock, Bart. Messrs. Romaine-Walker & Tanner, architects :—
 Brass & Sons £1,133 0 0
 Hall, Bedford & Co. 985 0 0
 Holloway Bros. (accepted) 912 0 0

RICHMOND (Surrey).—For new sewers in Kew and Sandycroft-roads. Mr. Walter Brooks, Town Surveyor :—
 Tomes & Wimpey, Hammersmith .. £8,615 0 0
 Nowell & Robson, Kensington 8,300 0 0
 L. B. atoms, Upper Tooting 6,960 0 0
 A. Kellett, Ealing 6,598 0 0
 T. Atkins, Kingston 5,400 0 0
 J. O. B. Marshall, Brighton 4,983 0 0
 J. Bloomfield, Tottenham 4,807 0 0
 H. Hill, Maidenhead 4,629 14 11
 D. W. Lewis, Southsea, Hants 4,590 0 0
 [Surveyor's estimate, £5,324.]

SAWBIDGEWORTH (Herts.).—For the erection of a pneumatic mailing, at Sawbridgeworth, Herts, for Mr. E. B. Barnard. Messrs. Inskip & Mackenzie, architects, 5, Bedford-row, W.C. Quantities by Messrs. R. L. Curtis & Sons :—
 Hunt, Hoddenden £14,935 0 0
 Jas. Morter, London 13,563 0 0
 Kirk & Randall, Woolwich 13,125 0 0
 J. & A. Brown, Braintree 12,300 0 0

SOUTHAMPTON.—For the new Church of S. Mark, Rehers-road. Messrs. J. E. K. & J. P. Cutts, architects, 28, Southampton-street, Strand, London :—
 W. R. & C. Light, Portsmouth £6,221 0 0
 Stevens & Bastow, Bristol 6,430 0 0
 J. Dyer & Sons, Southampton 6,300 0 0
 J. Farnell & Son, Rugby 6,222 0 0
 E. Carter & Son, Winchester 6,105 0 0
 H. I. Sanders, Southampton 5,989 0 0
 T. H. Kingerlee, Oxford 5,983 0 0
 Bull & Sons, Southampton 5,797 0 0

SOUTHEND-ON-SEA.—For rebuilding the "Old Grotto," Marine Parade, Southend-on-Sea, for Mr. W. H. Collier. Mr. J. H. Smith-Smyth, surveyor, Tottenham :—
 O. A. Collier, Milner-street, Islington (accepted) £750 0 0

TOTTENHAM.—For erecting billiard-room at the "Black Boy" Hotel, for Mr. C. W. Tame. Messrs. Hodson & Whitehead, architects, 7, Finsbury-square, E.C. :—
 N. A. Brown (accepted) £430 0 0

WATLINGTON (OXON).—For building new church, Christmas Common, near Watlington, Oxon. Mr. Walter F. Cave, architect, 8, George-street, Portman-square :—
 Robert M. Hamilton, Henley-on-Thames £200 0 0
 Claridge & Bloxam 720 0 0
 W. Lawrence, Whitechurch 605 0 0
 E. Williams, Abingdon 552 0 0
 John Grant, Banbury 495 0 0
 Harry Harris, West Wycombe 456 0 0
 George Glanville, Pyton (accepted) 455 0 0
 George Henry Wheeler, Abingdon 449 0 0

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The Builder.

Vol. LVIII. No. 2466.

FRIDAY, APRIL 19, 1900.

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Ashley House, Shaftesbury-avenue.—Mr. Charles Bell, Architect	Double-Page Photo-Litho.
Museum at Bordighera.—Mr. C. J. Tait, Architect	Single-Page Ink-Photo.
House for the Bellaggio Estate, Surrey.—Mr. R. A. Briggs, Architect	Single-Page Ink-Photo.
Wrought-iron Lamp Brackets and Holders.—Sketched by Mr. J. W. Benwell	Single-Page Photo-Litho.
Bromley College, Bromley, Kent.—Sketched by Mr. A. C. Breden	Single-Page Photo-Litho.

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Further Notes on Yorkshire Stone (Halifax District).

In our issue of March 29 we gave a general account of the groups of quarries, and of the kinds of stone which they supplied. In addition to the information conveyed in our last article respecting flags, &c., it may be well to distinguish the meaning of the two terms so frequently used, "self-faced" and "self-bedded." These ought not to be confounded; the latter is applied to "thin-lift" stone with micaceous faces; the former refers primarily to material which happens to come away from a mass of riving rock with a moderately even surface. The term "self-faced" is, however, frequently used to include "self-bedded," but "self-bedded" ought never to be employed to mean "self-faced." The two kinds of material are usually classed together, and are often sold under the name of "common" flags or landings; they do not, however, wear equally well, nor do they present the same appearance. The self-bedded flags, with their micaceous faces, are sometimes almost as smooth as if polished, and when laid form floors of commendable evenness; their appearance is certainly in their favour, but an examination of the edge of the flag will show that the lines of lamination are very marked, being sometimes almost black. Sometimes the edge of the stone has been "stunned" by the blows received during the operation of squaring, and the flag will be seen to gape at several of the more pronounced mica-streaks. A flag of this kind 2 or 3 in. thick can often be split into three or four slates with surfaces partly "white" and partly "black." In any case, the tendency of self-bedded flags is to wear in flakes. On the contrary, self-faced flags have a rougher surface, and require, as a rule, a certain amount of labour to be expended in taking them out of twist before they can be laid to form a floor of tolerable evenness; but their less flaky nature more than counterbalances these disadvantages, if durability be any object. Frost is a very powerful agent in the destruction of flags, especially self-

bedded ones; if the stone is of a flaky nature, frost will find it out. The only thing to do under the circumstances is to keep the joints of the flagging well pointed with cement, renewing it as often as necessary; but this will only mitigate the effects of the frost,—it will not render the flags proof against it. Architects and surveyors are largely to blame for not insisting on having flags squared "full" throughout their thickness. We know of one or two Vestries in London whose Surveyors insist on this with good results; it is the best plan for public bodies to buy flags, &c., directly of the quarry-owners, and to have them squared and laid by their own workmen.

We have heard it stated that polished flags are obtained from stone of worse quality than that used for tooling; in fact, that "anything is good enough to polish." This is not true of the polished material now sent from the district of which we are writing; it is true, however, of some of the Lancashire quarries. In these, the "rag" is polished and wears very unevenly, while frost will burst fragments off the face of the stone; in addition to this, polished flags of this ragstone (which cannot easily be split) are sent with scarcely an approximation to the thickness ordered; a "three-inch" flag means anything from 3 in. to 6 in. or 7 in., and this excess entails not only a considerable increase in cost of carriage, but also more labour in laying. Only the best beds in the Halifax quarries supply the stone for polishing; never, we believe, are self-bedded flags placed in the polishing machines.

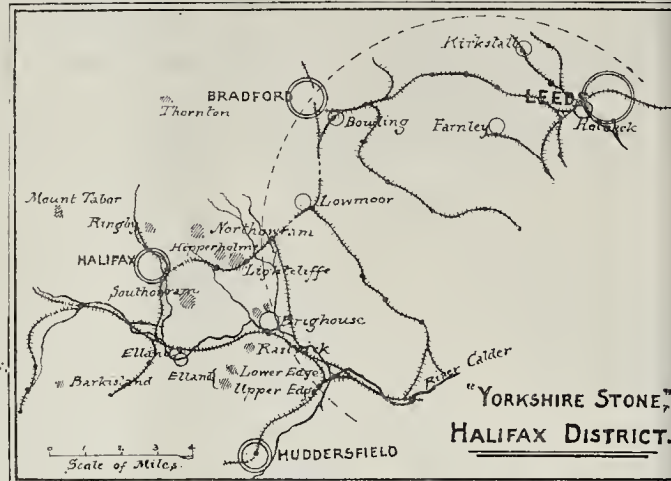
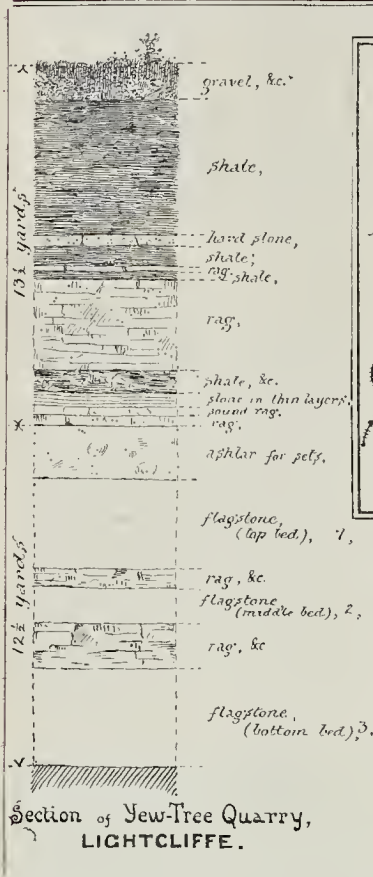
A new departure, which we watch with interest, has recently been taken by one of the principal firms of the district; we refer to the practice of branding with a certain name every polished flag, landing, and step which is found to be of the best quality.

We give a small map of part of Yorkshire, showing the position of the several groups of quarries in the neighbourhood of Halifax. The dotted semi-circle roughly indicates the boundary of the stone district, and encloses the ironworks of Lowmoor, Bowling, Kirkstall, Holbeck, and Farnley, and also a number of coal-pits. It will be noticed that the quarries at Hipperholme, Lightcliffe, Brighouse, and Rastrick are situated near the railways, whereas the older quarries at Northowram, Southowram, and Elland Edge are further removed. The three last-named have also the disadvantage of

being near the summits of lofty hills. The mere difference in cost of carriage from quarry to station is considerable; from the Lightcliffe quarries a cart will carry ten or twelve loads a day to the station, whereas from Northowram only three or four journeys a day can be made. This saving in carriage has a tendency to withdraw the quarry-owners from the older and better-known (in books, we mean) groups to the newer and more convenient. Lightcliffe now heads the list with sixteen quarries, but Southowram is a close second, having fourteen.

We supplement our remarks on the different beds of stone worked in the same quarry (see issue for March 29, p. 222) by giving a section of the quarry there described (see next page). It will convey a better idea of the strata than a verbal description. From 6-in. cubes of stone from the three principal beds we have ascertained the weights to be as follows:—Top bed, 15½ lbs. per cubic foot; middle bed, 15½ lbs.; and bottom bed, 15½ lbs. It is difficult to distinguish the stones when dry; but if the stones are wetted and then examined, it will be found that the stone from the top bed is very closely striated throughout its entire thickness (not, however, with streaks of mica); that in the middle bed the lines of lamination are less distinct; and that in the bottom bed the natural bed of the stone is not discernible, but there are a number of minute reddish-brown specks scattered throughout the stone. It is considered that this absence of beddiness in the last more than counterbalances its slightly less weight. It should be stated that some of the Lightcliffe quarries contain only two beds of stone, and some only one, even though they are within fifty yards of the one illustrated.

We have preferred to treat of the quarries in groups, and have endeavoured to show in some sort the features which the several members of each group have in common, but an intimate acquaintance with the subject shows us that almost every quarry, however near it may be to others, has some distinctive feature of its own. In the mere quantity of marketable stone the difference is very great; for instance, at Lane Head, Brighouse, in the two contiguous pits belonging to Messrs. S. & L. Cliffe respectively, the stratum is about 7 ft. thick, the lowest 3 ft. of this being "thin-lift" or "self-bedded" stone and the remaining 4 ft. being "thick-lift" or "riving" stone; at Swallow's quarry on the opposite side of the



Halifax-road (perhaps 50 yards away) the bed of stone is about 9 ft. thick, but the "thin-lift" has dwindled to 2 ft. Again, in the field adjoining his present quarry Mr. S. Cliffe sank several shafts, and in addition to the bottom bed 40 yards from the surface, he found and quarried at half that depth an upper stratum about 5 ft. thick; on trying this top bed in his present shaft he found that it had thinned out to about 18 in. and was not worth working.

Immediately beyond this most fortunate field he purchased a triangular plot of ground, but the shaft he sank in it proved quite unremunerative, for the stone, on account of oblique lamination or some primeval catastrophe, was found to be broken up into almost worthless fragments. About 200 yards distant (in Lightcliffe-road) J. Roper & Sons mine a bed of stone 19 ft. in thickness, and Farrars, Limited, at their vast open quarries utilise 33 ft. of stone.

Midway between the quarries at Rastrick and Lower Elland Edge, a shaft was lately sunk to the depth of 48 yards, but the stone was nearly all worthless; not only was it unevenly bedded, but it was also broken into small pieces, and cracked perpendicularly to the planes of bedding.

Besides the difference in quantity and lamination, there is also a considerable variety in colour, even in the same quarry and the same block of stone. At Lane Head, Brighouse, all the stone is light brown or yellow; at Lightcliffe-road there is a considerable quantity of "blue" stone, the colour showing the presence of iron. A block of stone is frequently "blue" in the middle, with an outer portion grey or white.

From these remarks it will be seen that there may be exceptions to the general con-

clusions which are here stated respecting the several groups of quarries. For all large works the architect or engineer ought to see for himself the state of the quarry proposed to be selected, besides obtaining and testing proper specimens of the stone.

In addition to the materials already mentioned, an extensive trade is carried on in what are termed "flat-bedded wallstones." A considerable quantity of "inside wallstones" are used in the immediate neighbourhood of the quarries, but not many of these are sent away by train. There is, however, a great and increasing demand for "outside wallstones," chiefly in the West Riding of Yorkshire, in Lancashire, and in the adjoining counties; several consignments have been delivered in London and suburbs for churches and halls.

The wallstones are obtained (by splitting with wedges and cutting with chisel and hammer) from the larger fragments which are cut off for the purpose of squaring the blocks of flagstones and landings, and also from those pieces of rock which are not of suitable shape and size for splitting into flags. They are usually 6 in. on the bed, but larger sizes are cut to order. Their thickness varies from 2½ in. to 6 in., and their length approximately from 9 in. to 2 ft. 6 in. It would be better, however, if wallstones of less than 3 in. thick were rejected, as they are frequently obtained from self-bedded material. Usually these wallstones are specified to be squared back from the face 3 in., and to be walled in courses of diminishing thickness from bottom to top of the building. This last is a point of considerable importance, and ought to be strictly observed, for the sake of appearance. The two kinds always in the market are known as "pitched-face" (sometimes

termed "rock-face"), and "straight-face" (also variously known as "common outside," "hammer-dressed," and "delf-dressed," but the last is certainly a misnomer, as the "pitched-face" wallstones are quite as much delf-dressed,—that is to say, quarry-dressed,—as are the "straight-face"). The epithet "pitched-face" quite sufficiently describes the rough surface of the first-class stones; the term "straight-face" is also explicit enough with this addition,—wallstones of this class always have upon their faces a number of hammer-marks vertical but irregularly spaced, varying in part according to the evenness or unevenness of the face-fracture. Those wallstones which present a perfectly even face after cleavage are sometimes left free from hammer-marks and sold at a slightly higher price as "clean-cut." Sometimes these clean-cut wallstones have a small chamfer taken off the edges, and are then sold as "slight-pitched;" they have a good appearance, and do not harbour dirt and moisture to the same extent as ordinary pitched-face wallstones. For the best work tooled wallstones are often used, but the tooling is usually done upon the building site itself, selected "straight face" wallstones being the kind obtained from the quarries for the purpose; on account of the hardness of the stone, the cost of tooling is very great. In some parts of Lancashire, it may be stated, the generic name "Yorkshire parpoints" is used to designate this kind of building-stone. By far the greatest number of buildings, erected in and around Halifax at the present time, are faced with flat-bedded wallstones of one or other of these classes. Sometimes the front or front and sides of a building will be faced with "pitched-face" wall-

Table of information respecting the principal groups of "Yorkshire Stone" Quarries in the neighbourhood of Halifax.

Situation of Quarries.	Miles from.	Nearest Railway Station.	Approximate number of Quarries.	Method of Working, &c.	Some of the Owners.	Colour.	Output.	Weight per cubic foot.	Remarks.
1. Northowram ...	1½	Hipperholme.	9	Open and mined, the latter 23 yards from surface.	Joseph Brooke & Sons, Appleyard & Booth, Haicy, Brearley, Briggs & Holmes, Wharton.	"Blue" and white, and also light yellow.	All kinds of flags and landings, hutchieffy-knotted and tooled (J. B. & S. supplying the only polished ones), sets, curbs, steps, slates (chiefly riven), wallstones, footings, &c.	lbs. 135·5 "Blue" Parkstone.	The quarries are situate on the top of the steep and lofty hill, on the lower portion of which Hipperholme and Lightcliffe stand. The wallstones are sorted into two classes, and sold as "hest white" and "blue and white," the latter presenting both colours in the same stone. The flags enjoy a good reputation for durability, the "blue" variety, from Park Quarries, being especially hard and heavy. The stone is nearly all "riving," or "thick-lift" stone. The "blue" stone has been tested and used for chemical cisterns, and can be obtained any size up to 14 ft. by 9 ft. by 2 ft.
2. Hipperholme ... (Pearson Brow)	½	Hipperholme.	5	Open, about 22 yards from surface.	J. Brooke & Sons, Shepherd & Bentley, Smith, Aspinall, Mackrill.	"White," really very very light grey, or greyish-white.	Ditto.	152	The quarries (especially the ones at Stubbins, belonging to the two first-named owners) supply the hest <i>selite</i> wallstones in the district. Sometimes the stone is sold mixed with Northowram stone, and further confusion arises because the two groups despatch their stone from the same station. The "blue" stone put into trucks at Hipperholme is almost invariably from Northowram. The stone is nearly all riving stone.
3. Lightcliffe (Hill Top) ...	¾	Lightcliffe.	13	Open, about 15 yards from surface.	J. Brooke & Sons, Shepherd & Bentley, Turner, Bentley, Crowther & Lodge, Walker & Co., Naylor, Cliffe, Blackburn & Co.	Light warm grey, (sold frequently as "white," but the colour is not as pure and uniform as Hipperholme stone).	Ditto, and also platform copings, and landings for chemical cisterns up to 12 ft. square.	150·76*	The bottom bed, found in some of these quarries, does not when wet show the lines of lamination. Selected stone from this and the preceding groups is polished by J. B. & S., at their Yew Tree Quarry, and stamped "Sillex brand." The stone is nearly all riving stone.
4. Lightcliffe (Harley Head) ...	¾	Hipperholme, Lightcliffe.	3	Mined about 20 yds. from surface.	Butterfield, Naylor, Goodyear.	Ditto.	Chiefly knotted and tooled flags, sets, curbs, wallstones, &c.	—	The stone is very similar to that at Hill Top, Lightcliffe.
5. Southowram ...	2	Halifax or Elland.	14	Ditto.	John Farrar & Sons, J. Charnock & Sons, S. Greenwood, Smith & Greenwood, Marshall & Greenwood, J. Thompson, A. Twait, Thornton, Clegg & Bartle, Maude & Deuham.	Light grey ...	All kinds of flags landings, a considerable quantity of <i>self-bedded</i> slates, flags, and landings; sets, curbs, steps, wallstones, footings.	—	Self-hedded material, with very smooth micaceous surfaces, and riving stone, are obtained at these quarries. J. Charnock & Sons have a polishing machine at Halifax, and J. Farrar & Sons one at Brookfoot, near Brighouse, and another at Thornton.
6. Brighouse (Lane Head).	¾	Brighouse.	4	Mined, about 40 yards from surface.	Samuel Cliffe, Isaac Cliffe, Thornton Cookson & Ellis, Swallow.	Light brown or light yellow.	All kinds of flags and landings (except polished), a large quantity of <i>self-bedded</i> slates, flags, and landings, a few sets curbs and steps, wallstones.	—	The wallstones are of good and uniform colour (especially the Cliffe's). The riving (very hard) and self-hedded (smooth) stones are in nearly equal quantities.
7. Brighouse (Lightcliffe-road).	¾	Brighouse.	6	Open and mined, 30 to 40 yards from surface.	Farrars Limited, Marshall, John Roper & Sons, Longhottom & Barker, Robinson.	Light grey or "white," and "blue."	Ditto, footings, and landings for chemical cisterns, tooled platform copings, tooled street-curbs, &c.	154	Some of the wallstones are variegated "blue" and "white." Self-hedded and riving stone are nearly equal in quantity — landings have been sent off containing 152 square feet.
8. Rastrick ...	¾	Brighouse.	8	Mined, about 35 yards from surface.	Bentley & Kaye, Bentley & Smith, Sunderland, Clayton, Sheffield, Jagger.	Light, warm grey, (a little blue).	All kinds of flags and landings (except polished), not many self-hedded; a few sets, curbs, steps; wallstones.	—	Nearly all riving stone.

* Mean of four weights, namely, Yew Tree Quarry, top bed, 151·5; middle bed, 150·8; bottom bed, 150·6; and Ganbert Hall Quarry, 150·14.

Table of information, &c.—continued.

Situation of Quarries.	Miles from	Nearest Railway Station.	Approximate number of Quarries.	Method of Working, &c.	Some of the Owners.	Colour.	Output.	Weight per cubic foot.	Remarks.
9. Elland Lower Edge	2	Brighouse.	4	Open, about 20 yards from surface.	Marshall & Walker, Normanton & Gledhill, John Wood & Co.	Light brown.	Sets almost exclusively; a few self-faced flags and slates; curbs, steps, footings.	lbs. 153½	Practically all riving stone. Sometimes the sets are used as wallstones or bearing retaining walls.
10. Elland Upper Edge	2½	Brighouse.	10	Open and mined, one of the latter 43 yards from surface.	F. Normanton, Walker & Brook, Rawnsley & Spencer. Marshall & Walker, Paul Normanton & Co., Richard Marsden, James Marsden.	Ditto. Ditto.	Ditto. Shoddy and self-bedded flags and landings (none tooled or polished); a few sets, steps, curbs, footings, and wallstones.	153½	Ditto. Almost exclusively self-bedded stone with smooth faces; landings up to 130 square feet.
11. Barkisland	1½	Ripponden	3	Open	Crowther & Lumb...	Ditto, but slightly darker.	Sets, flags, curbs, wallstones.		This is not as important a group as the ones previously mentioned; Mr. S. Cliffe, of Brighouse, has just stopped working a quarry here. The wallstones are not very uniform in colour.

stones, and the remainder, for the sake of economy, with straight-face. But there is not now as great a difference in the price of the two kinds as there was about ten years ago; then the pitched-face stones were ten shillings a rood more than the other, whereas one or two years ago, on account of the increased demand for straight-face ones, the prices were equalised, and now the straight-face have again fallen below the other. The difference in price between the two may be taken as 6s. per rood, that being the difference in the cost of dressing at the quarries. A rood of wallstones is 14 square yards, the stones being set up at the quarries in eight rows, 5 ft. 3 in. long and 3 ft. high. In each rood of wallstones a number of "throughs" are included, not exceeding one per yard; these, of course, vary on the bed according to the thickness of the wall for which they are required. Except near the quarries, where inside wallstones are easily attainable, the external stone-faced walls of buildings are lined with brick, and the general mode of tying the two parts of the wall together is by these throughstones. Where the internal brickwork is to remain unplastered, iron ties are frequently used, or the inner faces of the throughstones are dressed. If the brick lining is 9 in. thick, sometimes, instead of throughs, *bondstones* are used, reaching over one-half of the brick lining, this being bonded with the other half by ordinary brick headers.

The chief causes of the so general use of these wallstones in the locality are their durability and substantial appearance when compared with brickwork, and their economy in comparison with wrought ashlar. Like bricks, they are delivered upon the building site ready for use, the only working required being for the formation of the necessary headers for the angles of the building and the reveals of doors and windows. The external angles of pitched-face headers are almost invariably draughted about an inch wide on the front and return faces, and straight-face angles are also sometimes treated in the same way. It may be interesting for a moment to compare the prices current in the district for various kinds of walls. A solid brick-and-a-half wall costs 7s. a yard; a wall of the same thickness built with straight-face wallstones, 6 in. on the bed and 4½ in. brick, is worth from 7s. 6d. to 8s. 6d. a yard; and a similar wall built of tooled ashlar (from Ringhy or Hunter Hill), 6 in. on the bed and 4½ in. brick, cannot be built for less than

15s. or 16s. a yard. It will be seen, therefore, that these flat-bedded wallstones, although more expensive than brickwork, are considerably more economical than ashlar; the saving is effected not only in first cost of material but also in labour in dressing. The prices of wallstones vary according to the season, the summer prices being sometimes nearly 10 per cent. more than winter; but the following may be taken as average prices for material put on truck at the nearest railway station: straight-face wallstones, 43s. a rood, or about 3s. 1d. a yard; and pitched-face wallstones, 49s. a rood, or 3s. 6d. a yard; ashlar is worth about 1s. 6d. a cubic foot. The weight of a rood of wallstones is not more than 3½ tons, and, as the rate of carriage from the Halifax district to different parts of London varies from 10s. 10d. to 12s. 10d. a ton, the cost of wallstones delivered in the metropolis would be, say, 6s. a yard for straight-face and 6s. 5d. for pitched-face. We do not think that these prices are so high as to prohibit the use of Yorkshire wallstones in London, but we are of opinion that they might often be employed with advantage, as most of the stone weathers very well and has a pleasing appearance.

This question of durability is, perhaps, the most important of all, and the answer to it is "yes" and "no." In a house dated 1724, now standing opposite the east end of the Parish Church at Halifax, the tool-marks are still visible; in another house, which stands facing the east, within a few yards of the south gateway of the same church, and which is dated sixteen-hundred and something undecipherable, many of the wallstones are eaten into deep furrows along the joints and the most marked lines of lamination, and the surface will crumble away at a touch of the hand. To take another instance—certain houses at Northowram, dated 1651, still retain tool-marks on many of the stones; whereas a school in the same village, erected only sixteen years ago, exhibits wallstones in an incipient state of decay, some showing shallow furrows and others presenting a chalky appearance, which augurs ill for their durability. It is impossible, of course, to ascertain from what particular quarry or bed of stone the material of the older buildings just mentioned was obtained, and we are informed that the stone used in the erection of the school was supplied from several quarries at Northowram, some of which have since been worked out; other quarries, as the Park, &c., have since been opened.

It is imperative that these flat-bedded wallstones be laid on their natural bed. In a tooled or rubbed cube of the stone, it would in some cases be impossible to find the natural bed without trying to split the stone, but in most instances the lines of lamination are plainly visible, and in others they are revealed by wetting the stone. The shape of the wallstone, however, leaves no doubt as to the way in which it must be laid. Gwilt says, quoting the Commissioners, "Sandstones, from the mode of their formations, are very frequently laminated, more especially when micaceous, the planes of mica being generally deposited in planes parallel to their beds. Hence, if such stone be placed in buildings with the planes of lamination in a vertical position, it will decompose in flakes according to the thickness of the lamina; whereas, if it be placed so that the planes of lamination be horizontal,—that is, most commonly upon its natural bed,—the amount of decomposition will be comparatively immaterial." We have, however, seen very thin flakes, more than half an inch square, peeling off the vertical faces of stones laid on their natural beds, the flakes themselves being striated horizontally. Some of the striations we have seen are dark brown. This surface-flaking results, we think, from the "stunning" of the stone during squaring, and the subsequent action of the atmosphere and of rain; it serves to prove that not all striations are sources of weakness. In fact, there are many dark streaks in blocks of riving stone, along which the quarryman strives in vain to cleave the stone. But streaks of mica must be shunned; these are the edges of planes along which rain will penetrate further and further year by year, wearing them out into furrows, and sometimes freezing and lifting the stone. Generally it may be said that self-bedded stone, as it contains a considerable quantity of mica, ought to be rejected, and only riving stone employed. Care should also be taken that the joints in flat-bedded walling are well flushed up and pointed, for if not, the edges forming the joints will be the first to decay. Straight-face wallstones are to be preferred before pitched-face, as the latter harbour dirt, soot, and moisture.

It should also be stipulated that no wallstones be cut from the "rag" or "shoddy" beds of the quarries, but that they be obtained solely from the best flag-beds. If these points are observed, Yorkshire wallstones will withstand the smoky and acidulated atmospheres of our towns for centuries.

To compare the weight and strength of the stone of which we are speaking, we have prepared the following table:—

Material.	Average weight in lbs. crushing weight per square foot in ton, and	Remarks on same.
Aberdeen and Peterhead Granite.	166 534	Mean of four experiments on 1-in. and 1½-in. cubes.
Craigleith Sandstone	146 505	Stronger of two 2-in. cubes tested by the Commissioners, &c.
Portland Stone	137 276	Mean of two experiments on 6-in. cubes by Committee of R.I.B.A. in 1864.
Bath Stone (Box)	123 216	Experiments on 6-in. cubes.
Patent Victoria Stone	415	Company's own Circular.
"YORKSHIRE STONE"		
Park Quarry, North-owram.	155·5 715	Mean of three 6-in. cubes recently tested by David Kirkcaldy & Son.
Yew Tree Quarry, Lightcliffe (bottom bed).	150·6 629	Ditto.

These six experiments show that Yorkshire stone will not, on the average, yield under a pressure less than 11,000 lbs. per square inch. The "Park" stone, we may add, cracked slightly at 629 tons, and the "Yew Tree" at 532.

We append a succinct account in tabular form of the quarries of "Yorkshire Stone" in the Halifax district.

Flags, &c., from many of the quarries named in the table accompanying this article are sold to stone-merchants, and the quarry-owners do not know where they have been used, but in nearly all cases they are aware that some, at any rate, have gone to London. Great quantities are used throughout the provinces, and also in Germany and America. The principal owners, however, can point to many executed works, and some of them have agents of their own in London. Before specifying flags or other material for large works, architects and surveyors will do well to obtain from the best firms minute particulars of the places where their stone has been used, and then to inspect these places for the purpose of ascertaining the stone's durability and appearance. In no other way can a really satisfactory result be always obtained. If a firm can only state generally that its flags have been used, say, in London, and cannot point out the particular street, or rather portion of street, in which they have been laid, the information is of no value, and the architect must apply elsewhere; for it may be safely assumed that the quarry-owner who does not take the trouble to ascertain where his largest consignments of stone have been used has no pride in his work, and takes very little thought of the quality of his stone and of its future behaviour. It has not been considered advisable to state in this article where material from each group of quarries has been used, on account of the extreme difficulty of ascertaining and then of describing the exact locale, and also because in nearly all large buildings and streets stone from several quarries has been used by contractors.

To take one instance,—it is stated in Rivington's "Notes on Building Construction" (Part III.), that flags from Elland Edge were used in the Victoria Station, Manchester; but this information is really either too much or too little, for flags were supplied for this building from at least two other groups of quarries in the Halifax District, and also from certain Lancashire quarries. It may be added that "special tooled" flags have been largely used in Lambeth and by the London County Council. These are of selected stone, tooled down to a perfectly level face, and are worth nearly a shilling a yard more than ordinary tooled flags on account of the extra labour in facing.

NOTES.



HE verdict on the deaths from the Carlisle railway accident amounts to a censure on the London and North-Western Railway for the use of a brake whose action could not be depended on. It is not often that any censure as to their manner of working their line could be sustained against this company, but we fear it will be the general consensus of opinion in this case that they have been trusting the safety of their passengers to a brake which is at all events not the best known, and against which a good many failures are recorded. One or two points the jury seem to have missed in their verdict. It was certainly an omission on the part of the conductor, Downie, not to have informed the driver who joined the train at Crewe that there had been trouble with the brake in the early part of the journey. Had he been informed of this, he would at all events have been put on his guard. On the published evidence we considered from the first that no blame attached to the driver, who acted according to rules and on the supposition that the brake in his hands would do what it professed to do. But one admission by Mr. Whale, the assistant locomotive superintendent of the company, is very remarkable, and seems also to have been overlooked. He admitted that the driver tested the vacuum brake a mile further from Carlisle than he need have done, according to rules, but went on to say that he would have done better to have left the vacuum brake alone and trusted to the hand and steam brakes. This would of course mean shutting off steam a great deal sooner and taking more time to pull up. That is a precise confirmation, out of the lips of an official of the company, of the criticism we first made on the accident—that it was one of the results of running it fine in pulling up a train, trusting to the power of the modern brakes to pull up within a short distance; a system which almost ensures an accident at a large junction station if the brake does fail. We have noticed this increasing tendency to trust to the brakes for pulling up short over and over again on the leading English lines of late years; we have been in a railway accident caused by that practice; and we now have another instance of it, and we have the admission of an important practical official on a great line to the effect that it is a recognised source of danger. Then the practice ought to be abandoned. Drivers should be instructed to allow more space for pulling up, at large stations, and proportionate time should be allowed them for doing so; and the power of pulling up quickly by the continuous brake should be regarded as a power for avoiding unexpected danger, not for habitual use so as to create an unnecessary chance of danger. Journeys by fast trains would be a trifle less fast in this case, but they would be both safer and more agreeable. The habit of pulling up quickly when at high speeds is calculated to add very much to the detrimental effect which frequent railway travelling already exercises on most constitutions.

IN regard to the question of a diploma for architects in France, the *Semaine des Constructeurs* quotes with approval a letter by M. de Baudot on this subject, of which the following is the first paragraph:—

"J'ai la conviction que l'institution d'un diplôme est dangereuse pour l'art, d'une application difficile dans la pratique, et qu'elle ne peut donner sérieusement satisfaction à aucun des intérêts mis en jeu; en tout cas, si cette opinion est erronée en principe, je ne pense pas que, dans l'état actuel des choses, qui est le résultat d'un système d'enseignement vague et d'un manque absolument de véritable éducation professionnelle, il soit opportun d'armer aujourd'hui l'architecte d'un droit exclusif à l'exercice d'une profession dont les limites ne sont pas nettes."

This, it will be seen, is a repetition almost in so many words of the argument in support of Professor Roger Smith's resolution at the Institute the other evening. M. A. Lefeuille, in *L'Architecture* of April 12, has the following

remarks on the same subject, which forms nearly a repetition of the argument we used in our last in regard to the real cause of the want of power of the architectural profession, in comparison with that of the engineers, to act effectually in protecting their own highest interests:—

"Donc alors, un diplôme, un titre quelconque, ne serait autre qu'une satisfaction personnelle, et cela d'autant plus qu'aucun client n'oserait jamais demander la production d'une pareille valeur, d'un pareil titre.

Somme toute, aujourd'hui que le diplôme n'existe pas, est-ce que les choses marchent mal, et mal à ce point de voir chacun se plaindre? Est-ce qu'on manque d'hommes intelligents, capables? On manquerait plutôt d'hommes vraiment sérieux, foncièrement honnêtes (les capacités ne donnent pas toujours ces dernières qualités). Aussi aujourd'hui, et pour le moment, au lieu de diplôme, d'exigences, soyons tous égaux (en apparence du moins). Tendons-nous franchement la main! aidons-nous; unissons-nous! L'union fait la force! C'est ce nous voyant plus souvent, et d'un œil vraiment confraternel, que nous apprendons à nous mieux connaître, à nous apprécier plus sûrement, à nous respecter enfin. Là est le meilleur moyen de diminuer les faux frères qui peuvent exister encore et de ramener les récalcitrants."

WE report in another column the decision come to at the Institute special meeting on Monday last, to elect Mr. Waterhouse as a president for a third year. There could be no better opportunity for departing from the usual rule of two years than in the case of Mr. Waterhouse, who has attained a position in the profession which is in some respects unique, and who as President has exhibited a rare combination of courtesy and tact with business capacity.

THE Railway Rates Inquiry has now entered upon what we regard as one of the most practical stages. Indeed, it seems a pity that the time of the Court should have been occupied for sixty days before reaching this important stage, and that a large proportion of the evidence already offered might have been profitably reserved until now. The position of the articles in the proposed classification is at last being considered, commencing with the lowest,—the railway companies defending their proposals and the traders explaining their objections. Thus, bricks are placed in Class B, and makers urge they should be in Class A. The companies take the broad ground that the latter class should consist exclusively of unmanufactured raw material; while the traders urge that bricks are carried in heavy, compact loads, and are dealt with in the matter of loading, &c., in precisely the same manner as raw material. The brick and tile makers' interests were well looked after by Mr. Impey, of the South Staffordshire Brickmakers' Association, and others, and the position of various descriptions of iron, &c., were subsequently argued in a similar manner. The rate of progression is very slow, and when the higher classes are reached it will probably be still more tedious, as they include many more articles than the lower. Of course, the Court reserve their decision upon the disputed points, but they give expression to their opinion occasionally in a manner which shows that the position is clearly grasped, and that the arguments of both sides are well weighed.

THE case of Barlow v. Ross, reported in the current number of the *Law Reports* (24 Queen's Bench Division, p. 381), is of interest and importance. Fortunately, also, it is as simple as it is important. The Artisans and Labourers' Dwellings' Improvement Act, 1875, section 20, provides that upon the purchase of any lands for the purpose of the Act, "all rights of way . . . and all other rights or easements in or relating to such land or any part thereof shall be extinguished," subject to persons who are proved to have sustained loss under this section obtaining compensation. In 1877 the Corporation of Birmingham purchased some land for artisans' dwellings; opposite to it was the plaintiff's house, which for ten years had en-

joyed an easement of light over this land. In 1886 the defendant obtained under lease from the Corporation a part of this land for the purposes of the Act, and in 1888 obstructed the plaintiff's light. The question then arose whether the operation of the Act obstructed inchoate and accruing rights to light. For when the Corporation purchased the land, only ten years of the prescriptive period had run. The Court of Appeal decided that the Act by its terms did extinguish such right, and therefore that after the Corporation had bought the land in 1877, the growth of the plaintiff's rights ceased. But they were also of opinion that such growing rights were the subject of compensation, and that the plaintiff had had "a legitimate ground of applying to the Corporation for compensation." That this decision is in the main correct cannot be doubted; were such inchoate rights to light to be allowed to go on growing the whole use of the purchase of a piece of ground might be put an end to. Of course when the land was purchased there could not be said to be a right or easement of light in existence, and we have some doubt whether legally or morally a man with an inchoate right to light should have compensation. It is clear that if an ordinary purchaser bought the land and erected an obstruction to the light, the man with a growing right would have no right of action. Consequently it is difficult to see why a public body should be in a worse position than a private individual. On the other hand, if the private individual did not obstruct the light before the prescriptive period of twenty years had elapsed, he never could do so. Hence the compensation for an inchoate right is a kind of golden mean to enable a Corporation to be safe in the future.

WE hear from Athens that some gold ornaments have been discovered by the British School at Megalopolis. Owing to recent heavy rains, operations had to be stopped at the theatre, and attention was directed to the tumulus mentioned by Pausanias as the tomb of Aristomenes. A trench was started outside of this, and almost at once a quite plain marble sarcophagus was come across, containing bones and fragments of gold ornament. These are described as being of beaten gold, somewhat similar to the Mycenaean ones, but no definite conclusion can be come to as to their date till they have been more carefully examined. Work was stopped next day for the Easter holidays, and immediately these are over further investigations will be proceeded with at this spot.

IT seems that Manchester is hestiring itself in earnest to get rid of its canopy of smoke. Mr. Alfred E. Fletcher, in a letter to the *Times* of Monday, gives an account of the constitution of a committee to examine and report on the subject with the special view of improving the present condition of the atmosphere overhanging the manufacturing towns of Lancashire, and Manchester in particular. The two special causes of inaction hitherto, he says, have been first, a habit of acceptance of the present condition of things, as an unavoidable evil:—

"In Lancashire the workers are so accustomed to their darkened sky, the very blackness of which is sometimes taken as a sign of prosperity, that a passing grumble is all that escapes them; they accept the dirt as being inseparable from work:—

and secondly a fear that smoke-prevention appliances are likely to be too expensive for use with due regard to economy of production. "When summoned before the magistrates on the charge of emitting black smoke, the smokers say, 'show us an economical and effective arrangement, and we are quite willing, even anxious, to adopt it.' To this a fair answer would be 'the emission of smoke is illegal; choose your own course for abating it.' The average coal consumer is, however, not a scientific man; he is bewildered by the conflicting reports as to methods of burning coal without producing smoke." The newly-formed committee, of which Mr. Fletcher is chairman, proposes in a paternal

spirit to make things easier in this way for the manufacturer by collecting and arranging all the available information on the subject. The following are the main objects proposed by the committee:—

I. Collation of the results of past experience.
II. Examinations or tests to be conducted by experts, appointed by the committee, at places where the appliances for, or methods of, consuming coal smokelessly are already at work, with the object of ascertaining whether, under ordinary working conditions,—*i.e.*, with ordinary workmen, ordinary coal, and under varying demands for work,—these methods or appliances do produce or are accompanied by,—

(a) Practical freedom from smoke.
(b) Reasonable amount of duty.
(c) Economy of fuel.
(d) Moderate cost in wear and tear and simplicity of construction.

(e) Moderate cost of application.
III. Examinations or tests to be conducted on premises temporarily occupied and furnished with boilers, chimneys, and apparatus of such appliances or methods as cannot be adequately tested where they are in use, and which are of sufficiently promising and distinct a character.

IV. Issue a report embodying the results of the committee's operations."

We wish every success to this truly philanthropic effort.

FROM a passage in the *Building and Engineering Journal* of Australia and New Zealand, for March 1, it appears that the subject of the publication of tenders is being discussed in that part of the world, and that the publication of such tenders, and the occasional objections made to it, are alike on a footing exactly the reverse of what practically obtains in this country. The persons who seem specially to desire the publication of tenders here are the builders, and the only persons who occasionally make an objection thereto are the architects. The Australian journal above-named strongly urges the publication of lists of tenders, but states that "our representatives except in a few instances have been told by the architects of Sydney that builders objected" and therefore they could not adopt such a practice." On what ground the builders should or do object our Australian contemporary does not suggest, but gives some reasons why it is their own interest not to object, as indeed would seem almost self-evident. It appears from the same paper, however, that the "New South Wales Builders' and Contractors' Association" has formally and officially expressed itself in favour of the fullest publication, and it is expected that in consequence of this expression of opinion the difficulty formerly felt about the publication of tenders will soon cease to exist.

IN the autumn of this year will be opened at Turin what is we believe the first Italian exhibition of architecture and architectural design. The exhibition will comprise three sections: (1) Architecture, including studies and restorations of ancient architecture and designs in modern architecture; (2) Decorative work and art manufacture, including marble and stone work, terra-cotta, stained glass, mosaic, decorative painting, wrought and cast iron work, wood carving and inlay. The third main section will consist of architectural publications, historical and illustrative.

WHEN the scheme of St. Martin's-in-the-Fields Vestry for acquiring the property north of Green-street and improving the street is carried out, old Green-street will practically disappear. The name by which the street is now known (for it appears to have been once known by the euphonious appellation of "Dirty-lane") commemorates the site of the Green Mews of the Earl of Leicester, which stood where are now St. George's Barracks, behind the National Gallery. A chapter of the biographical sketches added by J. T. Smith to his life of Nollekens, contains some account of Woollett's early struggles as a line-engraver and etcher in Green-court, where he executed a copper-

plate of Wilson's landscape, the "Niobe," for Alderman Boydell, receiving one hundred guineas for the work. Woollett was born in 1735, in King-street, Maidstone, where his father was a flax-dresser. He learned his art at the hands of John Tinney, in London. He removed from Green-court, circa 1769, to No. 11, Green-street, and was buried, 1785, in old St. Pancras Churchyard, where his grave-stone, and that of his widow, were restored by the Graphic Society in 1846. In the cloisters at Westminster was set up a monument, with a bust by Banks, in honour of him who engraved the "Death of General Wolfe" and the "Battle of La Hogue," and other well-known works of his day.

WHEN the present General Post Office in Edinburgh was completed, about forty years ago, the accommodation provided for the department was considered excessive, but it was thought prudent to make provision for future expansion of work. A suite of rooms, over and above the requirements, were occupied by the General Board of Lunacy, but, in the course of time, that Board had to find quarters elsewhere. The increase of business has of late years been such as to cause great inconvenience to the officials, and it has become absolutely necessary to provide additional accommodation. Mr. W. W. Robertson, of Her Majesty's Board of Works, has accordingly been directed to prepare plans for an addition to the building, which was designed by his predecessor, the late Mr. Robert Matheson. Over the present sorting office an additional storey is to be erected, and the southern façade will be extended to about double its present width, which will then be about 180 ft. long, and rising from the level of the North British Railway Station to a height of about 100 ft. The benefit of these extensions will chiefly be felt by the telegraph department, sorters, letter-carriers, and parcels post. These additions will, of necessity, have to be carried on by degrees, so as not to interfere with the current post-office work. The estimated cost of the additions is placed at 30,000.

ONE of the objections advanced against the proposed underground railway in Princes-street, Edinburgh, was that the formation of a station at the west-end of Waterloo-place would necessitate the destruction of one of the finest architectural features in the neighbourhood. Sir James Gowans, the Lord Dean of Guild, has suggested, in the pages of the *Scottsman*, an alternative, which would be in every respect more suitable; it is that the Caledonian Railway Company, the promoters of the scheme, should secure the vegetable market, which is on about the same level as the proposed railway, and convert it into their East Princes-street Station. One evident advantage of such an arrangement would be that the market is in contact with the North British Railway Station, and greater facility of transit from the one station to the other would be had than if the Waterloo-place site was adopted. Sir James Gowans expresses a hope that if the projected railway is carried out, the bridge across London-road shall be made an architectural feature and not an eyesore, as such erections generally are when left entirely in the hands of engineers.

ON Wednesday, 30th inst., will be put up for sale, at the Mart, the ground leases, for fifteen years unexpired, of Nos. 166-173, Piccadilly, comprising the Dudley Gallery and the Egyptian Hall (No. 170). The three leases, with ground-rents, amounting to 3882. 3s. 6d. per annum, are held directly from the Crown; the property is at present under-leased at a total rent of 3,144l. a year. The Egyptian Hall was built in 1812, at a cost of 16,000l., after the designs of G. F. Robinson, architect—(the figures of Osiris and Isis are by L. Gahagan)—for W. Bullock's museum of natural history specimens gathered in Africa, the Pacific, and the Americas, together with many objects from the Leverian collection,

all of which were sold seven years later. The hall was then used from time to time for the exhibition of numerous pictures, models, "marvels," and other shows. These included Seurat, the "Living Skeleton," of whom a full account is given in Hone's "Every Day Book," vol. 1., columns 1017-31: Haydon's painting of the mock-election at the King's Bench Prison (1828), which George IV. purchased for 500 guineas; and, in 1844, his "Ostracism of Aristides," which, as that unfortunate man has himself told us, proved so sorry an attraction as compared with the dwarf "Tom Thumb" in the same building at the same time; and the "Siamese Twins," in 1829. Also a model of the tomb of Psammuthis, discovered by Belzoni (1821); Captain Siborne's model, with figures, of Waterloo, shown twice, in 1838 and 1845, and since deposited at the United Service Museum, Whitehall; Sir George Hayter's picture of the first reformed House of Commons (1843); Brunetti's two models of Jerusalem (1847); Banvard's diorama of the rivers Missouri and Mississippi (1848); and Bonomi's panorama of the Nile (1850). In 1852 Albert Smith first gave here his illustrated lecture upon his ascent of Mont Blanc.

THE latest of the series of paintings which Mr. Ford Madox Brown is executing as decorations for the Town Hall of Manchester (the tenth in number) is at present on view at Messrs. Dowdeswell's in New Bond-street. It represents John Kay, the inventor of the Fly-Shuttle, saved by his wife from the rioters, who proposed to take vengeance on him for the same reason that the Luddites in later times attempted to wreck machinery and lynch the owners of it, viz: for the crime of inventing labour-saving appliances. Kay's wife had him carried out, according to the story, by two of his workmen, concealed in a woollen sack or wrapper, and conveyed away in a cart from the scene. The painting shows the moment when Kay is being unwrapped and two of his men are about to carry him off. The whole scene has been cleverly got into a form for decorative painting, the long side of the room occupying the length of the panel, with the rioters seen through a window on the left and the cart through an open door on the right, the main group of figures being towards the right. This group is rather a confused tangle, and at first sight the head and shoulders of Kay appear to belong to the legs and feet of the man who is stooping to lift him; an unfortunate effect which the eye does not quite lose sight of even after the various personalities have been disentangled. The figures of the wife and children, all of whom seem very young in comparison with Kay's bald head and grey hair, are curiously short and stumpy in their proportions. The boy half lying on the table to get a look through the window is very cleverly drawn. On the whole we fear the general effect of the scene, in spite of the fine character and individuality of the heads, is a little ludicrous, though it tells its story with energy enough no doubt. It is a painting decorative in method and execution, but realistic in conception; and the two things hardly go together.

An excellent piece of arras tapestry has recently been executed by Messrs. Morris & Co., from the cartoons of Mr. E. Burne-Jones, and is intended to occupy the wall over the rector's stall in the chapel at Exeter College, Oxford. The subject, the visit of the Three Wise Men, has been treated in much the same manner as is usually done, but some of the details, such as the "Star of Bethlehem," being held in the hands of an angel in white and gold, and the Virgin being seated in an arbour surrounded by flowers, is a departure from the conventional treatment. The scheme of colour generally is low in tone, blues and reds forming the chief colours in the draperies, and the background a dark blue forest; but much light has been intro-

duced in the central figure of the angel, and on the steel armour of one of the figures. The execution of this steel work, and of the watered-silk worn by another of the Wise Men, is especially noticeable. The foreground is composed of grass thickly carpeted with flowers,—chiefly white lilies and blue iris.

AMONG the principal works at the Dudley Gallery Art Society's Exhibition are various large drawings by Mr. Walter Severn, two from Mentone, "The East Cliff" (163) and "The Old Town" (234), both of them rather hard in effect, especially as to the treatment of the sea; in the last-named the irregular piles of red-roofed houses are effectively treated. His "Crinan Canal" is a fine work (221), though here again the water is the least satisfactory portion. Among the most artistic works exhibited are various drawings by Mr. Fullwood, especially "By the River, Old Windsor" (122), a fine landscape with very rich colour and with a style of its own. His "Harvest" (120) is really a study of an old churchyard with its company of moss-grown head-stones in the foreground; a powerful work. Miss O'Hara's "Night's Shadows Falling" (212) is a study of sea in twilight of more than ordinary merit. A large drawing by Mr. R. Jones "Early Spring" (224) shows some fine painting of trees. Mr. F. G. Coleridge's various scenes on the Thames are good, and resemble the places they are meant for, which is not always the case. Signor Giampietri sends one of his admirable studies of Roman architectural remains, "Clivus Capitolinus" (58). Along with a good deal that is commonplace there are various other works of interest which we have not space to mention more particularly.

THE Ruskin Museum at Sheffield has at last been brought into a more accessible situation, experience having proved that the working man, when he has a holiday, will not take the trouble to walk two or three miles up hills to study a collection of art-treasures, as anyone but Mr. Ruskin might have known from the first. The new Museum, in Meersbrook Park, was opened on Tuesday last by the Earl of Carlisle, whose speech was followed by one from Mr. Arthur Severn which afforded a characteristic example of the logic of the disciples of the Ruskinian cultus. Mr. Severn is grieved that it should be necessary to show in the British Museum and other museums so many things that are not beautiful; "he would have no South-Sea gods, no skeletons, and no ugliness of that kind." So that history and anthropology go for nothing, we presume. But there is another question besides this: is Mr. Severn quite certain that we should fully realise beauty if we had no conception of its reverse? Does he forget Goethe's answer to the man who objected to the presence of evil in the world—"So you want to jump off your own shadow?" The same thing applies in the artistic as in the moral world: we cannot jump off our own shadow.

Land at Knightsbridge.—A correspondent writes:—"The unique building site forming the 'island' at the junction of the Brompton and Knightsbridge roads, which has for so long been occupied by small buildings entirely out of character with the present requirements of the neighbourhood and surroundings, has, we understand, been recently disposed of by Messrs. Chadwick, of Parliament-street, Whitehall, Messrs. Pinder, Simpson, & Newman, acting for the lessee. The site, which occupies an area of about 36,000 ft., with the extensive frontage of between 700 ft. and 800 ft., is believed to be one of the most valuable and important pieces of land which have come under development in the West-end of London for several years past. It is to be hoped that the buildings about to be erected on it will be of a higher architectural character than those with which some other important London sites have of recent years been covered." We believe the architect is to be Mr. Spencer Chadwick, but do not know for what purpose the buildings are intended.

THE NEW MUSEUM AT BERLIN.*

IN 1883 a new building, destined to hold the geological, paleontological, mineralogical, petrographical, and zoological collections of the Berlin University was commenced, and in December last its inauguration took place, the German Emperor personally declaring it "open."

Although situated at some distance from the homes of those people most likely to visit it, the new Museum has wisely been placed in close proximity to the Royal Agricultural and Royal Mining Colleges (both of which contain valuable collections), and it now takes up the central position in this imposing group of buildings.

As to the exterior of this new home of Natural Science, not much can be said, excepting that the architect-in-chief, Professor Tiede, has done as much as he could to ensure a monumental appearance of the building, considering what very meagre means were granted for the benefit of the façades. The central feature of the front elevation, which stands in advance of the main flight, is emphasised by a columnar order, and this part has been adorned with the statues of Johannes Mueller and Leopold von Buch and the sculptured heads of Ehrenberg, Alexander von Humboldt, and Weiss. All the other parts of the exterior are of a very monotonous and rather badly-proportioned design.

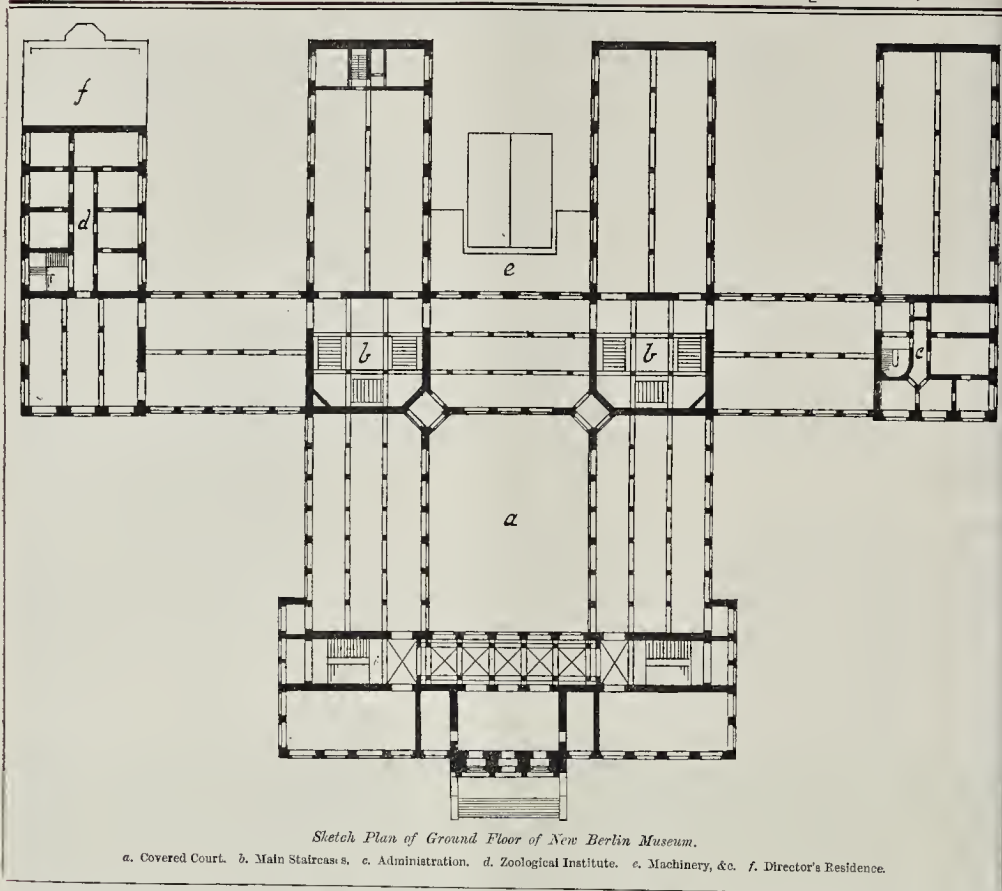
The new building covers 8,145 square metres of the site, and faces due south. The central court is covered in the boilers, machinery, &c., have been placed outside the main building between the two central wings on the basement level, with a top light; and in the north-west corner the plan shows the official residence of the director. In the extensive garden at the back of the building, huts for mammals, an aviary, and a reptile house have been erected, it being the intention of the present chief to keep such species of live-stock as might be required for scientific investigation close at hand.

Owing to the death of the former keeper of the Zoological collections, the interior arrangements are in many ways different to the original intentions of the promoters, and hence the grouping, &c., of the collections does not quite accord with what might be expected when looking at the plans. Whilst the original idea was to have all the collections (and hence also the different stories) accessible to the public, the Museum as it now stands is divided into two separate departments,—(1) scientific collections for the professional student; (2) popular collections for the general public; and as the latter are all situated on the ground and basement floors the enormous staircases leading to the upper stories become quite unnecessary. Another point not at first intended is the organisation of a so-called Zoological Institute, which takes up the greater part of the west wing; here some of the large show-rooms have had to be divided up and he changed into a set of lecture-rooms, work-rooms, and studies, together with all such offices as are required for the scientific investigation of zoological questions. Besides these two considerable alterations, which are solely due to the new director, Professor K. Moebius, various smaller but, perhaps, not less important new dispositions have been made.

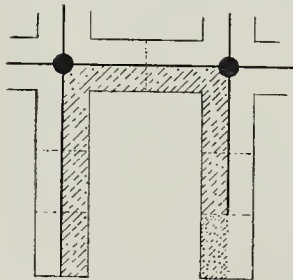
For instance, Professor Moebius has taken special interest in the planning (*i.e.*, positions, measurements, colour, &c.) of his show-cases, and the internal arrangements of every room under his control have been worked out under his direct superintendence. Numerous trials have been made, and the Professor's great aim has been that the new museum should even excel in detail the model museum he had organised at Kiel some years ago. He has reached his ideal, his show-cases have been planned in a most practical way, all receiving excellent light, and their positions not only leave the visitor plenty of free passage, but naturally compel him to make a systematic tour through each room.

It has been Professor Moebius' great desire to prevent the eye being distracted more than needs be, and therefore he has placed the exhibits so that the visitor can never see too much at a time. All his show-cases, excepting now and then a corner one (which then contains exhibits of larger size than the rest), are divided lengthways by movable

* Das Neue Museum für Naturkunde zu Berlin. We are indebted to the Director, Prof. Moebius, and the superintending architect, Baunsp. Kleinwachter, for the particulars.



canvas partitions, as shown in the diagram, thereby causing the show-room to consist of a set of separate compartments in which can be seen only those things that are contained therein. Of course, the visitor does not, according to this arrangement, find such an agreeable view, or perhaps one may say such a picturesque confusion, as he has been wont to find in most museums; he does not find a room full of transparent cases filled with many-coloured objects on which the light plays on from different directions; but it is argued that this is not the object in visiting a museum.



Arrangement of Screens to Cases.

All the halls and rooms of this new Museum have, by the Professor's directions, been kept as plain as possible, and the show-cases (which are of iron) have no unnecessary mouldings or ornamentation. The fittings, partitions (*i.e.*, backgrounds), &c., of these cases are all uniformly painted in a yellowish-grey tone, somewhat like the tint of a lithographic stone, and all such apparatus (both of wood and iron) as

are used for mounting the objects exhibited are of the same colour. This prevailing tint forms an excellent background for showing up the various objects exhibited, and marking the outline of the object as distinctly as possible, and at the same time does not attract or distract the eye in the least.

Such objects as are entirely transparent, or nearly so, and which hence require a good light at the back of them if their fibres, &c., are to be seen at all, have been placed in small show-cases in front of the north windows, and can be examined with ease without incommoding the free passage.

All the details of the plan have been devised with a view to giving every facility for the examination of the contents of the building.

The Zoological Institute, under the direction of Professor Schultze, has, in spite of its quite recent organisation, according to the requirements of the new administration, been excellently arranged. It has been so planned that the visitor ascends from the garden in which the live animals are kept, or from the cellars, where an aquarium has been placed, to the rooms in the basement, where the coarser work of the preparator is done by his servants, and from this floor to the one above, which is destined for more careful work and scientific investigation, and then finally ascends to the second floor, which is taken up by lecture and demonstration-rooms. A large lecture-hall on this floor has 300 seats, and another on the first floor 80; and room has been found for the tables, instruments, &c., for the 50 students who will take the practical courses in "observation and examination" of zoological matter. At the top of this wing, hot and cold rooms and also an open terrace have been planned for the reception of living animals coming from other climates, and in close proximity to these novel habitations a set of photographic ateliers and observation rooms are to be found.

On the first and second floors of the east wing

the committee-room and library, the studies of the Director, several keepers and assistants and the offices of the administration have been placed, and if there is any mistake in the planning it is certainly to be found in the steep and very badly lighted staircase which leads to this very important part of the building. In fact, the whole of this little bit has been wrongly placed; its natural position would have been in the west wing in close proximity to the Zoological Institute and the official residence of the Director. As to the latter, it shows no point of interest; it is, if anything, too roomy, lacks comfort, and according to its position in the building receives the north and east winds,—a great disadvantage in a German climate.

As a whole, however, the building may be well called a success; it is well adapted to its purpose, has plenty of air and light, and has the advantage of not being over-decorated. As mentioned above, the working out of the designs was placed in Professor Hilde's hands, who, together with Ban-Inspector Kleinwachter, has superintended the erection, the latter gentleman being especially appointed for the technical and business superintendence. As to construction, the whole of the building, except the roof, is of fireproof materials. Steam and hot-water coils have been used for heating purposes. The Museum building, not counting fittings, has cost 3,200,000 marks, the fittings alone 970,000 marks, making a total of 4,170,000 marks, or nearly 208,500*l.*

French Exhibition in London.—It is announced that the French Exhibition at Earl's Court and West Brompton will be opened at 3 p.m. on Saturday, May 10, by the Lord Mayor of London. The French Committee, we are informed, are of opinion that this will be the most representative display of arts and industries yet made by France abroad.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

RE-ELECTION OF THE PRESIDENT.

A special general meeting of the members of this Institute was held on Monday evening last, Mr. Arthur Cates, Vice-President, in the chair. On the motion of the Chairman, seconded by Mr. J. Macvicar Anderson, and supported by Mr. Henry Dawson, it was unanimously resolved to suspend By-law 26, which limits the term of office of the President to two years, in order that Mr. Waterhouse might be elected to that office for a third year.

Mr. Waterhouse shortly afterwards entered the room, and on taking the chair expressed his thanks for this mark of the members' goodwill and confidence.

The tenth ordinary general meeting of the session was then held, Mr. Alfred Waterhouse, R.A. (President), in the chair.

Church Fittings.

Mr. J. P. Seddon read a paper on "Church Fittings." The following is an abstract of it:—It is a question depending on the special circumstances of each particular case how far the fittings of a church should correspond in character with the architecture of the fabric. It is doubtful, as this age possesses no special style of architecture of its own to bespeak its historical succession, whether artistic harmony or archaeological consistency be the more important. A good rule where an old church is concerned is to leave it alone; but when one has to be refitted, it would seem that its furniture should not be of an earlier, but might be of a later style than that which is the prominent one of the structure; while with regard to wholly new buildings, they and their contents should certainly correspond. In all cases, however, the introduction of novel materials or modes of workmanship, and of the highest class of the subsidiary arts employed, may well serve to distinguish church fittings as being of the nineteenth century, and not merely slavish copies of old examples. As to church planning, the native Gothic style, than which (as laid down in the paper on "Requirements and Suggestions," issued by the Incorporated Church Building Society) none is more generally suitable for a church in the United Kingdom, is elastic enough to admit of any change needed to accommodate modern use and ritual; whereas that now fashionable for secular architecture, which ignores the scientific invention and beauty of the pointed arch, does not seem, even in its *chef-d'œuvre* of St. Paul's Cathedral, to have been able to assimilate a frank expression of constructional and ecclesiastical needs with its empirical rules of design. Simplicity of plan and amplitude of scale are more preferable for modern use than elaborate but diminutive detail, and in this respect it would be well that our architectural works should emulate the engineering ones of the day. The author has endeavoured in this new Church of St. James at Great Yarmouth to apply his own ideas of the manner in which he would deal with modern problems, in the architectural language inherited from our Medieval ancestors.

Church fittings, without reckless abandonment of precedent, should as a first requisite subserv utility, but may at the same time be made objects of beauty, and admit of ornamentation of high class and varied nature; among them

Fonts have in past time been specially distinguished by the lavish thought and art bestowed upon them and their accessories, and nowhere more so than in this country. Those of the Norman period, though the earliest, are generally the richest and most vigorous; those of the thirteenth and fourteenth centuries are more refined in their ornamental detail, but display less fancy in design; the Perpendicular fonts of the fifteenth century are no longer grotesque, but graceful in proportion and more appropriately enriched. The exquisite canopied spire of the font cover of Ufford Church, Suffolk, and the noble baldachin-like enclosures of the fonts of St. Peter Mancroft Church, Norwich,* and of Trunch Church, Norfolk, are examples of the magnificence often indulged in as regards this particular feature of church fittings by our ancestors. Modern munificence is often displayed upon the same objects, and we have at disposal for the purpose still richer marbles, with cloisonné and other kinds of mosaic, and the zealous services of able

* Illustrated, as restored by Mr. F. T. Buggallay, in the *Builder* for January 4 last.

sculptors if we would only employ them. In the fonts of Llandaff Cathedral, Rotherham Church, St. Margaret's Church, Westminster, and others, executed from the designs of the author, some of these means have been made use of as far as funds have permitted.

Pulpits, as Mr. Ruskin has said, may be over-ornamented, and if the preacher is to be thereby made to appear insignificant in comparison, as in some of the extravagant examples in Continental cathedrals, this has obviously been the case, yet the moderate richness of design seen in the specimens collected and published by Mr. Dollman from old churches in England cannot fairly be so censured. In the pulpit in course of erection for the choir of Norwich Cathedral, in honour of Dean Goulburn, from the designs of the author, the material employed is oak; that for Llandaff Cathedral is in stone, with marble columns; while others are entirely of marble, as at St. James's Church, Paddington, and Betchworth Church, Surrey (executed by Messrs. Blacklee, of St. Marychurch, Torquay, in their marbles from that locality); in the latter, mosaic has also been extensively employed. Drawings of other designs of a simpler character both in stone and wood suitable for small and cheaper churches are also exhibited.

Lessons may be considered in connection with pulpits as being the appliances in most churches where the Lessons are read; yet for this particular purpose their usage dates only from the seventeenth century. Many old examples of lecterns are, however, to be found, and those which take the form of eagle-desks were no doubt intended for the reading of the Gospels from the north side of the sanctuary, and other simpler ones were provided for the Epistles to be read from, and for other purposes for which uses were formerly and might again be found. As, however, one lectern only is now usually employed in moderate-sized churches, there seems no reason to object to this being of the eagle-desk variety. This is generally made in brass, and may be a costly object. That at Llanbadern Church, near Aberystwith, has an eagle made in majolica ware, with stone support; and that at Ingham Church, Norfolk, has a similar eagle on a wooden base, and designs for several of a simple and inexpensive character are also shown.

The Altar, with its surroundings, is, of course, the principal object in a church, on which the highest efforts of the architect to dignify it should be employed. The altar-table should be of sufficient width and height—not less than 8 ft. long as a rule, nor more than one-third the width of the chancel; 3 ft. 5 in. is the minimum height, 2 ft. 3 in. is sufficient for the width, as such will permit of the retable being then conveniently reached. The table itself does not require elaborate ornamentation, as its purpose is to be vested with rich altar-cloths; at the same time it should not be mean. Wood is the material most in use, but the altar-shelf behind it, to support the cross, candlesticks, and flower-vases, should be a part of the structure of the east end, and may be of stone or marble built into it. The drawings shown comprise the table in Lambeth Palace Chapel, St. James's Church, Great Yarmouth, and Christ College Chapel, Brecknock. The example given of an altar-shelf is from the new church at Gorse Hill, near Swindon Station; and that for the altar-rail for Norwich Cathedral, recently executed from the author's designs by Messrs. Starkie, Gardner, & Co., in brass and enamel on groups of marble columns; together with others in wood for smaller churches, are also shown.

The Reredos is the background to the altar-table, and therefore it is enriched in order to concentrate attention to that. Consequently it should not appear as if its object were to draw all eyes to itself. Even though the whole east end of the chancel be combined into one magnificent scheme of decoration, prominence should be given to what is the reredos proper—the immediate background of the altar-table, extending but little on either side of it, and rising to no great height above it, and not encumbered with sensational sculpture. This is the position generally chosen for a carved panel representing the Last Supper, a subject essentially picturesque in contradistinction to sculpturesque, and in white marble ineffective at a distance. Such a panel was placed in the reredos designed by the author for St. James's Church, Paddington, to his great regret. In St. Saviour's Church at Bath the reredos is of stone, executed by Mr. Hems, with a white marble cross in the central panel surrounded by foliage, with seven doves; and in the side

ones are the four Evangelists' emblems, and all are in high relief carved in alabaster. At St. Peter Mancroft Church in Norwich the reredos is in oak, and in the Perpendicular style, of which that noble church is a fine example; other examples of a simpler character shown are from Llanbadern Church, Aberystwith, and elsewhere.

The Seats for the congregation are the principal fittings for a church, and it is essential that they should be comfortable, and yet not conducive to lounging, and that they should afford proper facilities for kneeling. The variation of practice in so simple a matter is astonishing, and therefore the subject is now under the consideration of the Committee of Architecture of the Incorporated Church Building Society, as the paper entitled "Requirements and Suggestions," already referred to, is now under revision, and it is proposed to submit it to the criticism of this Institute before it is finally settled upon. Mr. William Butterfield has given his views, founded on great experience, in a pamphlet entitled "Church Seats and Kneeling-Boards," which deserves careful consideration. Several examples are shown in which the author has from time to time striven to arrive at the best result with regard to economy, and he also submits an attempt to provide suitable kneeling accommodation in cases where churches are furnished with chairs instead of fixed seats, which has been worked out by Mr. Carter, joint architect with himself for Grange Town Church, near Cardiff.

The Choir-stalls and Desks which were given to Rochester Cathedral nave as a memorial to the memory of his father by Canon Cazanove, and the stallwork in the chancel of St. Nicholas's Church, Great Yarmouth, are shown as examples designed to suit special conditions in the former case, and as suitable for a large church in the latter, and others for smaller churches in addition.

Church Screens are objects of extreme importance with regard to the effect of church interiors, against which, unfortunately, there is a modern prejudice, and in one diocese, at any rate, they were all but prohibited. They have, however, a useful purpose as marking the separation of the sanctuary from the congregation, and, aesthetically, a church seems unfinished without one. At Ingham Church, in Norfolk, the lower part of a magnificent old stone screen exists, and a design for a conjectural restoration of the upper portion to accord with what remains is exhibited. Wood, however, is the more ordinary material employed, and admits of great variety of treatment, whether simple or rich, and some examples are shown.

These and other church fittings, with monuments to the memory of the departed, are, perhaps, the best opportunities afforded to architects at the present day upon which they can devote their efforts to realise their own ideas of beauty; but it is earnestly to be desired that they would, whenever able, call to their assistance sculptors and painters as well; and this, by re-establishing the unity of the arts, which is an essential to their success, strive to enlist the sympathy and interest of the public, and render our churches once more museums for the people of this highest order of sacred and ecclesiastical art.

Mr. Wm. White, F.S.A., opened the discussion. Upon the general principles which the paper had brought forward he believed they would be all pretty well agreed. There could be no doubt that the Medieval Gothic of England was sufficiently elastic for all present purposes, in spite of some objections to it as representing disused and abolished practices and ritual. The present Prayer-book, including the at present much-discussed Ornaments Rubric, really represented the views which the Reformers had in eradicating from the Church what were regarded as superstitions. Mr. White continued that he was glad to hear that was considered an offensive term. It was not the term he would use, but what was much used at present to bring into discredit the treatment of churches generally, which he maintained ought to be followed. For such subordinate fittings as seats they ought to beware of great elaboration; nevertheless in churches which were elaborately finished it would not be right to leave the seats uncared for in their general treatment. At the same time strict convenience in treatment ought to be followed, and the question of the sloping seat was a matter, which had created a great deal of difficulty

Lecterns, again, ought to be designed with a sufficient slope to enable the reader to see readily without turning his face downwards towards the book. The height of many old altars was 3 ft. 3 in., and that, he believed, was better than a higher one. The centre should be treated as one with the altar itself, and not as a separate panel. He did not like the plain Latin cross in the centre. It was a distinctly modern invention, and not introduced in Mediaeval or earlier times in this way, being then considered as worthy of the highest decoration. The treatment of sculpture and painting for the centre of the reredos ought not to be suggestive, or what was termed conventional. In this connection he was sorry to have to express an opinion on one of the most magnificent frescoes of the present day, viz., that on the reredos at Lyndhurst Church, which, to his mind, set at defiance those principles. In that case, there was a realistic figure standing apparently in the middle of the altar in a way which was not agreeable. A church for a very large congregation was not the best for sound, unless divided up into aisles as well as nave, when it would in reality cost less than if it were not so constructed. The position recommended in the paper for the pulpit was the north side, but he considered the other side the right position; and in old churches where pulpits occupied their original place, they were found to be on the south side. Mr. White concluded by proposing a vote of thanks to Mr. Seddon.

Mr. S. J. Nicholl seconded the motion, and complimented Mr. Seddon on the fine collection of drawings he had exhibited. The old tradition of the font was that it should be approached down some steps, the original idea being that as they were born again in baptism, so they should descend into the tomb. The "wine-glass" pulpits were apparently reached by a portion of the staircase to the rood-screen. There were two ideas connected with the altar: the one that it was a table, and the other as to its being the tomb of the Martyr. The old idea of the communion-rail was that of a kneeling-bench. One could not help observing the great convenience of the loose seats common on the Continent. Something had been said as to the pulpit not being made magnificent, and Mr. Seddon had remarked that they were frequently too large. But any one who had seen an archbishop preaching from one of those Continental pulpits, especially with his mitre and crozier, would not consider the pulpits were too large.

Mr. R. Herbert Carpenter supported the vote of thanks, and spoke of the magnificent bronze fonts he had seen in the churches of Bremen. At St. Margaret's, Westminster, the font was so situated that it would suffer when the church was crowded. In the foreign churches he had referred to, however, the fonts were surrounded by splendid screens. He also mentioned the splendid font with stone spire and screen, at Lubeck, standing in the centre of the nave. This was parallel to those he had referred to, only on a much grander scale. He was glad Mr. Seddon had objected to the introduction into the reredos of sculptured representations of the Last Supper, it being a subject which never told in sculpture unless it was falsified, the great expense of white tahlecloth, in fact, spoiling any picture.

Mr. E. J. Tarver said that on the first occasion when he had to design church seats he cut out a facsimile of the human figure in cardboard, and having arranged it in what looked like a comfortable posture, he fitted the seats to it.

Mr. William Woodward remarked that he had been very much struck with the beauty of a font in the Baptistery at Pisa. The finest benches for seats that he knew were in the parish church of Hamstead, designed by Mr. Cockerell. These were classic in feeling, and, to his mind, were very beautiful. With regard to chairs, those who had visited Continental cathedrals would be sorry to see the chair principle adopted in this country. The noise created through the dragging of the chairs during the service was very detrimental to the attention which ought to be paid in church; and for the same reason he objected to a tile paving. As to the organ, it was not necessary that an architect should be a musician; but in designing a church he should make provision for the organ, giving it sufficient space, and not providing a small chamber in which the organ was buried, and its music lost. With regard to the church at Lyndhurst, he considered the fresco there by Sir Frederic Leighton the most

beautiful and harmonious treatment possible of the eastern end of a church.

The President said it was refreshing to have this old subject brought before their notice again. No one in the discussion had alluded to Mr. Seddon's remarks as to grandeur of scale and simplicity being a desirable object in building churches. This had been very much brought to his mind lately during his sojourn in Spain, where the churches were so very noble in their proportions. One felt on coming back to English churches that there was something very mean and despicable in a seat. It should be borne in mind, too, that if the seats were made too comfortable it rather tended to long services, which, perhaps, were not desirable.

The vote of thanks was then put, and carried by acclamation.

Mr. Seddon, in his reply, agreed with what Mr. White had said as to the use of the Latin cross. In regard to another question, in one of his drawings he had shown a board specially put for hats, and at the end was a place for umbrellas.

The proceedings then terminated.

Illustrations.

THE DRAWING-ROOM, GREYFRIARS, DUNWICH.

THIS room forms part of an extensive addition to Greyfriars, Dunwich, the seat of Colonel St. John and Lady Constance Barne.

The mansion stands in a well-wooded park close to the sea, and the site is altogether a beautiful spot. A seaside treatment has been adopted for the additions, with a wide verandah on the ground-floor and balcony above, whilst the style of the exterior is a free treatment of Tudor to harmonise with the old part of the house. Adjoining the drawing-room, and opening into it, is the boudoir, fitted up in similar style to the drawing-room.

The woodwork of the drawing-room is in light-coloured wainscot with inlaid parquetry floor and plaster ceiling. The dimensions of the room are 60 ft., by 25 ft., by 13 ft. high.

Music is the chief subject illustrated by the carvings, full-size details of every portion of which have been supplied to the carvers, Messrs. John Groom & Son, of Ipswich.

Mr. Alfred Brown, of Baintree, is the contractor, and Mr. E. F. Bisshopp, the diocesan surveyor, is the architect.

ASHLEY HOUSE, SHAPTESBURY AVENUE.

THIS building occupies a prominent corner site at the junction of Dyott-street and Shaftesbury Avenue—the Oxford-street end—and adjoins the French Protestant Church.

The site was originally acquired by Sir H. W. Peek, Bart., for the erection of a Huguenot Institute, but in consequence of the refusal of the London County Council to sell the freehold, the project was abandoned.

The site has now been taken by Mr. Henry Bailey, of Highbury, and the present building is in course of erection. It will contain shops and basements, with four floors of residential flats, which will be entered by a separate entrance near the French Protestant Church.

Each suite will be lighted from the surrounding streets, and not by areas. By careful planning the site has enabled this to be done.

The building will be of red brick, with stone dressings and slated roofs, the pilasters to the ground floor being of polished Aberdeen granite. Mr. Charles Bell is the architect.

MUSEUM, BORDIGHERA.

THIS Museum has been built for the Rev. Clarence Bicknell, of Villa Rosa, Bordighera, in a cleared olive-garden, off the Via Romano.

Although primarily a Museum for the storing of botanical drawings, and specimens,—of which Mr. Bicknell has made and collected a large number,—of Roman remains from the excavations at Ventimiglia, and other things of interest, it is also intended it should be a miniature "Palace of Delight," wherein the townsfolk may enjoy spectacles and gatherings of one sort and another. There is a library in the gallery, and there is to be a kiosk for a band in the garden.

The building, with the exception of the dressings, entrance arcade, and coursed work, is of rubble, stuccoed and coloured. The stone is of

the neighbourhood, and the brickwork lines that alternate with it are of the small red bricks of the country, with not too fine a joint. Below this work there is a broken frieze of pictures, with birds, beasts, and fowls of the air done in *aggraffito*. The roof is covered with plain Italian tiles. Inside, the walls are divided by colour into dado, filling, and frieze, and designs are being painted, thereon by Mr. Bicknell. The ceiling is flat, displaying the beams, and coffered by pieces filled in. The fireplaces are bold, with stone lintels and high brick hoods, crossed by shelves with coloured pottery, and brick jambs, lined with large green tiles.

The architect, Mr. C. J. Tait, of Exeter, is indebted to Signors Gastaldi, engineers, and Giovannelli, builders, for their assistance in the carrying out of the work.

HOUSE FOR THE BELLAGGIO ESTATE.

THIS house is now nearly finished, being faced with red local bricks, and the roofs covered with Broseley tiles. The woodwork is painted white.

The architect is Mr. R. A. Briggs.

WROUGHT-IRON LAMP BRACKETS.

THE smiths of the last century have produced some very fine specimens of wrought-iron work, and the lamp brackets illustrated are interesting proofs that their inventive faculty was equal to the necessities of the age. No. 1 is one of a pair to the town house of the Gurfurths, in Micklegate, York, an old Yorkshire family, now, I believe, extinct. Nos. 2, 4, and 5 are to houses of more or less importance in the same street. No. 3, now at the Manor House, or School for the Blind, until recently formed part of the railing to the Mansion House, York, when it was sold as old iron in exchange for a modern "improvement," dependent on paint and gilding for its attractions. Nos. 6 and 7 are from Newark, and, though exceedingly simple, are none the less graceful and effective. The remainder are from Carlisle. No. 8 has recently disappeared. No. 9 occupies its old position to St. Cuthbert's Churchyard, embodied in a new scheme of wrought-iron railing. No. 11 was over the gateway to Mushroom Hall, in Fisher-street, a house of some historical importance, now swept away by the tide of modern improvements; fortunately the ironwork has been saved from the marine-store dealer, and is now over the gate to the residence of Chancellor Ferguson, in Lowther-street. No. 13 occupies a new position in the Green Market. It is rather difficult to account for the Y-shaped arrangement in Nos. 8, 10, and 12; a rest for a ladder is out of the question. Both York and Carlisle, until the close of last century, had their town residences for the county gentry, and there are numerous examples of leadwork bearing their crests, panelled rooms and ceilings, and picturesque gables, reminding us of a past when individual work was recognised and flourished accordingly.

J. W. BESWELL.

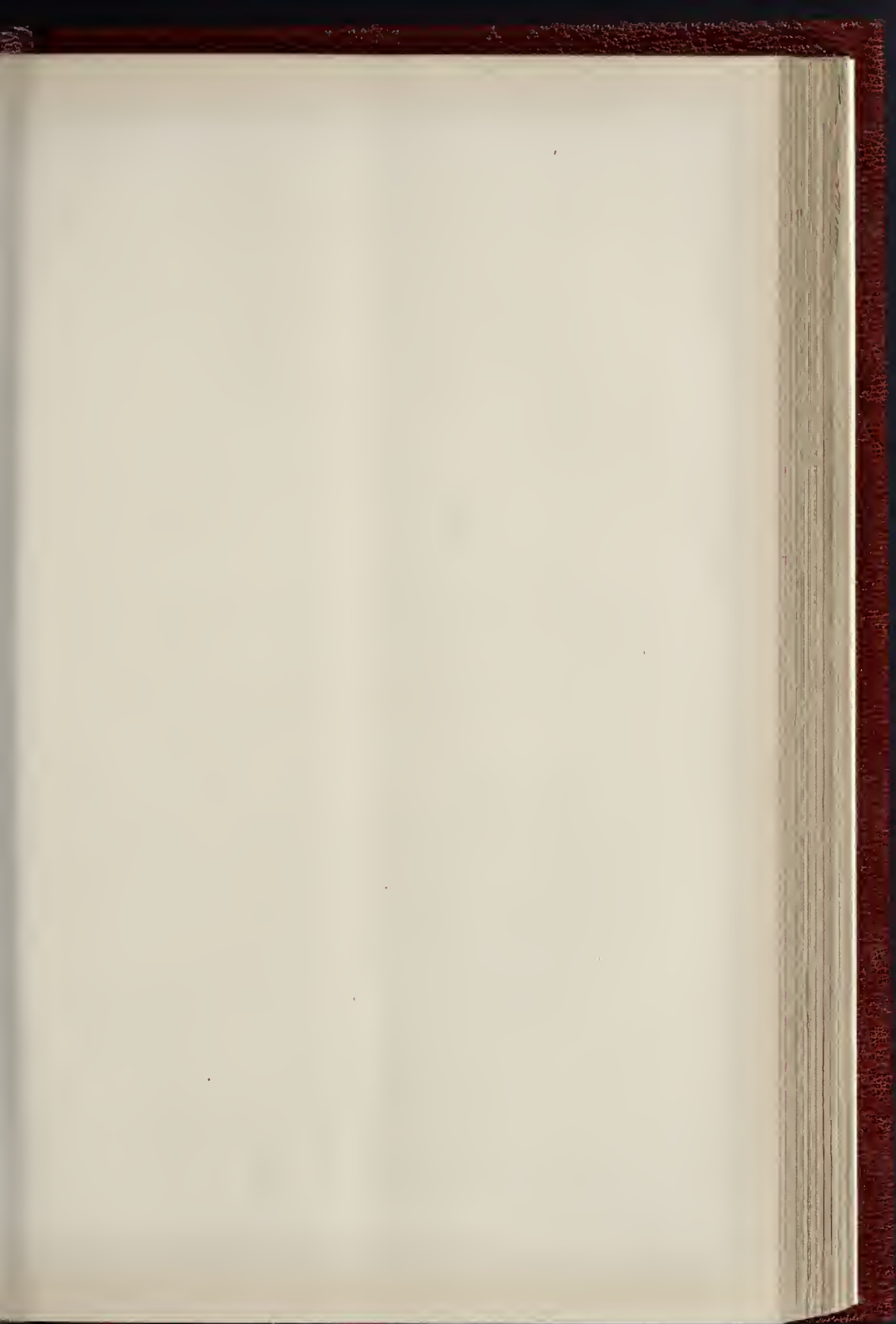
BROMLEY COLLEGE, BROMLEY, KENT.

THE two illustrations of this interesting though exceedingly simple bit of old school architecture are from sketches by Mr. A. C. Breden.

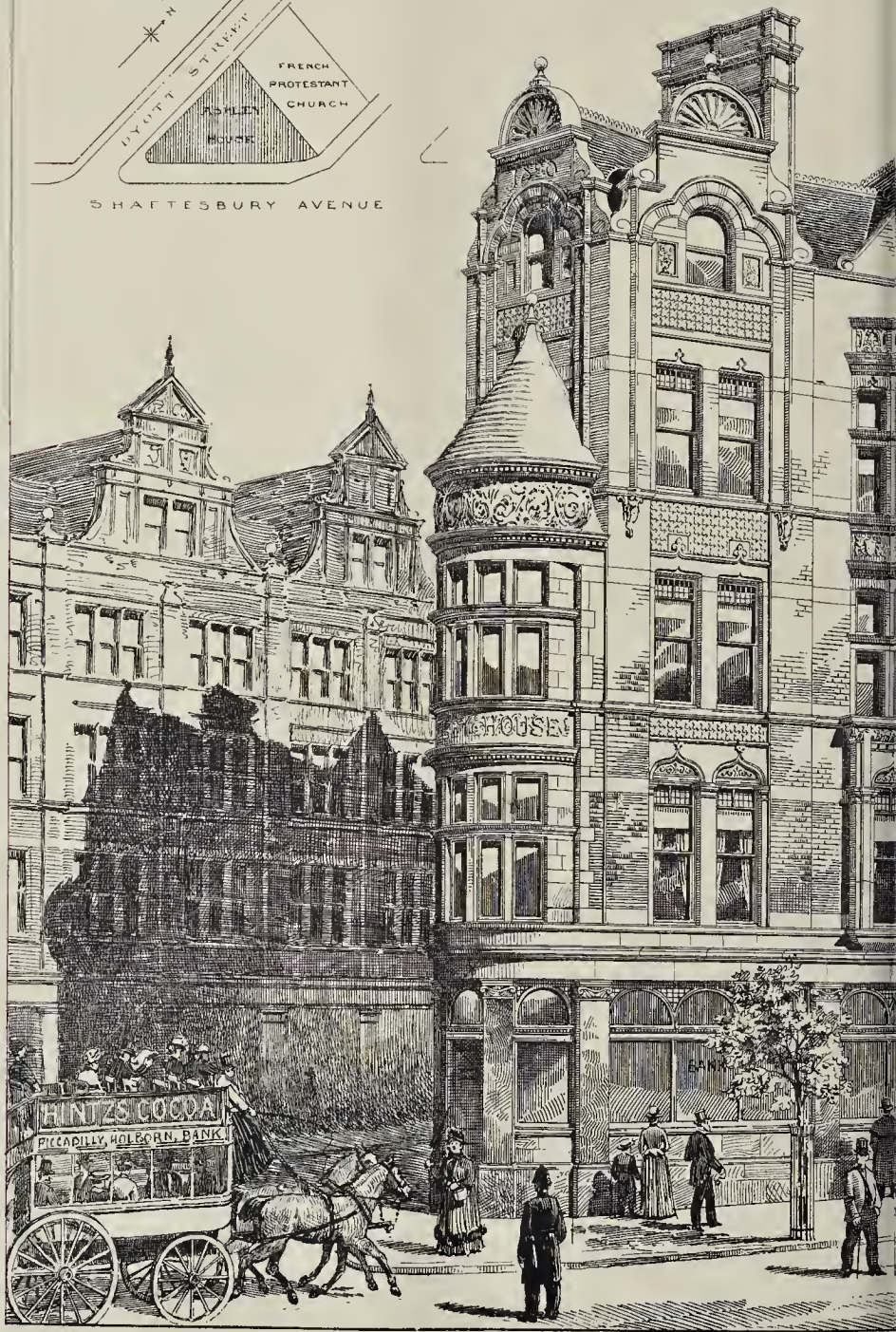
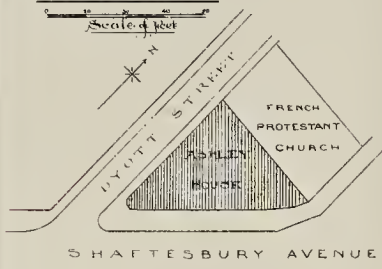
THE ENLARGED COUNCIL CHAMBER AT SPRING-GARDENS.

THE London County Council will re-assemble next Tuesday, after the Easter recess. The members will then sit for the first time in the enlarged Council Chamber at Spring-gardens.

When the Council succeeded, in March, 1889, to the Metropolitan Board of Works, it found the premises in Spring-gardens, which had been barely sufficient for the work of the Board, manifestly inadequate to its own larger requirements. In particular, the Board Room, which was part of the design of the late Mr. Fredk. Marshall, the first Architect to the Board, and which in the first instance was intended for forty-five members,—a number that was afterwards increased to sixty,—could only just contain, but by no means accommodate, the 137 members of the Council. The Council, by the courtesy of the Corporation of London, obtained the use for a limited period of the Council Chamber at Guildhall, and directed the preparation of designs for alterations, the chief object of which was the provision of an



— BLOCK PLAN —

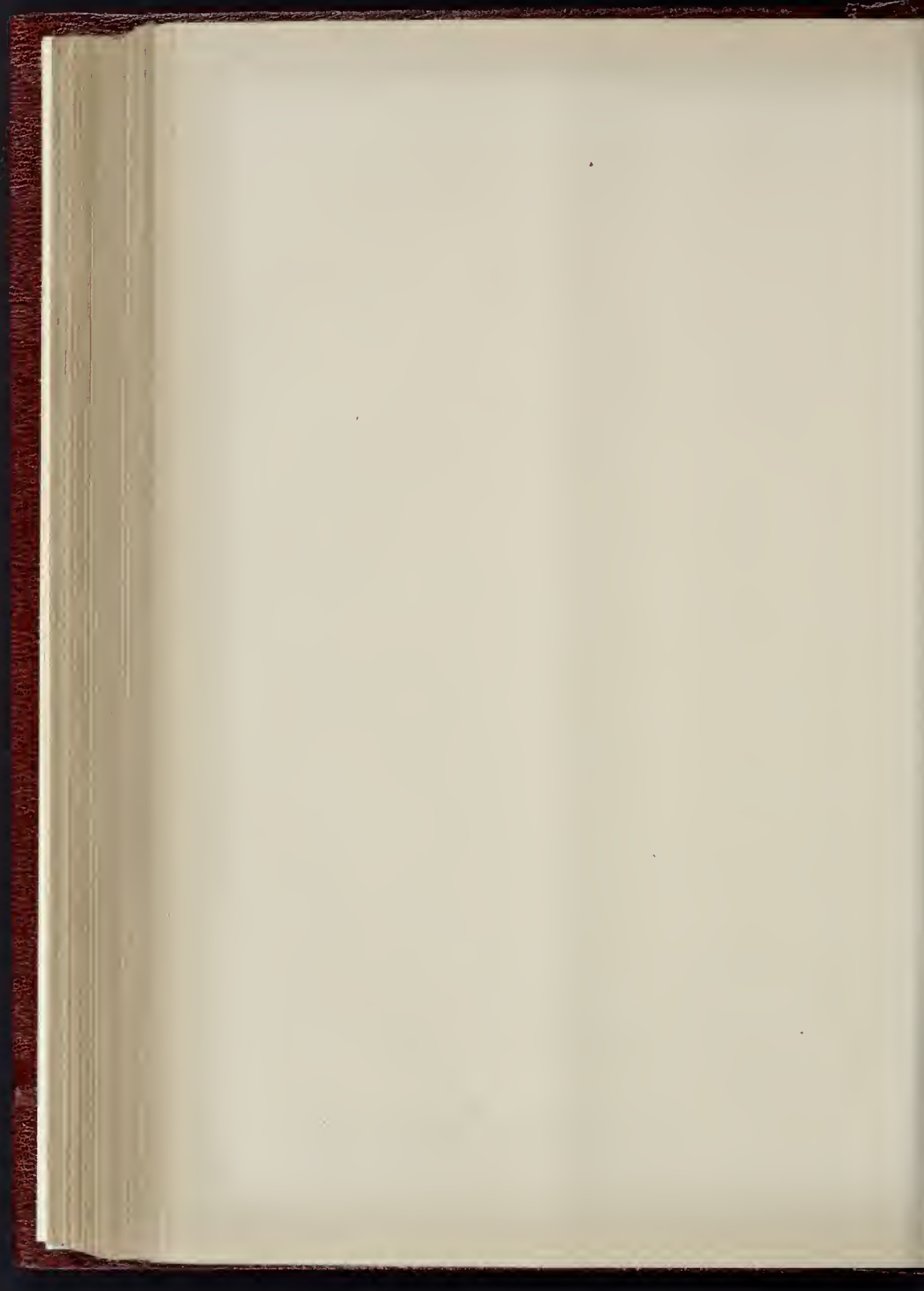


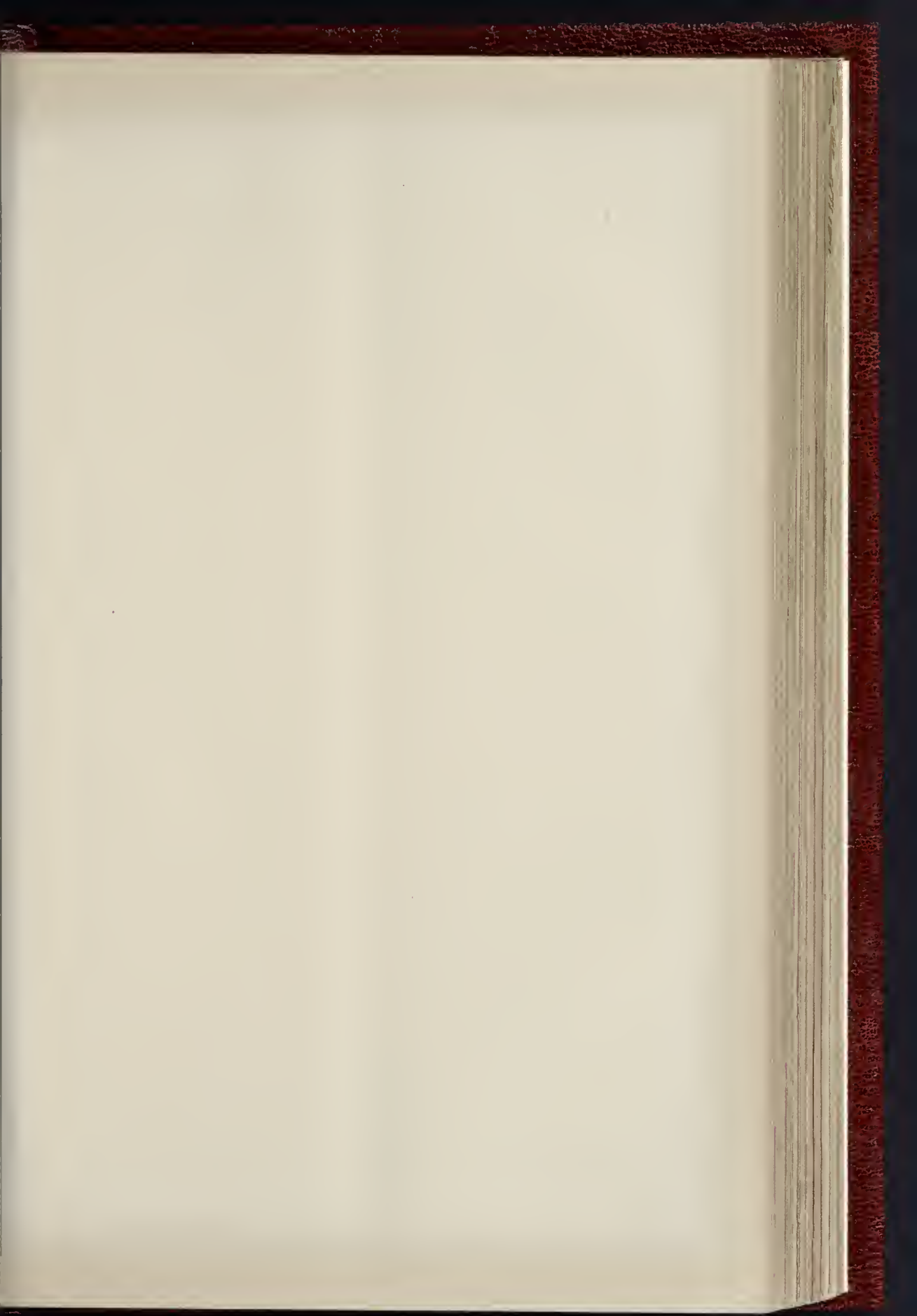
ASHLEY HOUSE, SHAFTESBURY A



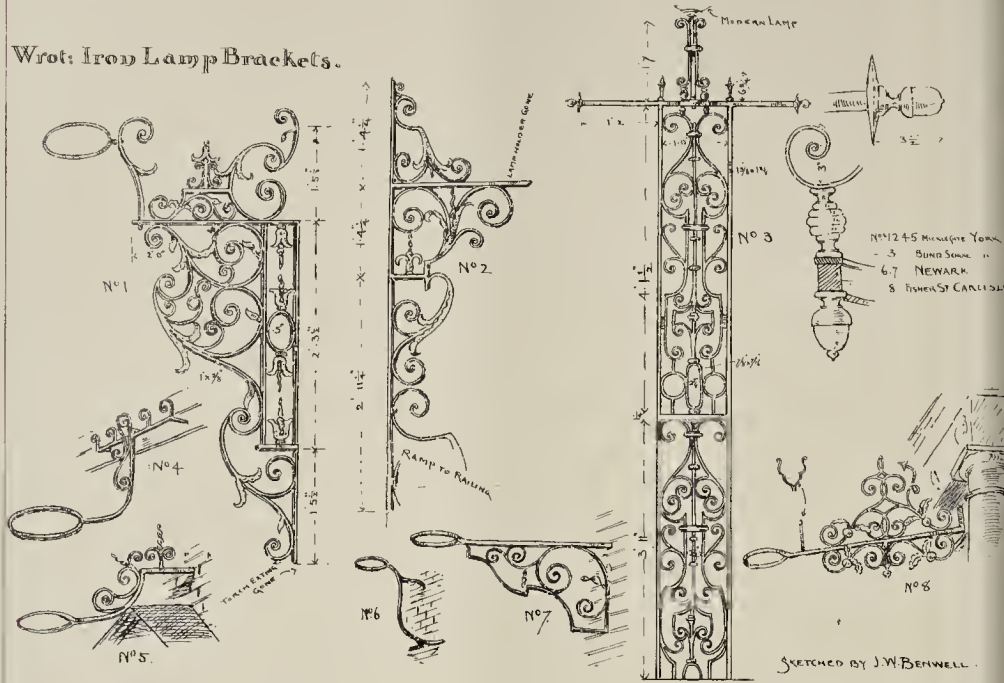
PHOTO LITHO. ORRAGUE & CO. 22, MARTIN LANE, CANON ST. LONDON, E.C.

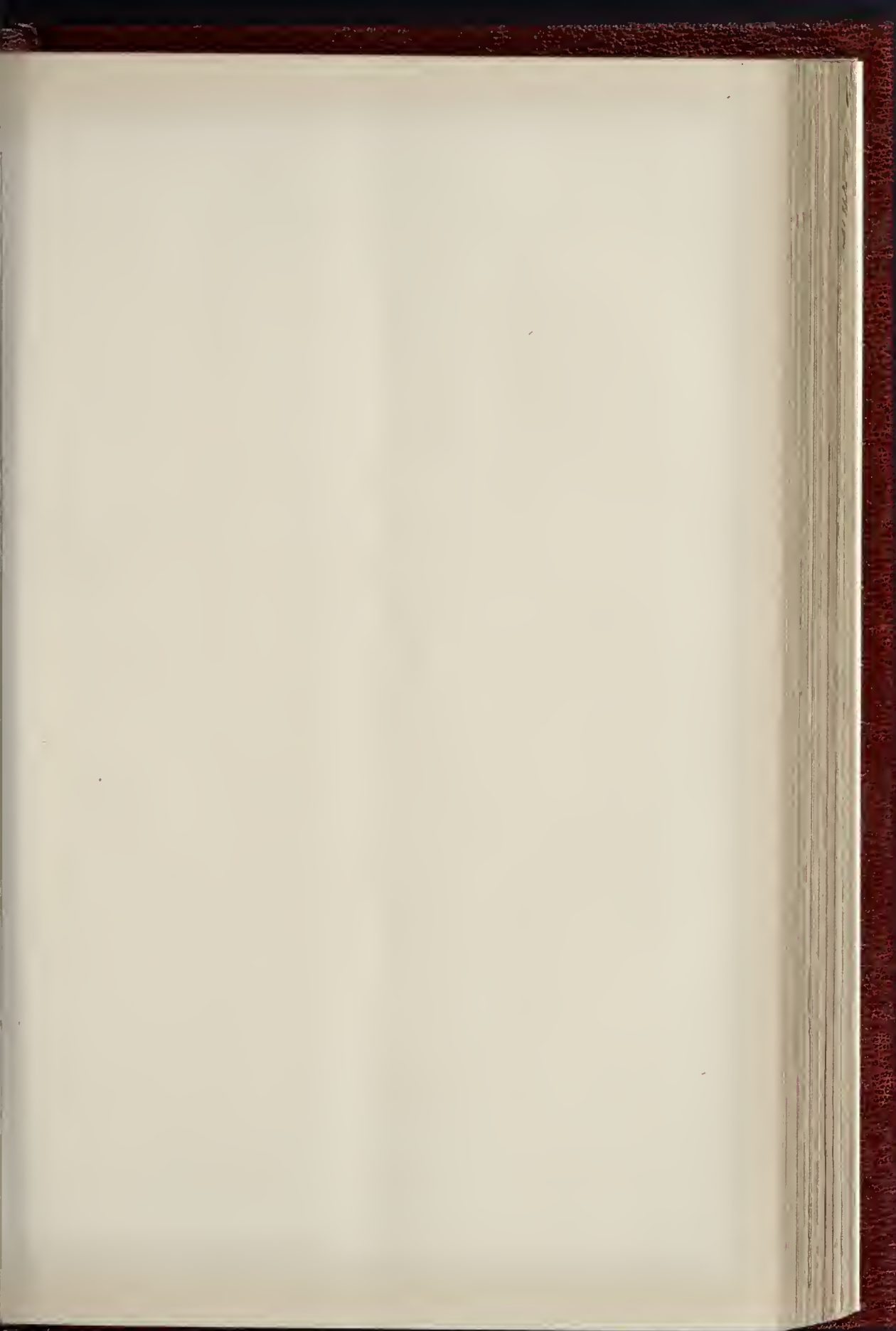
CHAS. BELL, F.R.I.B.A., ARCHITECT.



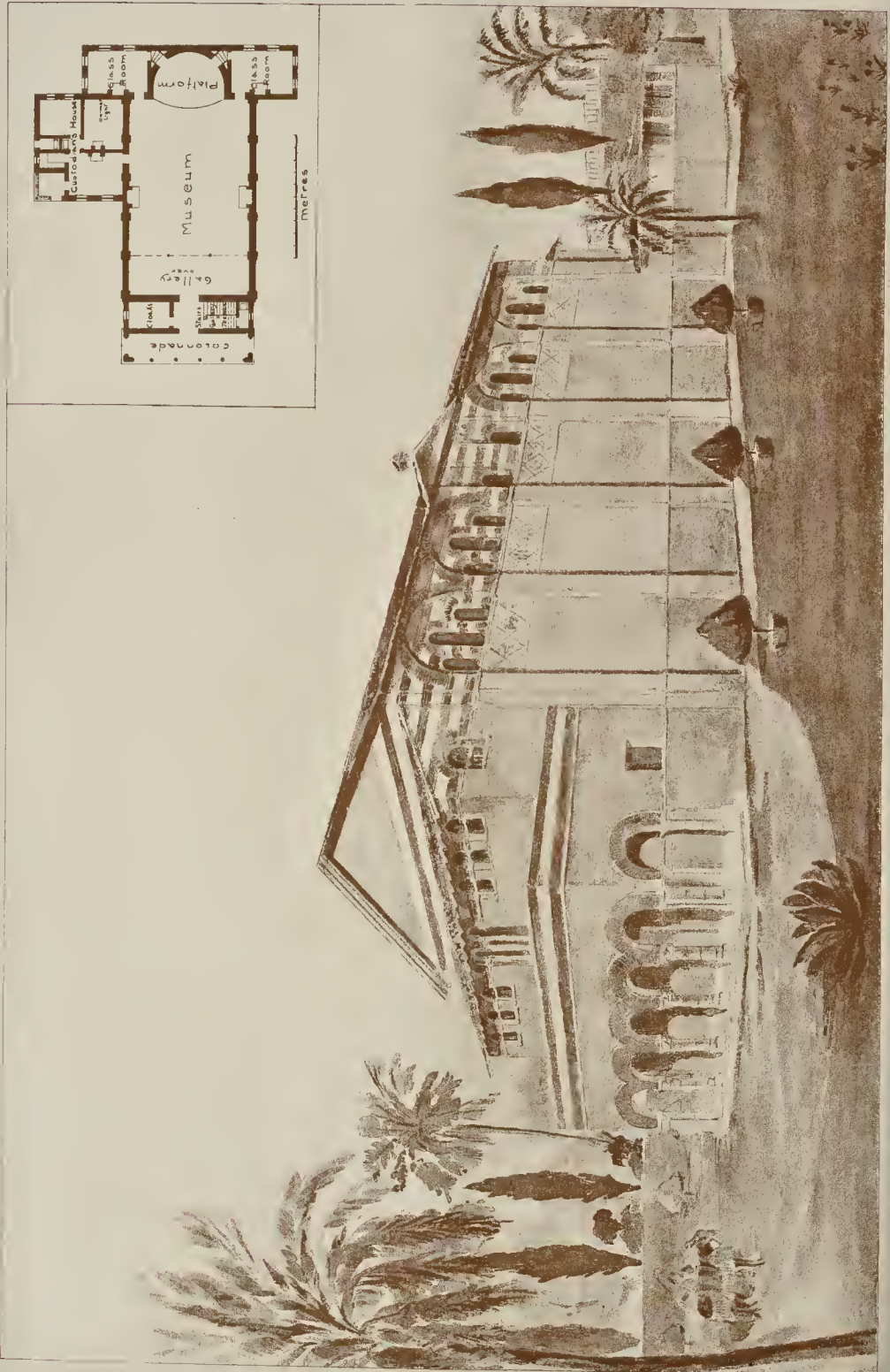


Wrot: Iron Lamp Brackets.





THE BUILDER, APRIL 19, 1890

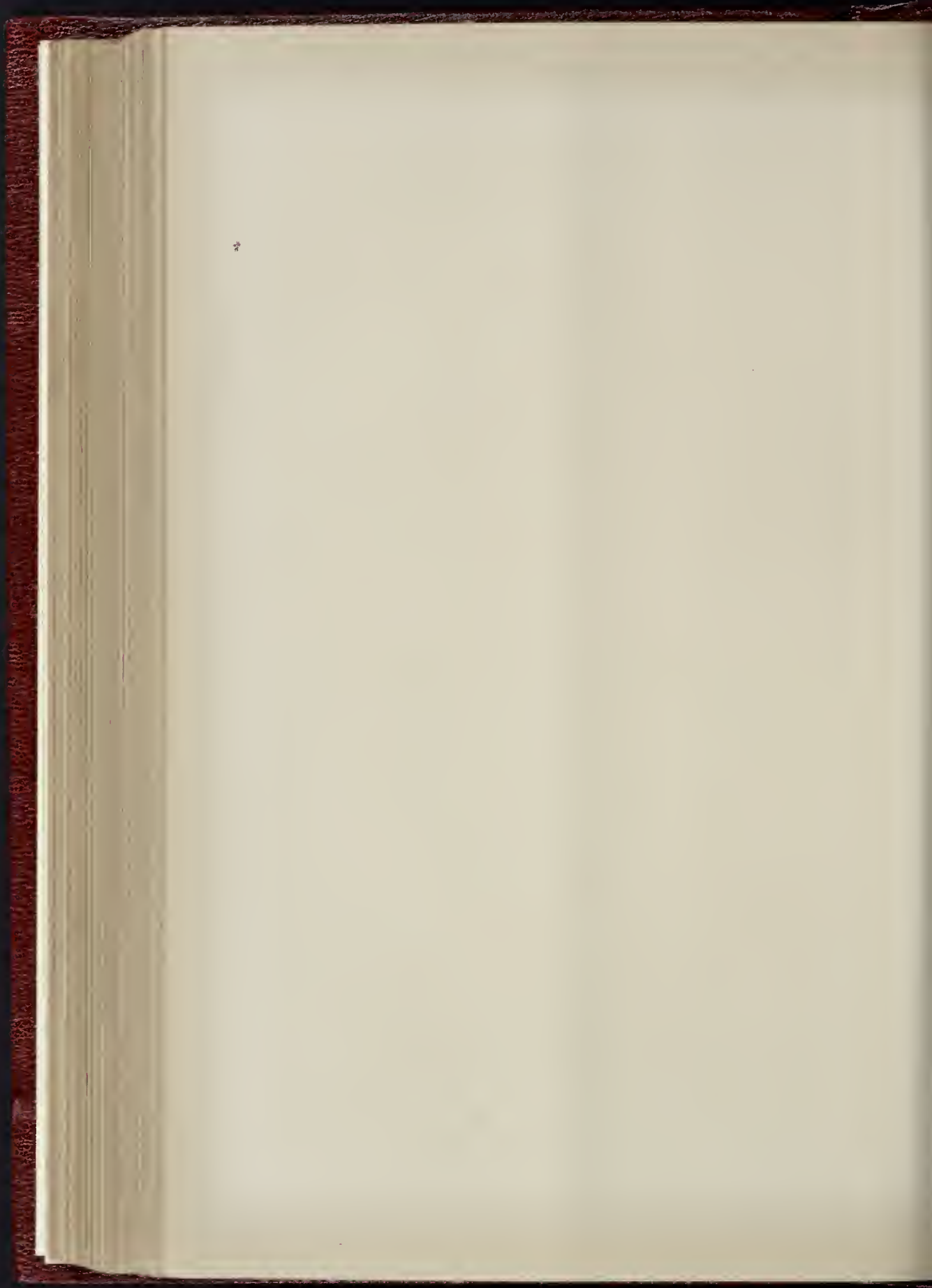


House for the
Bellagio Estate Surrey.
M^r R. B. Briggs, Architect.



THE ARCHT. DRAWING BY "ARTIST" B. LONDON, E.C.

R. Briggs del.
1859.





The Old Quadrangle

Bromley College - Bromley - Kent

Date 1666

a. C. Preder Sept 1889

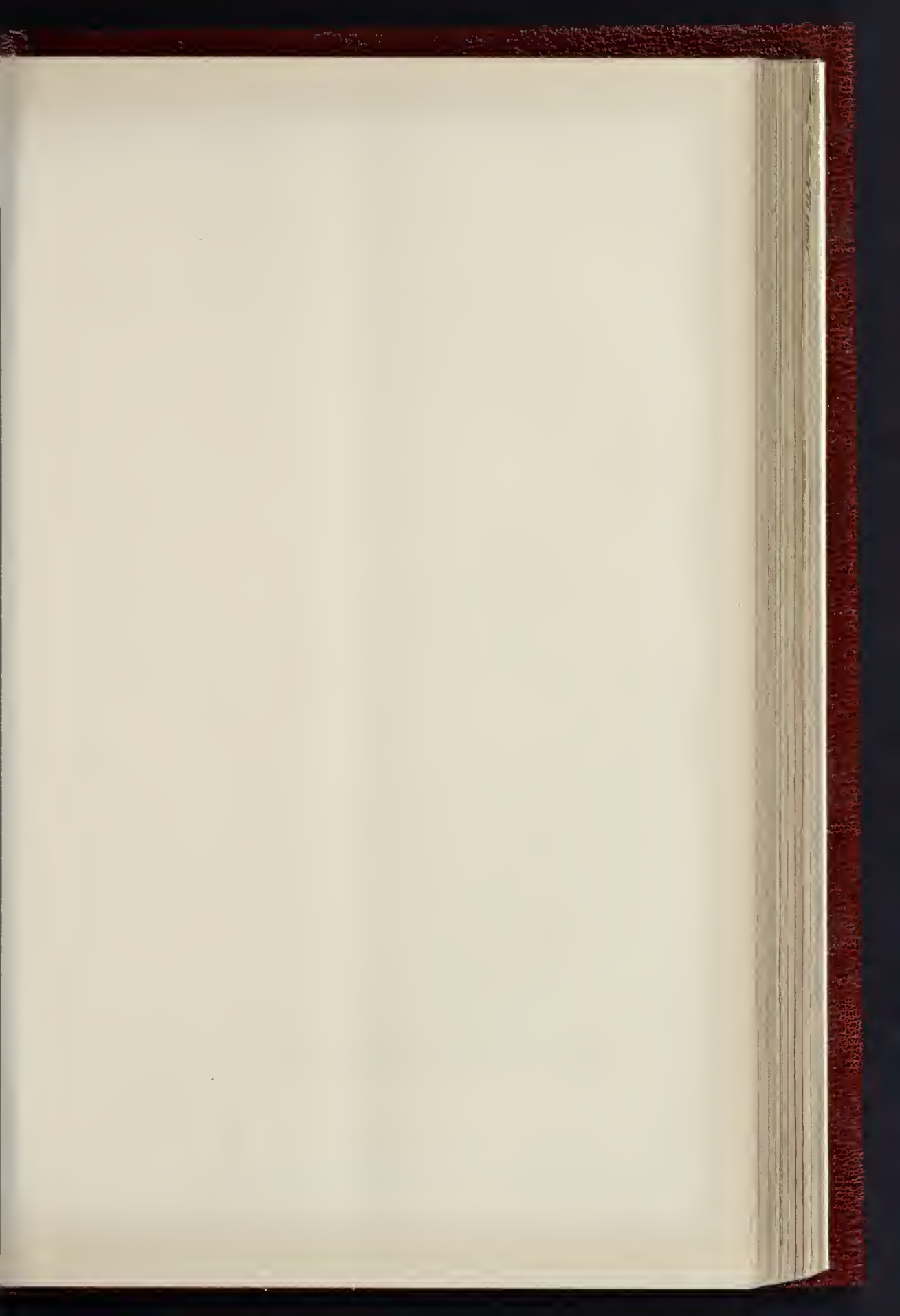


The Front

Bromley College - Bromley - Kent

Date 1666

a. C. Preder Sept 1889





DRAWING-ROOM, "GREY FRIM"



INK DRAWING BY J. L. MARTINE LANG. ARTIST TO LORDS OF THE TREASURY.

—Mr. E. F. DISSHOPP, ARCHITECT.



adequate Council Chamber, with such additional Committee-rooms as would admit of the whole of the business of itself and its committees being carried on at Spring-gardens.

The new Chamber has been formed by removing the north wall of the old Board Room, slightly lengthening the end walls, and adding a semicircular space beyond the line of the former north wall. The Chairman's seat is now placed in the centre of the old south wall, which remains undisturbed. The size of the chamber is about 50 ft. across the straight side, and 52 ft. from the latter to the centre of the semicircular wall, thus making it about twice the size of the old Board Room. The dais or chairman's platform extends along the south side, and the Press gallery (which is much more commodious than its predecessor in the old Board Room) is constructed at a higher level over the rear part of the dais; it is approached by the main staircase and members' lobby, and hence by a new short flight of stairs.

The floor of the body of the Chamber has been sunk to the extent of 1 ft., making the height of the seats for the members rise in four steps, following the course of the semicircular wall. They are massed together in seven separate blocks, and so arranged that from every seat a very large proportion of the members (from one-half to two-thirds) can be directly addressed by speaker. The six radial gangways and the semicircular ambulatory or corridor at the rear, under the public gallery, are so planned that no member need pass more than two other members in order to reach his seat, or to pass on one side of the Chamber to the other. The ambulatory or corridor referred to has its two ends in the division lobbies right and left of the dais, and is entered from the rear of the Council Chamber by two doors.

The seats are of American walnut, covered with maroon morocco leather. They are provided with elbows, and in front of each is a ledge for paper, pens, and ink. The floor generally is covered with dull green "Napier" matting, that under the seats being covered with green druggel laid upon felt. The walls are hung as a temporary measure with maroon hangings. On the floor of the Chamber in front of the platform is a table for the Clerk, the Solicitor, and the other officers of the Council who require to be in attendance at the sittings.

Behind the seats of the members, and on a higher level, is a public gallery for about 150 persons, accessible by a separate entrance reached from the gateway adjoining Messrs. Stanford's premises in Cockspur-street, and not on Spring-gardens, as formerly.

Two new committee-rooms have been provided, one of which will be used as a tea-room for the meetings of the Council. There is also available the provision of lobbies and lavatories accessible from the corridor that adjoins the chamber. The ground-floor of the new building is entirely devoted to the accommodation of the official staff, replacing some small and ill-lighted rooms that before existed. The Council Chamber is well lighted by day by skylights and windows, and the artificial lighting will be by electricity, supplied by the London Electric Supply Corporation, Adelphi-race, and fitted up by Messrs. Strode, of Osnaburgh-street, in addition to the provision of gas by means of three sunlights. The electric fittings include one eleven-light and eleven eight-light electrolights suspended from the ceiling, and a few two-light brackets over the dais.

The whole of the works are being carried out on the designs and under the superintendence of Mr. Basbill, the Architect to the Council, who is to be congratulated on having produced, at a small cost, a very convenient, well-lighted, and effective Chamber. He has been somewhat fettered by the necessity of preserving the existing plaster on the opposite (flat) side of the Chamber over the new Press Gallery. The enlarged Chamber in Spring-gardens will part from the convenience of its situation in the midst of the Council's offices) be found a much more satisfactory place of meeting for the Council than the costly Council Chamber of the Corporation of London. It will be lighted by day, ample provision has been made for warming and ventilation,

and it will surprise us if its acoustic properties do not prove to be much more satisfactory than those of the Guildhall Chamber. But at best it is only regarded as a temporary expedient. The time will no doubt come when the Council will find it to be advisable and necessary to build new and adequate premises for itself and its large staff. Already the central premises at Spring-gardens cannot accommodate all the departments of the Council's work, and separate houses in Spring-gardens and Craven-street have been taken on short leases to receive the overflow. But with its enlarged Chamber the Council will be able to "rub along" at Spring-gardens for a few years to come, and in the interval it will be able to form a mature estimate of the permanent accommodation which it will require, and will sooner or later have to obtain.

The contractors for the general works are Messrs. Allen & Sons, of Palmerston-road, Kiburn. The furniture is by Messrs. Hampton, of Pall Mall East. The ventilating, heating, and gas-lighting of the Chamber are by Messrs. Verity, of Regent-street. The electric-lighting fittings, as before mentioned, are by Messrs. Strode, of Osnaburgh-street; and the structural ironwork is by Mr. A. D. Dawday.

A sum of about 10,000*l.* in all has been allocated by the Council for the different branches of expenditure in connexion with the enlargement of the Chamber, and that amount will cover the cost.

REGISTRATION OF ARCHITECTS.

SIR,—The measure for the registration of architects is stated by its promoters to be intended at once for the protection of the public and the good of the profession. It would be unfair to say that these laudable objects are merely the stalking-horse, behind which lurks an unconcerned spirit of exclusiveness, and I am far from doing so; but, in admitting the sincerity of those who are moving in the matter, it is impossible to view without regret the inherent selfishness of their demand, or to refrain from asking, in the simple spirit of inquiry, in what way the public need, or will find, protection?

Can it be seriously suggested that the man who wants a house built goes, as he would go to the nearest chemist, to the first door on which he sees an architect's brass plate, and puts himself confidently and unreservedly into the hands of the *genius loci*? Does he not go to a connection, a neighbour, to some one whose work he has seen and liked, or failing all these, to a man of established reputation. It would be a poor compliment to the world of "clients" to hold the former supposition.

But for the people at large, for the poor and the ignorant, what can ensure them immunity from insanitary surroundings short of an Act of Parliament making illegal the erection of any building not supervised by a registered architect, even if that would? Will the leopard change his spots, the jerry-builder his skin, because he sees the architects being drilled and put through their paces? He is hardly likely to beg to be reformed in consequence of it. People go to their relations, it is said, when they want work done. Why not? and will they do so less because the relation happens to be unregistered? It may be doubted.

Materially speaking, registration might benefit the profession; commissions would be more readily recoverable in a court of law, and appointments go to a rather larger percentage of those in practice; but, in any other than a material sense, would the result be satisfactory?

A qualifying examination is undeniably a test of education up to a certain point, and it is not open to some of the objections which are taken to competition, pure and simple, but too much reliance may easily be placed in what it is taken to prove.

There is such a thing as cramming—"an exchange of knowledge for a diploma"—when the revulsion from forced labour opens the tap and lets most of the information trickle out again. There is again a faculty for passing examinations—mimetic rather than reasoning—the possessor of which is not necessarily competent to carry out what he can write about, nor, in any case, is the candidate's practical power of judging between good and bad work, and varieties of material, properly tested.

Still, *ceteris paribus*, the man whose know-

ledge has been tested by examination is in a better position than he who has not submitted himself to the test, and may reasonably reap some benefit from it. The point where examination fails is, of course, that at which architecture ceases to be a profession and becomes an art. To be unpractical is not to be artistic, but there are some men who, without the gift of acquiring accurate knowledge, may possess genius for beauty of form and disposition. Such men are usually quite alive to their want of thoroughness where it exists, and might be trusted to supply it from other sources, but the purely practical man asks to have them tabooed, and does so without any apparent consciousness that, practical as he is, he is asserting the half to be more than the whole, and himself to be that half. The closely-trimmed hedge is very well in its place, but there are some who prefer the natural growth of graceful tendrils and flowering shoot, and view with proportionate dislike the mechanical lopping of the hedge-cutter.

If Parliament sanctioned registration at this moment, which it is hardly likely to do, we should be in the position of men who, acting under a momentary impulse, have riveted their own chains, turned the key in the padlock, and thrown it into the sea. There it would rust into nothingness, and no hand would ever be stretched out to loose our self-imposed fetters.

A. E. STREET.

SIR,—Considerable anxiety prevails amongst the loyal members of the Institute as to the future of the profession, though I fancy there is no need for alarm. The idea that "Registration" will advance architecture cannot for a moment be seriously entertained. As Professor Aitchison pertinently reminds us, most of the best work in the past has been done by men educated for something else.—How devoutly we may wish that many educated for the profession would betake themselves to some other!—An architect is born, and cannot be made by Act of Parliament. The many subtle refinements which go to make good architecture, relate to plan, design, and constructive skill; to each there is added something which lifts it beyond mere convenience in arrangement, beauty in design, or strength in construction. No amount of examination will insure this product.

In many a man these powers may be latent or lie dormant until opportunity calls them forth, and the direction of the examination should be to arouse enthusiasm. But a large proportion of young men who enter themselves can never rise to any proper standard, and here compulsory examination may step in to hinder the waste of time and life in the pursuit of an art which is beyond their reach. The man of genius may be rare, but men of talent are numerous, and there is room for those capable at least of doing work which may fairly be entitled architecture; but from the genius downwards all require education, and though you cannot make an artist, by examination you can stimulate and test his study with advantage to himself as well as the public.

Admitting the principle of examination, the quantity and quality of it is a problem worth considering. Professor Aitchison draws attention to one evil of the method adopted in Austria; and both in Germany and Denmark, where the tests are severe and the course arduous, the results are alike disastrous. While much of the modern work is strictly academic and proper, all "life" seems to have been smothered, and, as a consequence, any development or advance has been prevented.

The object of the examinations should be to help artists, and not to turn out good builders or clerks of works, but to give too great a predominance to mere scientific branches would be sure to have this effect.

It is a mistake to look upon examination and registration as a means of protecting the public, and the advocacy of registration on that score is delusive. The only way to protect the public by legislation is to make jerry-building criminal. If bad drainage or shoddy materials, or faulty construction which endangered life, were punishable, the public would be sure to employ only those duly qualified; and the architect would take care that he knew his business, and be thankful to the Institute examinations, which direct his studies and secure him a recognised position.

JOHN BELCHER.

20, Hanover-square, W., April 14, 1890.

THE OLD QUESTION: "WHAT IS AN ARCHITECT?"

STR.—Before the question of registration goes any farther it is as well to understand what an architect is and what he is not.

In the opinion of some of the speakers at the Institute meeting an architect is a "member of a learned profession," "the servant of the public," "nothing if he is not practical," and architecture is a business about which "there is a certain amount of fine art more or less." We all know that a certain section of the public hold this view of architects and architecture; but surely even the most humble "servant of the public" has at any rate a vague idea that architecture is an art and not a matter of "light and air," drains, diameters of cast-iron columns, and the like, and that an architect is an artist and not a sort of compound animal, partly huilder, partly lawyer, and the rest policeman, to see that the huilder does not cheat.

Of course, if architecture is a learned profession, and architects learned professors, let them be examined, found correct, and registered without loss of time.

It is an old remark that building is not necessarily architecture, but apparently this truth is not generally accepted, and many seem to think that building, at any rate when it is ornamented, is architecture.

An architect must possess a very considerable amount of technical knowledge, but this is a means to an end, not the end itself. By all means let the Institute examine, and give certificates of proficiency in technical knowledge; but let us, once for all, face the fact that it is the one quality which makes an architect which cannot be tested by examination.

Let people once realise what an architect is (and in order to do this architects must make haste to realise what they are meant to be themselves), and there will be no necessity for registration; only those who are fit to do the work will get the work to do; the "business architect" must call himself by another name, and the "undertaker architect" can bury himself.

Finally, let our endeavour be to get altogether out of our minds the "learned profession" idea, and remember that the only reason for our existence is that we may, in the words of the Architectural Association motto, "Design with beauty, and build in truth."

ERNEST NEWTON,
MERYVN MACARTNEY,
JOHN BELCHER.

DAMAGE TO GAS-PIPES BY STEAM ROLLERS.

SIR,—I shall be obliged to any of your readers if they inform me of a case which will strengthen me in resisting a claim by a Gas Corporation against a Borough Corporation for damage done to their gas main by a steam-roller engaged in rolling a coating of metal upon a macadamised street. I understand that a case occurred in London about two years ago, when it was held that the Gas Company was bound to prove that their main was laid sufficiently deep to resist legitimate pressure from the surface. Definite information will oblige.

A BOROUGH ENGINEER.

CONDENSATION WATER IN STRONG ROOMS.

SIR,—I shall feel obliged if you, or any of your readers, can inform me through the columns of the *Builder* what is the best method for keeping a strong-room free from condensation water.

In the autumn of 1888 I built a strong room for a firm of solicitors, attached to the main building, but three sides being exposed. Walls 17 in. thick with an air-space between kept ventilated by air bricks; roof arched over in three spans with white bricks, the centre span being glazed bricks; the covering to roof 1 in. asphalt.

The walls are thoroughly dry, but water caused by condensation collects on the underside of the roof in such quantities as to render the strong-room practically useless for storing deeds and valuable papers.

A gas-jet is kept burning all day and night, and the iron door is left open during the day.

E. A. EMORR.

[Was the damp noticed before the use of the gas-light?—Ed.]

CHARLES SMITH & SONS (LIMITED), v. KIRK AND RANDALL.

SIR,—In your issue of March 15, you published a letter from Messrs. Kirk & Randall's solicitors, in which they stated their intention to appeal

against the decision in our favour given by the Breconshire County Court Judge.

We have received a letter from our solicitors, Messrs. Ingle, Cooper, & Holmes, stating that Messrs. Kirk & Randall have withdrawn the appeal, and paid costs.

This case being a matter of interest to the architectural profession and the trade generally, we thought you would like to know the final result.

At the same time, we have to thank you for the interest you have taken in the matter, and your able explanation of the facts given on March 15.

CHAS. G. SMITH, Managing Director.

OBITUARY.

Mr. J. A. P. M'Bride, Sculptor.—We hear with regret of the death of Mr. John Alexander Paterson M'Bride. According to the *Liverpool Mercury* he was born in February, 1819, and was the son of the late Archibald M'Bride, of Campbeltown, Argyllshire. His mother was a M'Kenzie, and his grandmother a M'Kinnon; so that, as he was fond of saying, every drop of blood in his veins was Celtic. At an early age Mr. M'Bride entered the studio of the late William Spence, of Liverpool, the friend and fellow pupil of John Gibson, R.A. At the Liverpool Art School, then held in Duke-street, he studied drawing along with Richard Ansdell, R.A., Samuel Haggins, and others of note, carrying all before him in the way of medals and prizes. After completing his time with Mr. Spence, Mr. M'Bride removed to London, where he became a student at the British Museum. It was at this time that he modelled his life-size group of "Margaret of Anjou and her Son" which was exhibited at the first sculptural contest in Westminster Hall, and highly commended by the judges, one of whom, the late Samuel Joseph, R.S.A., the sculptor of the Wilherforce statue in Westminster Abbey, and of the Wilkie in the National Gallery, was so struck by the work that he took Mr. M'Bride into his studio as premier pupil and manager, foregoing, on account of the excellence of the group, his customary fee of 500 guineas. After leaving Mr. Joseph, Mr. M'Bride returned to Liverpool, where he took an active part in the art movement then going forward, headed by the members of the Liverpool Academy. He became their honorary secretary in 1852. Among his chief works are the marble bust of the late Field-Marshal Lord Combermere, ordered by the Freemasons of Cheshire; his competitive model for the Wellington Memorial in St. Paul's Cathedral; a colossal statue of the famous Biblical commentator, Dr. Adam Clarke, ordered by the Wesleyan body; full-size statues of the Four Seasons, in front of Garswood Hall, the seat of Lord Gerard; group of "A Mother and Child"; half-size statues of Sir William Wallace and of the Duke of Wellington; bas-relief in Rock Ferry Church from the words, "Come ye blessed of My Father"; bas-relief in Birkenhead Church from the words, "Visit the sick and the afflicted"; a heroic-size bust of the late Mr. John Laird, M.P., in the Borough Hospital, Birkenhead; and many others. Mr. M'Bride's last work is the statuette of Mr. H. M. Stanley, which is now being published by Messrs. Minton. The first copy of this work reached Mr. M'Bride only a few days before his death, and was shown to him on his death-bed. Mr. M'Bride was a lecturer of much ability, and of late years, his health not permitting him to undergo much of the fatigue of his profession, he devoted a good deal of his time to lecturing on sculpture, and delivered courses to large audiences at the British Museum and Crystal Palace and for the Corporations of Liverpool, Bradford, and Greenock. He removed to London some seven years ago, and his health failing, early last year he left London for Southend-on-Sea, where, after a painful illness, he succumbed to a malady from which he had suffered for many years.

Mr. T. C. Noble, F.S.A.—Mr. T. C. Noble, F.S.A., a well-known antiquary, died recently. He was an old contributor to the columns of the *Builder*, and was of late very closely identified with the Ironmongers' Company, of which Guild he was compiling a history at the time of his death. He will be remembered also, for his efforts to secure reasonable facilities of light for those engaged in searches at the Public Record Office, where a few years ago searches were much hampered by regulations of the "red-tape" species.

* See report in *Builder* for March 1, p. 158.—J. A. Claim on a Bill of Extras.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—XVI.

SERIES-WOUND DYNAMO-MACHINE.

IT was not until some twenty years after the construction of the first dynamo-machine that the idea was conceived, obvious enough as it appears now, of making the current produced in the armature excite the field magnets. The whole, or a part only, of the current may be used for this purpose.

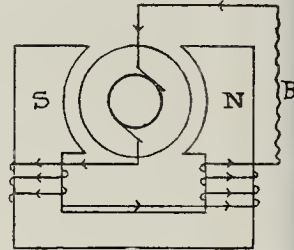


Fig. 40.

Fig. 40 shows the connections between the armature and field-magnet coils in a "Series-wound Dynamo-Machine." That is a machine in which the armature coils are placed in series with those on the field-magnet cores, so that the whole of the current given by the armature flows through them.

The characteristic of a series machine is very different in shape from that of a separately excited dynamo, fig. 39, as the strength of the field produced by the magnets rises continuously with increase of current from the armature, and consequently the line N₀, fig. 38, varies with the currents e_1, e_2, e_3, \dots , though not directly with them, but according to the law of the electro-magnet, article X, otherwise the characteristic would simply be a straight line passing through the origin of the curve. Different as are the two curves, yet with supplementary curves, fig. 41, to determine the length of the diameter N₀, fig. 38, in each case, precisely the same construction as that explained in the last article will enable us to determine the general form of the characteristic for the series machine. In fig. 24 a curve was given showing the connexion between the M.M.F. and flux produced through an electro-magnet. Fig. 41

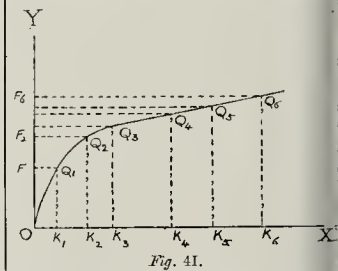


Fig. 41.

represents a very similar curve for the field magnets of the series machine, fig. 40. The lengths O K₁, O K₂, &c., set off on O X, are proportional to the ampere-turns or to the currents e_1, e_2, e_3, \dots , which flow from the machine running at a constant speed, when R is varied, while O F₁, O F₂, . . . O F₆, measured along O Y are the corresponding strengths of field produced in the direction N S, fig. 40, thus determining a series of points Q₁, Q₂, . . . Q₆, through which a curve can be traced, giving the relationship between the current through the coils of the field-magnets and the strength of field in the direction N S, fig. 40.

In fig. 42 these strengths of field are set off as N₁S, N₂S, . . . N₆S, and semicircles are drawn with these latter lines as diameters. From S mark off a series of chords S S₁, S S₂, . . . S S₆ proportional to the fields produced by the armature currents, in the direction of the diameter of commutation, that is, lines propor-

ional to the currents c_1, c_2, \dots, c_6 ; then $N_1 S_1, N_2 S_2, \dots, N_6 S_6$ will give the resultant field in each case. Figures 38 and 42 are really the same constructions, except that in fig. 38 the strength of field produced by the magnets was constant, so that $N_8 S_8$ was the same for all

this is the case, and the winding in both machines occupies the same volume, the same amount of power is absorbed by both fields. In the series machine the whole of the current and a small

islands, and the too little known island of Corsica. Detailed descriptions of places of interest and of monuments of antiquity are out of place in any handbook, especially in a work which is mostly an epitome of matter extracted from other handbooks or works of recognised value. For instance, a traveller making an excursion to Delphi would not expect to find a minute account of the remains of the first temple of which this was the fifth erected there in honour of Apollo; that the names of the architect and the contractors are still on record; that the building was constructed with local limestone; and that, according to Herodotus, the white marble columns of the portico were the gift of the contractors. Nor, in the excursion to Eleusis, would the average traveller care to know that the plan of the vast temple of Ceres was more like that of the hypostyle halls of Egypt, and that the form of the edifice itself remains as much a mystery as the Eleusinian mysteries, for the celebration of which it was designed. Nor would he look for more than passing allusion to the remains at Olympia, of which the best description may be found in Adolf Bötticher's little octavo volume. A few footnotes referring to this and some other recent works would have added to the value of many of the pages in this handbook. The chapter on Dalmatia has been mostly re-written, but it would have been as well if more notice had been taken of Mr. T. G. Jackson's scholarly work on the architecture of that country. The sculptured west doorway of the Duomo at Trù, which will hold its own for beauty and richness of detail with any portal of Romanesque design, deserved more than passing mention. Respecting the great campanile at Spalato, the most important specimen of Dalmatian architecture of the fourteenth century, the handbook informs us that it was commenced in 1416 by Marie, Queen of Naples; and only finished during the last century. This latter statement is true in respect of the octagonal lantern, but there is little doubt that the tower itself was begun at the commencement of the fourteenth century, and completed in 1416. In the foot-notes referring to standard works on this part of the Mediterranean, no notice has been taken of Le Cassas' magnificent volume, entitled, "Voyage Pittoresque de l'Istrie et Dalmatie," fol. 1802. Whether this was intended to supplement Adams' great work, published some twenty years previously, is doubtful. Many of the illustrations, some fifty in number, are very beautiful, and those relating to the architecture of Diocletian's palace are worthy of reproduction, as examples of the transitional phase of Roman art. The original water-colour drawings, of high artistic value, may still be seen on the walls of a library in Bedford-square. The chapter on Sicily is an outline of the matter contained in Murray's handbook for South Italy. Why the remarkable monumental remains of the Greek city of Acragas should be styled as appertaining to the insignificant Roman town of Agrigentu requires explanation. This is an error that has crept into most handbooks. The city of Acragas, although the latest of the Greek cities of Sicily, was for more than three centuries one of the strongholds of the Mediterranean. The six centuries of occupation by the Romans have left so few traces of their presence that it is fair to presume this old Greek colony was neglected till the invasion by the Normans in the eleventh century.

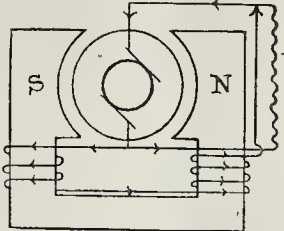


Fig. 44.

part of the electro-motive force is used. In the shunt machine the whole of the external electro-motive force and a small part of the current is used. But the product EC is the same in both cases; the number of turns of wire employed varies directly as the electro-motive force used, and inversely as the current flowing through them.

currents in fig. 38, while the corresponding line arises when the current changes in fig. 42. The construction of the characteristic can now be proceeded with in precisely the same manner as before.

Along OX (fig. 43) the currents OC_1, OC_2, \dots, OC_6 are set off, and along OY , lengths OE_1, OE_2, \dots, OE_6 proportional respectively to $N_1 S_1, N_2 S_2, N_3 S_3, \dots, N_6 S_6$, fig. 42, since electro-motive force, at constant speed, is proportional to strength of resultant field.

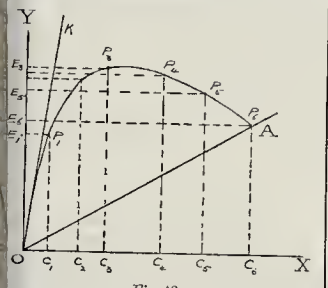


Fig. 43.

The points P_1, P_2, \dots, P_6 being determined, the characteristic can now be drawn. The E letters in figs. 39 and 43 have corresponding meanings, and the two should be carefully compared, OA in the present case being the distance line for the field-magnets, in addition to that of the armature.

A very curious property of the series machine can be seen from fig. 43. Suppose that R is increased until the resistance-line turns into the position OK , that is to say, a position in which is the tangent to the curve at O . Then, though the resistance in circuit is only OK , the machine gives no current. This distance is called the "critical resistance," and varies with the speed of the armature. It has also been seen that if speed is sufficiently reduced, the curve sinks below OA , so that OA is the tangent to the new curve at O . In such a case the machine gives no current, even when short-circuited; there is, therefore, a speed below which a series machine is unable to give any current at all. For every speed, then, there is a "critical resistance," and for every resistance there is a "critical speed."

It must be noted that in the constructions given above no account has been taken of the fact that the core of the armature, being of iron, the value of μ for it also varies, tending to become 1, the effect of which is to flatten the characteristic. A glance at fig. 42 will, however, show that unless there is very little iron in the armature, it will never really reach saturation-point, and that it would be needless for our purpose to complicate the constructions to correct an error, on this score, which is practically non-existent.

SHUNT-WOUND DYNAMO-MACHINE.

When the field-magnets are excited by a part of the armature-currents, the field-magnets are placed as a "shunt" across the brushes, and share the current with the external circuit R . When this method of excitation is employed the name "Shunt-wound Dynamo-machine" is given. If the two machines, figs. 40 and 41, are to deliver the same amount of power into the external circuit, the field-magnets must be equally excited in both—in other words, the same number of amperes-turns to envelope the limbs of both magnets. If

Books.

Handbook to the Mediterranean; its Cities, Coasts, and Islands. For the Use of General Travellers and Yachtsmen. By Lieut.-Col. Sir R. LAMBERT PLAYFAIR, K.C.M.G. Third edition, revised. London: John Murray, Albemarle-street. 1890.

Handbook for Travellers in Algeria and Tunis. By Sir R. LAMBERT PLAYFAIR, K.C.M.G. Fourth edition, thoroughly revised. London: John Murray, Albemarle-street. 1890.

No branch of general literature has been marked by greater progress during the last twenty years than that relating to handbooks or guides for travellers. The old road-book that did duty for so many decades, indicating the position and distance of turnpike and tavern, church and forge, was superseded, in the earlier days of railway locomotion, by a class of works in which hotel tariffs and cab fares were freely intermixed with scraps of descriptive poetry, and padded with information that was rarely accepted as trustworthy. Higher education and constantly-increasing facilities for visiting every part of the habitable world have created a demand for a class of literature that had no existence in a previous generation. More than this. The eagerness to acquire knowledge with a minimum of trouble, and the impatience that rebels against staid investigation, have called into existence a class of books in which a mass of useful and trustworthy matter is placed before us in a handy and concise form. It was a new departure to issue ten years ago a handbook to the Mediterranean for the use of general travellers and yachtsmen. The wisdom of the step and the success of the undertaking are marked by the issue of a third edition, thoroughly revised up to date. To condense within the limits of two handy little volumes a reasonable and reliable amount of information regarding all the countries in the vast basin of the Mediterranean, including such inland excursions as the average traveller would naturally make from its ports, is a creditable undertaking, and fairly merits the success it has already achieved. It might be expected that so keen an observer of the monuments of antiquity, and so diligent a student of antiquarian literature as the accomplished author of this handbook, could not fail to satisfy the expectations of the architect and the archaeologist. A glance at the pages of these volumes is sufficient to show that their expectations are realised, and that every endeavour has been made on the part of the editor and his fellow-workers to secure accuracy without losing sight of the great desideratum of a handbook—practical utility.

Respective of the revision to which previous editions of this work have been subject, parts having been re-written, the attention of travellers is specially directed to the chapters relating to localities insufficiently described before, such as the coast of Africa, Greece, Dalmatia, Cyprus, Malta, Sicily, Sardinia, the Balearic

The success of the last edition of the "Handbook to Algeria and Tunis" has induced the publishers to issue another revise under the same experienced editorship. The knowledge and enthusiasm which prompted Ford many years ago to write for the benefit of travellers in Spain the best handbook of his time, or indeed of any time, are equally conspicuous in the volume before us, and it would be difficult to name any other work of the kind where more care has been taken to ensure accuracy of description throughout all its pages. Railway communication has now placed the chief points of interest within easy access of London, and excellent roads to the military stations in the interior, as far as the Desert line, offer as many facilities to the pleasure-seeker and the student as are to be found in most parts of Europe. There is no country that possesses such abundant traces of every stage of civilization as the region described in this handbook. In the Museum at Carthage the traveller will find a varied collection of early Punic sculptured remains:—The disc of Baal, "the abomination of the Sidonians," the upright hand, the crescent of Astarte, palm trees, rams, and other

symbols of long-forgotten creeds. On the coast below Mahadia he may explore the tombs of still earlier settlers, far back into pre-historic times. Inland, almost wherever he turns, he may study the monuments of the long and prosperous period of Roman dominion, and the short rule of the Byzantine Emperors. From the borders of Tripoli to the holy city of Kairouan, and westward up to the pillars of Hercules, he may trace the march of the victorious Arabs. In Tunis and Susa, and Sfax and other towns, he may note that the arts and crafts of this once conquering race, notwithstanding long centuries of decay and misuse, are not yet wholly extinct. And at Tlemcen, hitherto neglected by the architect and the archaeologist, he will find admirable specimens of Moorish art not surpassed, except in grandeur of scale, by any of the better known work at Granada or Seville.

Electrical Influence Machines. A full account of their Historical Development and Modern Forms, with Instructions for making them. By JOHN GRAY, B.Sc. London: Whittaker & Co., 1890.

In his preface the author states that "In the present work an attempt has been made to bring together in one volume all that is useful and interesting about Influence Machines. In the first part is given a sketch of the elements of static electricity sufficient, it is hoped, to make the reader independent of a text-book on the subject, and at the same time, in such a form as will enable those with little mathematical knowledge to understand the nature of electrical quantities. . . . In the second part, the history of the Influence Machine, from its earliest known form up to its modern forms, has been given. . . . The construction and working of all the important machines, have also been described in this part of the book." Those who are familiar with electrical theory and measurement may omit reading Part I. without missing anything necessary for the proper understanding of the subsequent portions of the book, though the author is happy in his treatment of this well-worn branch of the subject, and, in places, original. After giving "The Experimental Data of Static Electricity," Mr. Gray devotes a chapter to "A Working Hypothesis of the Electric Field." A dielectric is represented by a collection of cells, with elastic walls, filled with incompressible fluid, and the walls of these cells are bulged out in the direction of a line of force. "The potential at any point in an electric field or strained dielectric is the pressure in the cell in which the point lies." How far such a hypothesis will assist the average reader is an open question, but the definition or explanation of E. M. F., which the author deduces from it, is altogether unwarrantable and calculated to lead a beginner into hopeless confusion. E. M. F. is defined as "the rate at which the potential decreases," that is, E. M. F. is defined as though it meant "electric force" and not "electromotive force." Electric force and electro-motive force being totally different things, we are at a loss to understand how Mr. Gray can have committed such a blunder. In the next paragraph it is stated that E. M. F. at "points" on a conductor would be infinite, and "this explains the discharging effects of points." Considering that the letters E. M. F. are now universally used to mean something quite different from the above, Mr. Gray ought at least to warn his readers that he is attaching a new signification to them.

The final chapter of Part I. is taken up with very full descriptions of Sir William Thomson's well-known electrometers and a brief description of one of his volt-meters. As the most important step in the progress of every science is the measurement of quantities, the reader may reasonably expect, after reading through some twenty-five pages of detailed descriptions of instruments for measuring potential and current, that the actual performances of the influence machines about to be described will be given. Such, however, is not the case; qualitative results, not quantitative, alone are recorded except in one or two cases.

Part II. begins with the description of an electrophorus, given by Wilke in 1762, and in due course details are given of the influence machines of Belli, Bertsch, Dieckrode, Rohmberger, Cavallo, Carré, Clarke, Clerk Maxwell, Goodman, Haebette and Desormes, Holtz, Kaiser, Kundt, Leyser, Musaeus, Nicholson, Pogendorff, Riess, Rigbi, Ronald, Rohmkorff, Thomson, Töpler, Varley, Voss, Wilson,

Wimbhurst, Wimbhurst-Holtz. This list will indicate the amount of information about this type of electrical machine that Mr. Gray's little book affords; and it is extremely interesting to note how, and at what rate, influence machines have been gradually developed from that of Wilke in 1762 to that of Wimbhurst in 1890.

The rate of development has, however, been by no means uniform, for, as the author points out, "subsequent to the invention of Belli's machine [1831], no real progress was made till Varley's machine appeared in 1860, with the exception of Goodman's machine [1840], which showed no advance except in the use of uncoated glass as a carrier of electricity. . . . This sudden loss of interest in the subject appears to have been due to the fact that the attention of scientific men became absorbed in the magnificent discoveries of Faraday in electro-magnetism and other kindred branches of electricity, which covered a period extending from 1831 to 1857."

It is needless to say that in some of the older forms of machines curious devices appear. In one of Töpler's machines a sort of electrical safety-valve, consisting of two points opposed to each other, the distance between which can be adjusted, is introduced "to prevent the difference of potential becoming so great as to cause internal sparking in the machine." Some instructive figures are given in connexion with the great Töpler machine. "A machine with 20 discs, each 26 cm. diameter, the axis of which made 22 revolutions per second, with an expenditure of 4 kilogrammetres of work, supplied a current of electricity of 0.0081 absolute units, when measured by passing the current through a U-formed glass tube filled with water and a tangent galvanometer."

The author has himself made some interesting experiments on the Holtz machine by substituting tin-foil for the usual paper armatures. "Tin-foil sectors subtending an angle of 20 deg. were found to answer, while it was found that the machine would work with paper sectors of about one-half that length." The Bleekrode Machine appears to be a very remarkable one, and we wish the author had allowed more space to it. It is a modified Holtz, with vulcanite instead of glass discs. "Contrary to the usual practice, the electrodes of the machine must not be in contact when the machine is started. But the most interesting points are in connexion with the neutralising rod. It has been found that a machine such as this, having vulcanite discs, will not work at all without the neutralising rod. . . . the machine will cease to act, and all electricity will apparently disappear from it. . . . when the neutralising rod is again brought into position, the machine will commence to act as before." A final extract is made for the purpose of showing how little is really known as to the behaviour of influence-machines, owing to the apathy displayed towards them by modern electricians. "It has been observed that these Holtz machines of the 'second kind' are liable to die out when the electrodes are separated beyond the striking distance, though, according to other authorities, a reversal of the current takes place." It is indeed curious that so interesting a point as to the behaviour of a well-known machine has never been definitely settled. A chapter is devoted to the tiny machines of "the celebrated physicist, Sir W. Thomson," and Part III. gives pretty complete instructions for the practical construction of that most successful of modern machines, the Wimbhurst, as well as of the Holtz and Voss machines.

The descriptions given throughout the book are excellently illustrated with eighty-eight figures and three plates. The matter it contains, collected, as far as we are aware, for the first time in a single volume, proves how much this branch of electrical science has been neglected and the immense field for original research offered by it.

SOME TRADE CATALOGUES.

Messrs. DOULTON & Co., of Lambeth, have lately issued a very complete illustrated catalogue and price list of sanitary appliances. There are figured in it several novelties in the way of pedestal "combination" and other closets, as well as baths, lavatories, water-fittings, and urinals of an improved type, such as were provided by this firm for the chalets of the Paris Exhibition, where, we learn, they planned and fitted up 300 water-closets, 100 urinals, and sixty lavatories. Their new cata-

logue will be found very useful to architects and the building trade. Messrs. Doulton, we may add, have lately erected an additional manufactory for sanitary appliances at Paisley.

Messrs. Adams & Co., of York, London, and elsewhere, have sent us their new illustrated list of patent sanitary specialties. Amongst the novelties it contains we would call special attention to a new form of lavatory basin, which is devoid of the old-fashioned plug and chain outlet. The water is admitted from the rear, towards the bottom of the basin; a continuous current strikes the front of the basin, is directed upwards, and then flows back at the top of the basin towards the back, where there is an outlet weir. By this means the water can be continually renewed while it is being used, all dirt and foul matter being carried away at once. We may also mention Messrs. Adams's special disconnecting chamber, made of stoneware; their improved automatic flushing syphon; their patent revolving disc panstick, which is ingenious and secures a tight fit, as well as a quick and easy lift; and their patent "automatic" flushing-door, useful for large cisterns, &c. These and other appliances in the list are well worth the attention of Borough Engineers and Surveyors.

Messrs. D. Hulet & Co., Limited, of Holborn, send us a copy of their illustrated catalogue of electric-lighting plant and material, which appears to be very complete, and cannot but be found useful by architects and builders. It is very well got up, and every article illustrated or described is priced, so that some approximate idea of the cost of an installation may be arrived at.

From Messrs. H. Binko & Co., of Leadenhall-street, we have received another useful catalogue of electric fittings and appliances, including bells, telephones, telegraphs, lighting, and motors.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

7,415, Window Sockets. C. J. Harcourt. The "sockets" which are the subject of this patent are chiefly designed for shop-fittings, and are so made as to be easily fastened around any pillar or projection, and removable without being passed over the top, or permanently fixed.

20,914, Fireproof Ceilings and Walls. A. Klapperstuck and A. H. Meyer.

According to this invention, mortar and gypsum, with colophony and diluted acid, are mixed and applied as a plaster, which is thrown against a suitable fireproof backing, preferably a coarse-wired wire netting. It is applied to both sides, and is smoothed off the usual way. The colophony remains in a neutral condition within the wall until subject to heat. When, however, a fire breaks out, the colophony will cause the wall to assume a glazed structure, which renders it incombustible. This structure the wall will always after maintain. The walls may be made very light and thin, waterproof, and poor transmitters of sound, and, moreover, the walls may be made in small portable sections.

1,525, Brick Kilns. I. Button and others.

In continuous kilns improvements are made according to this invention, by the combination and arrangement of a series of separate arched compartments in connexion with a smoke-chamber and in the novel arrangement of a temporary and permanent part of the kiln. The temporary parts are made of green bricks, and each compartment as it is filled is closed by a wall of green bricks, a sand filling, and an iron gate.

1,762, Railway Sleepers. R. Hirschberg.

This invention consists in a means for retaining metal sleepers in a proper position with relation to each other, and in locking devices for the same. The clamping devices are peculiarly arranged.

1,839, Windows or Casements. F. Schmidt.

This invention refers to means for preventing the said inner and outer casements from clashing together, or being thrown apart by influences such as the weather or the sudden opening or closing of doors. The frames for the two panes are fixed that they are rigid, and always maintain a parallel position to each other. The socket is made by piercing a hole in the centre of the frame carrying the two panes.

1,868, Forming Holes and Screw-threads in Clay and Earthenware. G. Schönau.

According to this invention, mandrels used are forced into the holes in which the threads are to be cut, or sectional mandrels having removable dies, are pressed around the projectors on which the threads are to be made.

"Structure" is the word used in the specification but "surface" seems to be the word intended.

1,890, Drive Chains. T. Moxon and others.

The object of this invention is to produce a chain of pivoted links which shall be extra strong and simple in construction, and which may be easily shortened by the removal of links or lengthened by the insertion of new links without the employment of pins, screws, or rivets; the links being held together by simply keeping the chain taut. The links are formed in one piece, each link having one end and a hook at the other, and being a link apart from the others. When it is desired thus to separate them, it is first loosened a little, and then the upper part is slid far enough to disengage its hook from the lower section, the eyes formed by the hooks being sufficiently elongated to permit this to be done.

2,200, Closing and Sealing Device for Discharge Openings. J. L. Bradley.

This device is for closing and sealing the discharge apertures of vessels containing liquids or gases, free or under pressure, to prevent leakage and setting fast by corrosion, such as occurs with ordinary cocks or taps, to ensure a certain and immediate discharge of the vessel when required, and to render impossible any tampering with the device without detection. It consists of a peculiarly shaped cover piece or plate, soldered or otherwise fastened over the discharge aperture.

2,326, Blind Furniture. J. Robertsshaw.

According to this invention, a pivot, ratchet-wheel, spiral spring, and a screw nut are employed in combination to effect a tension of blind board and even rotation of the blind roller.

* * Owing to the failure of the Patent Office to issue the official Journal of Patents last week, we are compelled to hold over the "New Applications," &c., until next week.

RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

Table listing real estate transactions with columns for date, location, and price. Includes entries for Messrs. Cobb, Rogers, Chapman, & Thomas, Henry & Larchford, Westacott, Moore, Newbon & Harding, Reynolds & Eason, and Slade & Butler.

MEETINGS.

- SATURDAY, APRIL 19. Royal Institution.—Captain W. de W. Abney, F.R.S., "Colour and its Chemical Aspects." 3 p.m. Edinburgh Architectural Association.—Visit to Carlton Castle. St. Paul's Ecclesiological Society.—Visit to the Battersea Churches of St. Mark, St. Peter, and St. Mary by St. Paul's Park, under the direction of Mr. William White, S.A. MONDAY, APRIL 21. Royal Institute of British Architects.—Special General Meeting for Members only. 8 p.m. TUESDAY, APRIL 22. Institution of Civil Engineers.—Discussion on Sir Richard Branson's paper on "The Application of Electricity to Welding, Stamping, and other Cognate Processes." 8 p.m. Society of Arts (Foreign and Colonial Section).—Sir Stokes, on "The Danube and its Trade." 5 p.m.

WEDNESDAY, APRIL 23. Society of Arts.—Mr. W. Whitaker, F.R.S., on "Coal in the South-east of England." 8 p.m. Sanitary Institute.—Address by Sir Robert Rawlinson, who will present the Metals and Certificates awarded to the successful Exhibitors at the Exhibition held at Worcester in 1889. 8 p.m.

Liverpool Engineering Society.—(1) Nomination of Council and Officers for ensuing Session. (2) Adjourned Discussion on Mr. T. J. Miller's paper on "The Efficiency of Gas Engines." 8 p.m. THURSDAY, APRIL 24. Guild and School of Handicraft.—Mr. Stirling Lee on "A Talk on Sculpture." 8 p.m. Institution of Electrical Engineers.—Dr. Oliver Lodge, F.R.S., on "A Lightning Guard for Telegraph Purposes and the Protection of Cables from Lightning." 8 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. C. F. Jenkin on "Some Applications of Electricity in Engineering Workshops." 7.30 p.m. SATURDAY, APRIL 26. Association of Municipal and Sanitary Engineers and Surveyors.—Home District Meeting at Acron, Ealing, and Hampton. Royal Institution.—Captain W. de W. Abney, F.R.S., on "Colour and its Chemical Action." 11. 3 p.m.

Miscellaneous.

Robert Boyle & Son (Limited).—The directors of Robert Boyle & Son, Limited, ventilating engineers, London and Glasgow, have resolved to pay an instalment on account of dividend at the rate of 12 per cent. per annum for the half-year ending March 31 last, which is stated to have been the most prosperous since the formation of the Company. The directors attribute this success to the great and ever-increasing demand for the latest improved form of their self-acting "Air-Pump" ventilator, upon which further improvements have recently been effected by Mr. Robert Boyle, adding considerably (so we are informed) to its power as an exhaust ventilator, weatherproof and free from down-draught. It is now made of a more ornamental character, of the best rolled steel plates, galvanised, and painted with enamel paint, and, though superior to those Messrs. Boyle have hitherto made, is sold at 50 per cent. less in price, and it is claimed that it is not only the most efficient but also the most substantially-made and cheapest ventilator in the market. The Company have just applied their system of ventilation to the Lord Mayor's Court, Guildhall, H.M.S. Conquest, the new "White Star" line steamers Pentonic and Mejestic, and the new steamer of the Compagnie Générale Transatlantique, La Touraine. The Company have at present some very important ventilating contracts in hand and in prospect. Mr. Robert Boyle, the managing director, is now in India, arranging contracts for Government buildings and establishing "agencies," after which he proceeds to China and Japan.

University College, London.—A series of Saturday morning lectures on "Architecture; Classic and Christian," intended for art students and others, and open to ladies, will be commenced by Professor T. Roger Smith, F.R.I.B.A., on Saturday, April 19, at 11 a.m. The following is the syllabus:—Classic Architecture (three lectures and one visit); The nature of architecture; the origins of Greek architecture; Greek archaic buildings and temples; public buildings; parallel between Greek and Roman art; Roman temples; public and domestic buildings; monuments; Basilicas; visit to the British Museum. Christian Architecture (three lectures and one visit); Byzantine and Romanesque architecture; Gothic architecture in England; the usual division into periods; cathedrals, churches, and monastic buildings in England; domestic and military buildings; Gothic architecture in France, Germany, and Italy; visit to Westminster Abbey. The lectures will be fully illustrated by diagrams and photographs. The fee for the course is one guinea, admission to the first lecture being free.

The "Marlborough" Patent Pamphlet Cases.—We have previously noticed these admirable cases for preserving loose pamphlets, periodicals, &c. We have now received a specimen of the case which has been prepared specially for containing numbers of the Builder. Messrs. Marlborough, Gould, & Co., of Old Bailey, are the manufacturers, but the cases may be had to order from all stationers and booksellers. The cases are very convenient. They facilitate order and tidiness, and help greatly in the classification of loose pamphlets and periodicals, dust and "blacks" being effectually excluded. They are made in sizes to suit all magazines and periodicals.

The English Iron Trade.—The English iron market is very quiet, with a general downward movement in prices. Business in pig-iron is of a very restricted nature. Consumers are holding back in the expectation of still lower prices, while producers are unable to sell at the reduced rates, owing to the dearth of raw material, the business done passing almost exclusively through the hands of merchants and holders of warrants. The Glasgow and Middlesbrough warrant markets have been on the downward course all the week. Scotch warrants are about 2s. a ton lower, and Cleveland warrants as much as 6s. The drop in Scotch makers' iron ranges from 6d. to 5s. per ton, and in Cleveland makers' iron it is 5s. a ton. Lancashire pig-iron has lost 2s. a ton, Lincolnshire 1s., and Derbyshire 5s. Other descriptions of pig-iron have experienced a corresponding fall, while West Coast hematites are obtainable at prices 5s. below those ruling a week ago. The demand for manufactured iron and steel continues very limited, and prices have further declined. The decline in finished iron is from 2s. 6d. to 5s. a ton, and in steel from 2s. 6d. to 15s. Shipbuilders, although pretty well engaged on work in hand, are not looking any fresh orders. Engineers are taking some new work, but they are quieter on the whole.—Iron.

Proposed Artisans' Dwellings.—On Tuesday next, at the Mart, the London County Council will offer for sale some lands lying east and west of Rosebery-avenue. The two lots, being about 41,150 feet superficial together, abut against that portion of the new street from Gray's Inn-road to St. John-street-road which is now nearly completed. They will be utilised for artisans' dwellings, to be constructed in accordance with plans to be approved by the Council. It is required that the dwellings shall accommodate 660 persons of the "labouring class" as defined by statute, and shall be built for a least total of 20,500. Their erection here is stipulated for by the Metropolitan Board of Works (Various Powers) Act of 1855, in terms whereof the late Board made a scheme in this behalf. At the part in question, Rosebery-avenue passes between Mount Pleasant and Clerkenwell-road, and is carried upon a viaduct of brick arches, crossing Warner-street by a girder-bridge. The height of the footway above the lowest point of the hollow is 27 ft. The two lots are traversed, at a depth of about 18 ft., by the Old Fleet sewer, which here forms a boundary between the parishes of St. Andrew, Holborn, and St. James' and St. John, Clerkenwell. The stream ran along the northern sides of the present Poole's-buildings, on Mount Pleasant, and the Field-lane Refuges in Vine-street.

Copping's Automatic Sash-lock.—This sash fastener, of which a working model has been submitted to us, is one of the best recent patents of this kind that has come under our notice. A small barrel bolt, fixed in a strong sheath on the rail of the inner sash, shoots with a spring into a brass socket fixed on the rail of the outer sash; the socket is combined with a striking-plate which automatically pushes back the bolt on closing the window, until it is opposite the socket. The bolt works at right-angles to the sash-rails. Combined with the bolt are a couple of clips on the inner sash sliding on a brass hed on the outer sash which slopes obliquely, so that, on meeting, the sash-rails are drawn together and held tight. The bolt is withdrawn by a dropping-rod on the inner side. As we have observed in former instances, a spring is always a certain element of weakness; but in every other respect this is an excellent and workmanlike fastener, good in principle and very strongly made, and we commend it to the attention of architects.

The Zolus Waterspray System of Ventilation.—It will be seen from our advertising columns that Messrs. Baird, Thompson & Co., ventilating and sanitary engineers, of Queen Victoria-street and Glasgow, have purchased the patent rights and plant of the Zolus Waterspray General Ventilating and Electrical Engineering Company, together with the goodwill of the business carried on by that company. The Zolus Waterspray System of Ventilation has been largely applied on the Continent of Europe, where many important Government and other buildings have been ventilated by it. In Canada and Queensland it has been applied to the Government Offices; while in this country many important buildings have been heated and ventilated by the company.

Registration of Plumbers at Plymouth.

The Mayor of Plymouth presided, on the 10th inst., over a public meeting held in the Municipal Buildings, Plymouth, in furtherance of the national system for training and registration of plumbers. There was a large and influential attendance. The Mayor opened the proceedings by introducing the Master of the Worshipful Company of Plumbers, Mr. W. H. Bishop, who said that Plymouth was very rapidly growing, and in the race between seaside places for public favour as health resorts there was no reason why it should not take the front rank. The subject of sanitation was an eminently practical one, and was pressing itself on the public attention more and more every day.

He said that the Company's object was not confined to the registration of competent men; they were doing their utmost to provide the younger members of the craft with facilities for rendering themselves competent, and he referred to the rapid spread of technical classes in various parts of the kingdom. The men who attended those classes showed by their study and application to the work during three hours of voluntary schooling a determination to improve themselves and their trade which could not fail to ultimately succeed. Referring to the way in which the movement was being carried out, he said they were met there in public to elect a Council composed equally of each section of the plumbing trade, and representatives of the public. With a body so constituted, surely it would be hard to find fault. They would draw up their by-laws, fix the time and place of their meetings, and prepare for examinations; for the feeling throughout the country was growing stronger every day that applicants for registration should be admitted on examination only. The Earl of Morley moved that a Council be formed at Plymouth to carry out the registration system in South Devon and Cornwall. Several other speakers having warmly supported the resolution, it was carried unanimously, and a District Council elected, including, besides the representatives of the master and operative plumbers, the following public representatives:—The Mayor of Plymouth, the Mayor of Devonport, Dr. Greenway (Medical Officer, Plymouth), Dr. Lear (Medical Officer, Stonehouse), Dr. W. May (Medical Officer, Devonport), Dr. Kerswill (Medical Officer, St. German's Union), Dr. France, Dr. of Hingston, Dr. J. H. S. May, Messrs. C. King, F. Hine, W. Snell, and Luff (architects), J. Bellamy (Borough Surveyor, Plymouth), W. Burns (Borough Surveyor, Devonport), and A. E. Lyons (Chairman, Stonehouse Local Board). The Mayor of Plymouth presented Certificates of Registration granted by the Plumbers' Company to a number of local plumbers who had passed the examinations, and the proceedings ended with the usual votes of thanks.

Association of Municipal and Sanitary Engineers and Surveyors.—A Home District meeting of this Association will be held on Saturday, April 26, 1890, at Acton, Ealing, and Hampton. The members will proceed to the sewage works of the Acton Local Board, on the morning of the 26th inst., by railway to either Turnham Green Station (Metropolitan Railway), or Acton Station (North London Railway), from each of which stations the works are about three-quarters of a mile distant. The programme of the meeting will be as follows, viz.:—11 a.m. Assemble at sewage works of Acton Local Board, where a short paper descriptive of the process of the International Rivers Purification Co. will be read by Mr. Ehhets, Surveyor of Acton, and the works afterwards inspected. 12 p.m.: Proceed by breaks to Ealing. 12.20 p.m.: Arrive at Ealing, where a paper descriptive of the new Public Offices and other recent works at Ealing will be read by Mr. Jones, and an inspection made of the Baths, Offices, Free Library, Fire Brigade Station, stabling, &c. 1.30 p.m.: Light refreshments will be provided by Messrs. Jones and Robson at the Public Offices, Ealing. 2.30 p.m.: Proceed by breaks to Haupp'n, where by the kind permission of Mr. Frase, the large Extension Works of the Grand Junction Waterworks Co. will be viewed, including special pumping machinery now in course of erection.

Surveyorship, Luton.—We understand that the Town Council of Luton have appointed Mr. E. J. Lovegrove, A.M.I.C.E. (Assistant Borough Engineer and Surveyor of Croydon), as Borough Engineer and Surveyor. Mr. Lovegrove is the son of Mr. Jas. Lovegrove, C.E., Surveyor to the Hackney District Board of Works.

Edinburgh Architectural Association.

The usual fortnightly meeting of this Association was held on the 9th inst. in the Architectural Hall, 42, George-street, Professor G. Baldwin Brown, President, in the chair. After the usual preliminary business, a paper on "The Accessories of Architecture" was read by Mr. John Keppie, President of the Glasgow Architectural Association. The subject of the paper, which is one of the most important with which the architect has to deal, and which in a great number of instances does not receive the attention it deserves, was the first accessory to which attention was drawn. Comparison was made between the setting-out of cities in Britain and on the Continent, considerably to the advantage of the latter. Paris particularly was alluded to as a city in which most of the fine buildings were beautifully situated, and the lecturer said that consequently they received a much greater degree of public appreciative attention. Sculpture and metal-work were next alluded to as valuable aids to the architect, not only on account of fine form, but of the texture and coloration of which they were capable, and which was as valuable in architecture as in painting. Some remarks were made on the correct method of designing in different materials, such as cast-iron, plaster, &c. The lecturer said, in conclusion, that, owing to the increase of interest in the various accessories, these arts were now in a more flourishing condition than they were fifty years ago, and consequently architecture ought now to be, if it was not, more interesting and thorough than it was then. At the close, a hearty vote of thanks was accorded to the lecturer.

Lifts.—Messrs. Archibald Smith & Stevens have received instructions to erect one of their "Rialance" hydraulic lifts at the Badminton Club-chambers. They are also erecting similar lifts at Ashley-mansions, Victoria-street, Westminster; and in several other buildings.

Building Land at Northwood.—We may call the attention of our readers to the sale of freehold building land to be held at Northwood, on the borders of Middlesex and Herts, on the 30th inst., by Messrs. Humbert, Son, & Flint, as advertised.

PRICES CURRENT OF MATERIALS.

Table with columns for material names (e.g., Greenheart, B.G., Teak, E.I., Sequoia, U.S., Ash, Canada, Birch, Elm, Fir, Dantico, &c., Oak, Canada, Pine, Canada red, yellow, Lath, Bantale, St. Petersburg, Watuscot, Riga, &c., Deals, Finland, 2nd and 1st, std., 100, 4th and 3rd, Riga, St. Petersburg, 1st, yellow, 2nd, white, Swedish, White Sea, Canada, Pine, 1st, 2nd, 3rd, &c., Spruce, 1st, 2nd and 3rd, New Brunswick, &c., Batters, all kinds, Flooring Boards, sq., 1 in, prepared, First, Second, Other qualities, Cedar, Cuba, Honduras, &c., Mahogany, Cuba, St. Domingo, cargo average, Mexican, cargo average, Ohio, Honduras, Box, Turkey, Rose, Rio, Bahia, &c., Satin, St. Domingo, Porto Rico, Walnut, Italian) and columns for prices in £, s., d., and c.

METALS.

Table listing metal prices for Iron-Bar, Welsh, in London (at works in Wales, at works in London), Best selected, COPPER—British, cake and ingot, 53, 0, 0, Best, Sheets, strong, CHINA BARS, Yellow Metal, LEAD—Pig, Spanish, English, com. brands, sheet, English, Pipe.

METALS (continued). Table with columns for material names (Tin—Strait, Australian, English Ingots) and columns for prices in £, s., d., and c.

OILS.

Table listing oil prices for Lincseed, Coconut, Ceylon, Palm, Lagos, Rapeseed, brown, Cottonseed, refined, Tallow and Oleine, Lubricating, U.S., refined, TAR—Stockholm, Archangel.

TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

ABINGDON.—For the erection and completion of Salvation Army Fortress, Abingdon, for General Booth. Mr. J. Williams Danford, architect and surveyor, 101, Queen Victoria-street, E.C. 4:— E. Williams, Abingdon, 2546 0 0; Ellwood & Sons, Sandy, 497 0 0; S. Drew, Abingdon, 490 0 0; T. Barrett, Abingdon, 455 0 0; J. Buckle, Abingdon, 445 0 0; G. H. Wheeler, Abingdon, 437 0 0; Martin & Barclay, Battersea, 430 0 0.

ANSTEY (near Dorchester).—For the erection of a pair of semi-detached villas, for Messrs. Hall & Woodhouse. Mr. A. L. T. Tilley, architect, Dorchester:— W. House, Hurlfoot Lane (accepted), £786 0 0.

BROADSTAIRS (Kent).—For erecting a Convalescent Home, for the Board of Managers of the North Surrey District Schools, Anerley. Mr. A. G. Hennell, architect, Forest Hill. Quantities supplied by Mr. J. B. Vinney, 89, Chancery-lane, W.C. 1:— H. L. Holloway, 24,290 0 0; A. G. Lockwood & Co., 3,750 0 0; W. Johnson, 3,800 0 0; J. T. May, 3,800 0 0; Foster & Dicksee, 3,681 0 0; W. & T. Denne, 3,680 0 0; Holloway Bros., 3,600 0 0; Charles Home, 3,695 0 0; R. G. Battley, 3,574 0 0; W. Akers & Co., 3,670 0 0; J. Shillbee & Son, 3,400 0 0; F. J. Coxhead, 3,439 0 0; W. H. Port, 3,490 0 0; W. J. Adcock, 3,397 0 0; C. J. Adcock, 3,365 0 0; T. Pearce, 3,353 10 0; F. J. Doughty, 3,288 0 0; J. Longley & Co., 3,293 0 0; W. W. Martin, 3,149 0 0; Robeson & Rickett, 3,138 0 0; J. Pocock, 3,133 0 0; Andrew Black & Sill, 3,128 0 0; L. Shrubsole, 3,095 0 0; G. H. Denne & Son, 3,083 0 0; J. Brown & Son (accepted), 2,933 0 0.

BROADWELL (Gloucestershire).—For new wing and alterations, at Broadwell, Gloucestershire, for Mr. R. G. Francis. Mr. E. Guy Dawber, architect:— H. Kotham, Stow-on-the-Wold, 2,999 0 0; Groves, Milton-under-Wychwood, 587 0 0; Howman Bros., Stow-on-the-Wold, 510 0 0.

BUTION-ON-TRENT.—For the erection of new malt-house, avenue, hop and barley stores, and other works, at Clarence-street Brewery, Burton, for the trustees of the late Mr. P. Walker. Mr. Robey E. Carpenter, architect. Quantities by the architect:— Wood, Derby, 46,465 0 0; Hunter, Burton, 6,440 0 0; Walker & Slater, Derby, 6,345 0 0; Hojages, Burton, 6,290 0 0; Chamberlain, Burton, 6,195 0 0; Lowe & Sons, Burton, 6,100 0 0; Varlow, Burton (accepted), 5,997 0 0. [Architect's estimate, £6,250.]

COLCHESTER.—For erecting new schools, Kendall-road. Mr. Frank Whitmore, architect, Chelmsford:— E. S. Ward, 21,490 0 0; F. Dupont, 1,393 0 0; Everett & Son (accepted), 1,389 0 0. [All of Colchester.]

EASTBOURNE.—For the erection and completion of Salvation Army Chadel buildings in Eastbourne, Sussex, for General Booth. Mr. J. Williams Danford, architect and surveyor, 101, Queen Victoria-street, E.C. 4:— J. Peerless, Eastbourne, 42,625 0 0; I. Huggett, Eastbourne, 2,488 17 8; J. Coster, Eastbourne, 2,250 0 0; J. Pinn, jun., Eastbourne, 1,979 10 0; E. Cornwall & Son, Eastbourne, 1,860 0 0; Rowland Bros., Horsham, 1,749 0 0; Coxhead, Leytonstone, 1,679 0 0; J. Beckhurst, Eastbourne, 1,569 0 0; F. Mitchell, Bexhill-on-Sea, 1,557 0 0; Martin & Barclay, Battersea, 1,385 0 0.

EAST BRENT (Somersetshire).—For the first portion of the work to be done at the parish church, for the Ven. Archdeacon Denison. Mr. E. H. Lingen Barker, architect:— Jones & Willis, 2,600 0 0; Midland Joinery Co., 517 12 0; Goss, 400 0 0; Hems, 380 0 0; Kibbey, 365 0 0; Cowlin, 349 0 0; Pollard, 345 0 0; Hawkins & Co., 293 19 0; Nerrick, 263 0 0; Dart (accepted), 240 0 0.

COMPETITION, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITION.

Table with 5 columns: Nature of Work, By whom Required, Premium, Designs to be delivered, Page. Includes 'Schools' and 'North Wales University College'.

CONTRACTS.

Table with 5 columns: Nature of Work or Materials, By whom Required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page. Includes 'Sewers', 'Paving of Paths', 'Water Pipes', etc.

PUBLIC APPOINTMENTS.

Table with 5 columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Includes 'Assistant Surveyors' and 'Civil Service Commission'.

INCHLEY.—For erecting coach-house and stables, Torrington Park, North Finchley. Mr. F. D. Dixon, architect. The Oaks, Woodside Park, N. S. Wheeler & Co. (accepted) £203 0 0

INCHLEY.—For repairs, &c., to two houses in Torrington Park, North Finchley. Mr. F. D. Dixon, architect. The Oaks, Woodside Park, N. S. Wheeler & Co. (accepted) £203 0 0

INCHLEY.—For repairs, &c., to Congregational Church, North Finchley. Mr. F. D. Dixon, architect. The Oaks, Woodside Park, N. S. Wheeler & Co. (accepted) £203 0 0

BREAST GATE.—For new banking premises and 4, Forest Gate, for the London and South-Western Ry. Co., Limited. Mr. Edward Gabriel, architect, Old Broad-street. Quantities by Mr. G. R. Tasker, John-street, Bedford-row, W.C. :-

BRNSEY.—For new road, sewer, surface water, &c., for the British Land Company, and, on their estate at Harringay Park. Mr. Henry Nichell, surveyor :-

NEGSTON.—For alterations and additions to 'Millist' Mr. T. Searancke Archer, architect :-

LONDON.—For rebuilding the "Plough" Inn, Mile-end-road, E. Mr. W. D. Church, architect, 12, South-place, Finsbury, E.C. Quantities by Messrs. C. Stanger & Son, surveyors, 21, Finsbury-pavement, E.C. :-

LONDON.—For alterations at St. James's Schools, Wandsworth Common, S.W., for the Guardians of the Westminster Union, Mr. Jno. Waldram, C.E., surveyor, 10, Craven-street, Charing-cross, W.C. :-

LONDON.—For painting and other work at the Lambeth Infirmary, for the Guardians of the Poor of the parish of Lambeth. Quantities supplied :-

LONDON.—For decorating and painting, &c., at 12, Carlton House-terrace, for Sir Savile Crossley, Bart., M.P. :-

LONDON.—For the erection of one pair of semi-detached houses on the Frogmole Mansion Estate, Hampstead (exclusive of mosaic floors, tile hearths, stoves, mantelpieces, painted glass, door furniture, painting, and papering). No quantities supplied. Mr. James Neale, F.S.A., architect and surveyor, 10, Bloomsbury-square, W.C. :-

Langdale, Hallett, & Co., London £5,500
Holloway Bros. 5,420
Garlick & Horton 5,305
Foster & Dicksee, Rugby 5,252
McCormick & Sons, London 4,387

LONDON.—For the erection of Clarendon Chapel and Schools, Clarendon-street, Camberwell, New-road, S.E. Mr. George Baines, architect, 4, Great Winchester-street, E.C. Quantities by Messrs. G. E. Goodchild & Son, St. Finsbury-pavement, E.C. :-

Holiday & Greenwood £6,139
R. E. Nightingale 6,132
F. & H. F. Higgs 6,120
F. Tarrant 5,983
R. G. Battley 5,957
R. J. Coxhead 5,598
W. Johnson 5,500
S. J. Jerrard 5,433
H. L. Holloway 5,470

LONDON.—For constructing swimming-bath at the Licensed Victuallers' School, Mr. G. Trescher, architect :-

Allen & Son £3,400 0 0
Holiday & Greenwood 3,120 0 0
Beaf 3,120 0 0
Gould & Brand 3,079 0 0
Burnham & Son 3,050 0 0
Mower & Son 3,915 0 0

LONDON.—For alterations at the "Good Intent" public-house, Cambridge-heath. Mr. Batts, architect :-

J. & H. Cox £1,297 0 0
Blow 1,282 0 0
Mower & Son 1,275 0 0
Edwards 1,237 0 0

LONDON.—For alterations at the "Crooked Billet" Upper Clapton, for Mrs. Fairhead. Mr. Brown, architect, 21, Liverpool-street. No quantities :-

Godfrey & Son £793 0 0
Mower & Son 777 0 0
Walker Bros. 694 0 0
J. Anley 690 0 0
S. Goodall 677 0 0

LONDON.—For additional workshops, 120, East-road, N., for Messrs. Dotteridge Bros. Mr. A. G. Collins, architect, 32, Finsbury-pavement. No quantities :-

J. Chesnam & Sons £194 0 0
J. Godfrey & Son 194 0 0

LONDON.—For pulling down and rebuilding warehouse, No. 6, Henegage-lane, Evers Mark, E.C. Mr. H. Percy Monckton, architect, 32, Walbrook, E.C. :-

J. Greenwood £1,153 0 0
Harrison & Spooner 1,087 0 0
Turtle & Appleton 1,013 0 0
E. A. Roome (accepted) 846 0 0

LONDON.—For fittings and decorations to Oliphant's Restaurant, No. 5, St. Erle's-street, E.C., for Mr. W. Oliphant. Mr. Walter Graves, architect, Winchester House, Old Broad-street, E.C. :-

J. & S. Bowyer £436 0 0
A. Siegmund 478 0 0
B. E. Nightingale 388 0 0
P. Sage & Co. 340 0 0
Pitman & Son (accepted) 238 0 0

LONDON.—For drainage and sanitary works at "Claremont," Allyn Park, Dulwich, for Mr. O. A. King. Mr. Walter Graves, architect, Winchester House, Old Broad-street, E.C. :-

J. & S. Bowyer £195 0 0
B. E. Nightingale 188 0 0

LONDON.—For additions to laundry at Charlotte-place, Walworth, for Mr. T. B. King. Quantities by Messrs. Young & Brown, 5, Henrietta-street, Covent Garden :-

Downs £469 0 0
Colls 435 0 0
Castle 397 0 0
Marland, Wandsworth 377 0 0

MAIDENHEAD.—For house and stables at Maidenhead Court. Mr. T. Scrancke Archer, architect.—
Gibson..... £2,545 8 6
Joseph Higgs..... 3,418 0 0
For Billiard-room.
Joseph Higgs..... £450 0 0

PETERBOROUGH.—For the erection and completion of three shops in Cowgate, Peterborough, for the Salvation Army. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria street, E.C. 1.—
Martin & Barclay, Battersea..... £2,850 0 0
W. Jennings, Peterborough..... 2,465 11 9
F. J. Coxhead, Leytonstone..... 2,247 0 0
J. Wenlock, Peterborough..... 2,150 0 0
D. Gray, Peterborough..... 2,040 0 0
Ellwood & Sons, Sandy..... 1,975 0 0
Solden Hipwell, Wisbech..... 1,948 0 0

REDHILL.—For the erection of Salvation Army Messrs at Redhill, Surrey, for General Booth. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria street, E.C. 1.—
Bushy, Reigate..... £640 0 0
Coxhead, Leytonstone..... 555 0 0
Amos & Foad, Whistable..... 555 0 0
Wright, Broadwater..... 500 0 0
Martin & Barclay, Battersea..... 470 0 0

REDHILL.—For alterations and decorations at Furze Hill Lodge, Redhill, for Sir Francis Truscott.—
Messrs. Charlwood Bros., East Grinstead (accepted)..... £750 0 0

SANDIACRE (near Nottingham).—For the erection of a hotel, stabling, &c. Mr. T. W. Latham, architect, Sandiacre. Quantities by the architect.—
George Bantable..... £1195 0 0
C. Youngman..... 1180 0 0
F. Perks & Son (accepted)..... 1119 5 5

SOUTHAMPTON.—For taking down New Place House, Southampton, and erecting new house and offices on the site. Mr. W. H. Mitchell, architect, Southampton.—
Udall, Southampton..... £10,331 12 0
Dyer & Sons, Southampton..... 10,152 0 0
H. Stevens & Co., Southampton..... 9,576 0 0
Sanders, Southampton..... 9,770 0 0
W. R. & C. Light, Portsmouth..... 8,909 0 0
Bull, Sons, & Co., Limited, Southampton (accepted)..... 8,908 0 0

STOCKPORT.—For alterations and additions to premises situate in Short-street, Stockport, to form same into a Salvation Army Barracks for General Booth. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria street, E.C. 1.—
Coxhead, Leytonstone..... £829 0 0
Martin & Barclay, Battersea..... 826 0 0
Batsion, Heston Norris (accepted)..... 793 0 0

TEDDINGTON.—For finishing, draining, and decorating two houses in Teddington Park-road, for Messrs. J. & H. Pullman.—
Stanway, Acton..... £222 0 0
Slade, Twickenham..... 157 2 0
Eydman, Chiswick..... 142 0 0
Collinson, Teddington..... 124 0 0
* Accepted.
† Without the drainage.

WANSTEAD (Essex).—For alterations and additions to Cam Hall and Downsall-road Schools. Messrs. Bressay & Liddon-Walters, architects.—
Norths Bros..... £3,170 0 0
Flaxman..... 2,696 0 0
Mundy..... 2,800 0 0
Allen & Sons..... 2,775 0 0
Coxhead..... 2,728 0 0
Reed..... 2,696 0 0
Barrett & Power..... 2,604 0 0
Holland..... 2,652 0 0
Dahls..... 2,624 0 0
Cutley, Leytonstone (accepted)..... 2,626 0 0

WHETSTONE.—For the erection of a house at Oakleigh Park, Whetstone, N., for Mr. W. B. Passmore. Mr. Herbert Passmore, architect, 6, Cumberland terrace, Regent's Park, N.W. Quantities by Mr. W. Ralph Low.—
John Grover & Son..... £1,048 0 0
E. Laurence & Sons..... 1,923 0 0
James Smith & Son..... 1,857 0 0
R. Battley..... 1,839 0 0
Mattock Bros. (accepted)..... 1,511 0 0

WIVENHOE.—For the erection of new schools for 400 children, and alterations and additions to the present schools for boys, boundary walls, drainage, &c., for Wivenhoe School Board. Mr. J. W. Start, F.S.I., architect and surveyor, Cups Chambers, High-street, Colchester. Quantities by the architect.—
W. Bell & Sons, Saffron Walden..... £5,527 0 0
John Saint & Sons, St. Ives..... 5,515 0 0
Harcourt Runnacles, Halstead..... 5,446 0 0
D. Mackenzie, Claxton..... 4,998 0 0
T. J. Ward, Colchester..... 5,260 0 0
Geo. Dobson, Colchester..... 5,080 0 0
D. Ellwood & Son, Sandy, Beds..... 5,045 0 0
C. E. Orfeur, Colchester..... 4,980 0 0
H. Plummer, Ratcliffen, Suffolk..... 4,909 0 0
W. A. Chambers, Colchester..... 4,893 0 0
F. Dupont, Colchester (accepted)..... 4,790 0 0

WRACKLEFORD (Dorset).—For alterations and additions to Wrackleford dairy-house, for Mr. Alfred Pope, J.P. Mr. A. L. T. Tilley, architect, Dorchester.—
Davis & Son, Dorchester (accepted)..... £519 0 0

Burry-road Congregational Church, East Dulwich.—Referring to the list of tenders for this job in our issue of the 12th inst. Messrs. Henry Everett & Son, of Colchester, write to say that the amount of their tender was £11,298, not £12,298, as printed.

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TO CORRESPONDENTS.
V. N.—H. & H. generally speaking an done's this is an undesirable kind of condition to make; but we do not know what special circumstances may have led to it in this case.—J. K. (hardly within our province).—C. B. B. (thanks).—A. C. H. (we are glad to hear it, but the case is of no public interest).—S. T. (too late, and also illegible).—F. R. (too late).
All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, and not merely for publication. We are compelled to decline pointing out books and giving addresses.
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The Builder.

Vol. LVIII, No. 2464.

SATURDAY, APRIL 25, 1890.

ILLUSTRATIONS.

The United States Trust Company's Building, Wall-street, New York.—Mr. R. W. Gibson, Architect	Double-Page Typo-Gravure.
Sheffield Municipal Buildings Competition:—	
Design Submitted by Mr. J. W. E. Tilley, B.A. (With Three Plans)	Double-Page Photo-Litho.
Design Submitted by Mr. W. Henman, A.R.I.B.A. (With Two Plans)	Double-Page Photo-Litho.
Sculpture purchased by the Municipality of Paris:—	
"Turenne Enfant."—M. Hercule, Sculptor	Single-Page Ink-Photo.
"Lully Enfant."—M. Gandez, Sculptor	Single-Page Ink-Photo.

Blocks in Text.

Two plans of the United States Trust Company's Building, New York	Page 304
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Sanitary Blue-Books from Melbourne.



THE sanitary condition of Melbourne has been the subject of an elaborate inquiry by a Royal Commission appointed two years ago, and which appears since to have been prosecuting its inquiries with most commendable zeal and

thoroughness. The result of its procedure is now before us in the shape of four reports and a formidable mass of evidence. Three "Progress Reports" were issued, and a final report has now followed, which, we presume, closes the labours of the Commission. The evidence taken includes a good deal in regard to the capitals of others of the Australian colonies, Sydney and Adelaide, as well as in regard to lesser towns, into the state of which inquiry was made, especially as to the success or non-success of various sanitary schemes, in order to throw light on the general question of what could or ought to be done in Melbourne. The evidence thus taken gives an interesting view of the state of sanitary matters, and of the special difficulties to be contended with in this comparatively new country.

The present population of Melbourne City is only 76,000, with a density of 23 per acre, though the city proper is surrounded by various suburban municipalities, some of them more thickly populated, but with an average density over the whole area of only 6·3 per acre, and numbering altogether over 420,000 inhabitants; but we gather that the inquiry concerns all these suburban districts also, that any public works undertaken would be for the benefit of the whole of the collective districts as well as of the city, and that hence some of the difficulties attending sanitary action and improvement are such as arise from the extent of the area to be dealt with and the rather scattered nature of the population.

The heads of inquiry under which the First Progress Report is issued are those of "General Sanitary Condition of Melbourne," "Meat Supply," "Abattoirs," "Noxious Trades," and "Water Supply." The first and the last two headings include such considerations as would be common to large towns in any other part of the world, but the question of method of

ment supply and the position and construction of abattoirs assumes a special importance in Melbourne and other Australian cities, in consequence of the immense and quite exceptional export trade in meat which is carried on from them.

The preamble of the First Report states that the Commission, besides examining into the sanitary state of Melbourne, had visited Adelaide and Sydney in order to inquire into the state of drainage and of the regulations in regard to noxious trades in those cities. The report then commences with a description of the existing sanitary condition of Melbourne, which is rather surprising reading, and quite contradicts the idea which many English people, we believe, entertain as to the spirit of progress abroad in the Australian cities. Sanitary matters in Melbourne, at all events, seem to be in a sadly inchoate condition. The pan or pail system for solid refuse is in full operation, with accompanying results which are detailed with painful minuteness in some of the evidence. All liquid refuse flows down open channels in the streets. This drainage goes into the river Yarra, a stream which, as we see from the map of Melbourne and suburbs appended to the report, winds through a considerable portion of the suburbs and through a part of the city. This river is further polluted by the direct drainage into it of waste liquids from noxious trades situated on its banks, such as abattoirs, wool-scouring establishments, and tanneries. The Yarra flows from the North-east portion of the suburbs, and meets what is called the salt-water river flowing from the North-western suburb, the two forming roughly the forks of a Y of which the stem runs southwards into the sea. The salt-water river is described as even more polluted by drainage from noxious trades on its banks. "Into it pass large quantities of blood-stained fluid from the city abattoirs, and blood from the slaughter-yards at Footscray and Braybrook, of the contents of intestines from gut factories, of waste liquids from bone mills, manure works and boiling-down establishments, and the washings of pelts and wool from fellmongeries." As these streams mostly "wash" (?) the region of the suburbs, it is not surprising to read further on in the report that the death-rate in the suburbs is higher than in the city itself. It appears that even the somewhat primitive method of drainage by open channels in the streets is in anything but a complete or satisfactory state

in itself, as the following extract from the report sufficiently indicates:—

"In many of the suburbs a large proportion of the channels are still unmade; the liquid sewage from the houses passes sluggishly along natural channels in the ground, here and there accumulating and stagnating, and everywhere soaking into and polluting the soil. In sandy districts the liquid house-refuse is largely allowed to lose itself in the sand around the houses. The channels which have been made are not in all cases accurately levelled, with a sufficient fall, and not infrequently the flow is checked by solid refuges which collect in them. Under such circumstances, the sewage lingers in the channels, and undergoes decomposition. The permeable joints of the pitchers allow great contamination of the soil beneath. This evil is greatest where blocks of houses are intersected by branching lanes and passages, in which channels, having often only a slight fall, may be traced for long distances, uniting together and bending at various angles before they reach the main channel in the street. In some instances, those complicated channels in the blocks cannot reach the streets directly; a length of underground piping is necessary, which commences as a catch-pit, covered by a grating. During heavy rains, solid refuse of all kinds is swept down the channels and accumulates over the gratings, and the drainage then overflows the lanes and yards. Thus the soil is constantly being polluted in greater or less degree; and in the crowded portions of the metropolis, where the evil is greatest, the floors of the houses are often close to the ground, so that the mischief is intensified. In certain places crude forms of underground drainage have been introduced to remedy the ill conditions of groups or terraces of houses; but it is questionable whether the remedy so applied does not involve greater dangers to health than the open nuisance originally existing."

This is bad enough reading, but what follows is worse:—

"The underground sewers are not sufficiently ventilated, offensive gases escape through the various openings, and accumulations of a black and very offensive silt frequently occur, which is removed through manholes. During this process of removal the smell from the sewers is very offensive, and the air is necessarily polluted. The greatest pollution of the air, however, is produced by emanations from the pans for night-soil. The closets are frequently placed very close to dwelling-houses, and are not ventilated. No earth nor deodorant is used in these pan-closets, except in a few cases; the pans are not cleansed in any way, and in many instances are not emptied with sufficient frequency. Hence, most intolerable odours arise during the process of emptying these receptacles into the night-carts. The moist residue left in every pan after emptying produces offensive effluvia, which persist till the residue has dried and crusted. Less perceptible but constantly present are the emanations from the thousands of pans all through the metropolis."

This evidence on the effect of the pan

system in Melbourne ought to be of interest to those English local authorities who still partially retain and even defend it for special districts.

Adelaide and Sydney, it would appear, have both taken the lead of Melbourne in regard to drainage, though the movement has only been very recent in Adelaide, which was described by one witness as having been, prior to the commencement of its new drainage system in 1885, "a city of stinks." Now all this is altered. "The city is now free from offensive ordours, the subsoil is recovering, the street channels are used only for surface water, and the Torrens has been changed from a filthy sewer to a beautiful lake." The sewage is carried out of the city by gravitation to a sewage farm four and a half miles from the centre of the city (rather close quarters); the following particulars as to the working of the farm may be of interest in this country:—

"The farm is 450 acres in extent, and receives in round numbers the sewage of 70,000 inhabitants. About one-third of the soil is of a gravelly, porous character; the remainder is loamy, with a thin layer of clay underneath. The farm is worked on the broad irrigation principle, combined in the winter months with intermittent downward filtration. Before passing on to the land the sewage is strained—the solid matter is collected and trenched in, and the liquid portion is distributed over the farm by wooden troughs.

The cost of the system, up to June 30, 1888, was £21,500*l.*, and the sewage rate on the citizens is 8*d.* in the £. The cost of converting the old closets to water-closets was about 10*l.* per closet. Concerning the financial working of the farm, it may be briefly stated that the balance-sheet, at the end of June, 1886, showed a profit on the working expenses during the previous six months of 720*l.* In the following six months there was a profit of 200*l.* But when the balance-sheet for the year ending June 30, 1887, was prepared, there was a loss of 740*l.*, the profit made in the first six months of that financial year being swept away. The loss was due to the excessive wetness of the season, the farm being unable to absorb all the sewage. The operations for the year ending June 30, 1888, resulted in a profit of 391*l.*"

At Sydney underground sewers were laid down as early as 1854, which, however, discharged directly into the harbour. In 1860 a complete deep-drainage system was carried out, with an intercepting sewer to the northern portion of the system, which carried away the sewage to the ocean at Bondi, where there is a strong current which carries it away. The southern portion of the city drains into a shallow estuary, and the sewage is conducted by a main sewer to a sewage-farm at Botany, where there are a thousand acres of sandy soil suitable for filtration purposes. So runs the description in the report, though we do not quite see, if this part of the sewage is taken on to land in the end, what is the use of the episode of the "estuary." It is stated, however, that the Sydney drainage works, which are still in progress, have proved eminently satisfactory in their results so far. We do not gather anywhere from the evidence what is the distance of the sea outfall of the Bondi sewer from the town, but we observe in the minutes of evidence that the commissioners very properly questioned their expert witness closely in regard to the construction of the sea outfall and in regard to the evidence as to the behaviour of the sewage after delivery into the sea. This witness was Mr. W. C. Bennett, Commissioner and Engineer-in-Chief of Roads for the Government of New South Wales, who in his evidence expressed himself strongly in favour of running sewage away into the sea where possible to do this at reasonable cost. "There is no money," he said, "to be made of it, however elaborate all the statements in England may be." On the south side of Sydney, Mr. Bennett said, there was no opportunity of doing this; "the sewage drained into a large shallow estuary, and we thought it better there to provide the sewage farm." This is the estuary referred to in the Report, apparently, though the evidence still does not explain the relation of the sewage farm to the estuary. In regard to sea outfall, the witness stated that there was an iron shield or ferrule used to protect the openings,

and after this was rather vaguely described the following evidence was given as to the getting away of the sewage from the outfall:

"2,287. Opposite the outlet I noticed at our visit, there was discolouration of the water; and that the discoloured part bore away towards the south—is there any constant current in that direction?—The current outside is very constant to the south, but the long-shore current varies with the tides; there are eddies, but we have never had any complaint of anything being carried inland, because it is a very salient point of the coast.

2,288. No complaints from Coogee?—No.

2,289. Have you made experiments to see what course the sewage takes when it gets into the sea? We examined with corks before we bored it.

2,290. There is no eddying round in the Coogee?—No, it goes away well to seaward.

2,291. What became of the corks?—They floated away to seaward with the south current."

This seems satisfactory so far; and no doubt when you can get a sea outfall far enough off, and a sea current which will carry the sewage well away from the coast, there is much truth in Mr. Bennett's theory of the desirability of getting rid of it and seeing no more of it. But the sewage of London (to which one's mind naturally reverts) is of too exceptional proportions to be regarded in the same light as that of cities of ordinary or secondary size, nor have we such an advantageous place of outfall as appears to be available for Sydney: so we can only look on with a certain amount of envy at this comparatively easy solution of the problem.

To return to the main business of the report, before us, the sanitary improvement of Melbourne, the Commissioners in their first report came to what appears the inevitable conclusion from the evidence, that no half measures in the way of attempting to better regulate the present system of refuse disposal would be of the slightest ultimate advantage:—

"No thorough reform would be secured by improved pan services for solid sewage, or by the use of destructors for general refuse, without such a system of drainage. The liquid sewage of the city, which constitutes the great bulk of the refuse to be disposed of, would still remain untreated; the street-channels, whether on the surface or beneath it, would still remain offensive; the subsoil would still be damp and foul; and the river would continue to be progressively polluted. Intercepting sewers would not diminish the offensiveness of the drains, nor sensibly improve the condition of the subsoil; and the pollution of the river would simply be replaced by pollution of the harbour. Being thus definitely of opinion that a system of underground drainage must be instituted, we propose to take such skilled evidence as may be available concerning the best method or methods to be adopted, but we are satisfied that the evidence which may be so obtained cannot be more than ancillary. . . .

We therefore recommend that, as soon as possible, a civil engineer of the highest attainments, and of practical experience in sanitary and hydraulic works, be selected to prepare such a scheme after a thorough study of the local conditions, which are admittedly full of difficulties. The question arises by whom shall such an engineer be appointed, and from what fund shall he and his assistants be remunerated?

In our opinion such engineer should be appointed as soon as possible by the Government, and should be provided with such assistance as he may require; and the remuneration of such engineer and his assistants, also the expenses incidental to the formulation of the scheme, should be a first charge upon the funds at the disposal of a Metropolitan Board of Works, which Board should be created without delay, and should be charged with the control of the water supply and sewage.

In the meantime, it is our intention to gather as much local information as possible from the best sources, to obtain sections and other geodetic measurements across country likely to be traversed by main lines of sewers beyond the metropolitan districts, also the levels and particulars of soils and subsoils of lands whereon might perhaps be ultimately selected sites for sewage farms and filtering beds. The information might be placed at the disposal of the engineer when appointed."

The Commissioners then go into the question of the constitution of the proposed Board of Works, adding a number of recommendations as to the special powers to be given to it; and following the example of Sydney, they recommend (and wisely) that the numbers of the Board should not be large, as the object is to work and not to talk. They then subjoin some "interim recommendations" for the sanitary benefit of Melbourne until such period as the proposed Board may

be formed and the proposed drainage works carried out. The main suggestions in this part of the report are that all "tips" of rubbish should be abolished, that ordinary refuse should be burned in destructors, and that an effort should be made to render the administration of the pan-system at all events as innocuous as possible for the present:—

"That the ordinary system of pans for night-soil be abolished; that instead thereof, every closet be furnished with a double-pan service; that at least once a week, or so much more frequently as the local board of health may from time to time direct, the pan in use be closed with a tight-fitting lid, and removed in the day time in a suitable cart; that a pan cleaned by superheated steam, or some equally efficient means approved by the local board of health, be left in its place; that the use of a suitable deodorant be made compulsory; that the night-soil removed be either treated in a destructor or be trenched or ploughed into land; that failing the use of a destructor the contractor be compelled to obtain a receipt from the occupier of the land whereon deposit is made, or from the manager of some approved depot for night-soil, for the number of pans there emptied or delivered; that stringent supervision be exercised by the boards of health over all such depots or places of deposit."

They also add the very pertinent suggestion that the inspectors of nuisances in all districts "be as far as possible freed from all other duties;" and it would certainly seem that in a city in the present condition of Melbourne an inspector of nuisances who was disposed to do his duty would be likely to find his hands full.

Then follows the consideration of the important question of abattoirs, and of the whole system of meat supply, which, as observed, assumes such large proportions in the Australian cities. The result of the Commissioners' inquiries is that the suburban abattoirs should be immediately abolished, and they are not disposed to listen to any half-measures, but advocate a general adoption of the system of country abattoirs and chilled meat trains; the process of chilling being, it is to be gathered from the evidence, not deleterious to the meat in the same manner that freezing is held to be. This is a question beyond our province; but as to the main question of the health and comfort of the town there can be no doubt that the Commissioners are entirely in the right, and it seems indeed quite monstrous that immense establishments for the continual slaughter of cattle on a large scale, not for the provision of the town but for export, should be kept up within the precincts of the town. As to other inconveniences to the town from this state of things the evidence of Mr. Dickinson, a medical man residing in one of the suburban districts, is rather striking. The cattle, he says, are not allowed to be driven through the streets, except after ten at night, but after that hour, on what is called "cattle night," the roads are unsafe for pedestrians; there is one street, Epsom-road, that is useless after ten on "cattle night," the inhabitants dare not go into Melbourne to the theatre for fear of encountering these half-wild cattle on their return, and the witness had himself, even when driving, had to go a long way round to avoid the cattle; to try to drive through them, he said, was unsafe. With all this, and the mass of evidence as to the nuisance from the abattoirs, it is not surprising that the Commissioners should have made a very decided stand as to the removal of the abattoirs from the precincts of the town, except with the allowance of one in the neighbourhood of the town under very stringent regulations. Yet in their final report, issued since the commencement of the present year, the Commissioners note that no improvement of importance has been made, and that things are still as unsatisfactory and insanitary as before. It does not appear, however, that Melbourne stands alone in respect of the bad administration of its abattoirs: the evidence of one witness who had made the subject a special study gave a most unfavourable impression as to the great Chicago pig-killing establishments, in which he said it was literally true that the pigs were driven in at one end and came out in the

shape of tinned meat at the other end; the arrangements for the production of this metropolis were, the witness testified, most ingenious and elaborate; but the approaches to the works were in so filthy a state that no one could walk up to the entrance, and the general impression produced by the whole place, in regard to cleanliness and sanitary condition, was summed up in the remark of one of his party—"I will never eat tinned meat again!"

The second Progress Report deals with the water supply of Melbourne, the oldest and principal portion of which is from the Yan Yean reservoir, a supply which dates from the year 1853, and consists of water impounded from a large catchment area. The great drawback to this supply seems to have been the existence of farms on the slopes draining towards it, a point several times touched upon in the report, with regard to various localities. The Commissioners take a very strong view of the matter; they recommend, for instance, that no dogs should be kept on catchment areas, a prohibition no doubt desirable, but which we should fear it would be exceedingly difficult to carry out. The strong representations made in the Progress Report do not seem to have borne much fruit, for we find the subject again returned to in the Final Report of this year:—

"Professor Masson's analyses showed that the water underwent decided improvement while stored in the Yan Yean Reservoir. They gave no positive evidence of constant pollution. Some of the passages of the water through the mains in Melbourne, but it has been noted that at certain times, apart from rainfall, the water is dirty. A yield of such discoloured water, when analyzed, yielded unfavourable results. In our Second Report we made detailed recommendations for the protection of the water-supply from pollution. Some of these recommendations have been partly carried out; others, so we understand, under consideration. We regret that, although we drew attention to the unfinished siphon when inspecting the aqueduct on April 19, 1889, and subsequently recommended in our Report, dated July 30, that the siphon should be completed at once, it still remains in its old condition, capable of delivering roadway and other drainage into the clear-water channel, and this, too, notwithstanding that the then Minister of Public Works in our presence gave instructions that it should be completed immediately. We trust that no further delay will occur in removing the two embouchures from within the direct catchment area of the Yan Yean Reservoir. We regret that we are compelled to draw attention to the fact that many street-hydrants remain in dangerous positions, notwithstanding our urgent recommendation and the special report of the officer appointed by us. We would also suggest, again, that the water supplied to the metropolis should be analyzed at least once each month, and that the question of the filtration of the Yan Yean water on a large scale should receive careful consideration."

This last sentence touches on one of the most serious and radical deficiencies of this portion of the Melbourne water supply. It appears that this water, thus collected from a large surface area, undergoes no systematic filtering whatever! No wonder the Commissioners are anxious to keep the area uncontaminated; but they speak strongly also of the necessity for filtration works on a large scale being instituted. A large portion of the immediate catchment basin, however, is, it appears, permanently reserved and unoccupied, and the Commissioners add that the manner in which the portion of the reserved land immediately about the reservoirs is cleared, grassed, and planted, reflects great credit on the resident inspector. We come to the unsatisfactory side of the case again when the Commissioners have to speak of the state of the water supply mechanism in Melbourne itself. We are told that "all the mains, which have been laid for any time, tend to become choked to a greater or less extent by incrustations of rust and silt. Pipes of all sizes are affected. The silt is decidedly offensive. It consists largely of decomposing vegetable matter. But the analyses made by Professor Masson do not afford evidence that there is any constant contamination between the Yan Yean Reservoir and Melbourne, though they show that occasional disturbances occur, which render the tap water turbid."

Then does it not appear that the contamination, which consists of decomposing vegetable

matter, has its origin in the reservoir itself? Another defect more than once referred to is the placing of street hydrants at too low a level, so that surface storm-water, carrying of course various impurities, runs over and may trickle into them. This is bad, and the removal of the hydrants (several times insisted on by the Commissioners) to more suitable and higher points should undoubtedly be carried out; but on the basis of the evidence we should not be inclined to attribute the unsatisfactory state of the water in the mains to this cause, unless to a very slight extent. The filtration is what is wanted, and the sooner Melbourne sets about it the better.

The third Progress Report deals with the subject of drainage and sewerage of Melbourne in a more special manner than in the First Report, and with some additional evidence, chiefly from experts. On this subject Mr. Mansergh has been consulted, and paid a few weeks' visit of inspection and inquiry, and we gather from the Final Report that a special report by him is in preparation, though the Commissioners express their regret that he did not or was not prepared to remain long enough in Melbourne to obtain the data for drawing out a detailed scheme of drainage, and the Commissioners express a fear that any mere sketch of a scheme, without details, "if prepared during a short visit and without full knowledge of local conditions, may cause embarrassment and delay. The Commissioners include in their report three schemes submitted to them by Mr. W. Thwaites, Mr. G. Gordon, and Mr. W. F. Bell. These schemes are embodied in the "Blue-book," with explanatory plans accompanying two of them. All three engineers recommended the separate system, with the admission of a small proportion of the earlier part of a rainfall into the sewers; one-tenth of an inch, it was suggested by one witness, was ample, though not too ample for getting all the cleansing effect of the rain in carrying off surface impurities. With a climate subject to violent rainfall of course any other but the separate system would be out of the question. It seems to be thought that the existing surface channels may be left to carry off the bulk, the clean portion, of the storm-water. But all the three engineers who submitted schemes concurred in this point at least, in emphatically advising the entire relinquishment of all relic of the pan system, and the adoption of water carriage alone, and we are glad to see that the Commissioners adopt this view in their report, though with some cautious expressions as to the possible insanitary effects of a water-carriage scheme unless carried out in the very best manner. This is perhaps a truism; in fact, any sort of sewage scheme must be carried out in the best possible manner to be satisfactory; but we doubt if the worst evils incident to an imperfect water-carriage scheme could be as bad as those which are almost inseparable from a pan system when applied to a large city as its only method of removal of excreta.

The final report leaves things in this position. The Commissioners recapitulate briefly their former recommendations about noxious trades—that these should be classified, and the more offensive ones distinguished from those which are not offensive unless negligently conducted, and that the former should be removed from their present proximity to population; and they thus state the result so far:—

"The Public Health Act 1883, section 32, enacts that no noxious trade shall be carried on without the consent of the local authority, and provides heavy penalties against offenders; it also empowers persons, whether resident in the district or not, to object to the continuance or extension of any such trade, and constitutes the Board of Public Health a board of final appeal whenever objection is taken to any consent given by the local council to the continuance and extension of such trade. Section 33 enacts that whenever there shall have been three convictions for nuisance after the passing of the Act, the local council may refuse to renew registration, and again provides for a final appeal to the Board. Section 41 enacts not only that every local council may prevent discharge of noxious matter into rivers, lagoons, &c., but empowers the Board when necessary to issue orders according to the local authorities. The powers so conferred

on both the local councils and the Board of Public Health are very large, and, in our opinion, if fearlessly exercised, will suffice to secure the necessary reforms. At present, however, the evil conditions described in our First Progress Report remain practically unchanged."

This is not very satisfactory, but it must be something for the Commissioners to congratulate themselves on that they have at any rate procured the formation of the legal machinery necessary for action, and it is to be hoped that this will not long be allowed to remain inert. In regard to abattoirs, which are classified separately from other "noxious trades," we learn that the Port Melbourne abattoirs were to be closed at the end of January in consequence of action taken by the Melbourne Harbour Trust, which resolved to pay £1,250 in compensation to get rid of this nuisance. But, adds the Report, "the South Melbourne abattoirs remain in the offensive condition described in our First Progress Report. The continuance of this establishment on Crown lands, under a so-called 'permissive occupancy' is, in our opinion, highly unsatisfactory, and likely to increase the difficulty of dealing with such establishments. Councils and private individuals can hardly be expected to conform promptly with the law, when such a place as this abattoir is permitted to remain, without any legal authority, on Crown land." In reference to the question of water supply, the Commissioners repeat and emphasise their cautions expressed in a previous report against too great confidence being placed in intercepting drains for the protection of the aqueduct; their recommendations as to a filtration scheme we have already referred to. The final report is largely occupied with a summary of the results of chemical and biological investigations as to the presence or absence of the germs of various diseases in the water. The conclusion of the report is that freedom from any water bacteria or water-borne germs may be ensured, in regard to the Yan Yean water, by the use of a pressure-filter on the pipe, and they add a brief expression of the very wholesome doctrine that "it is the duty of purveyors, and not of consumers of water, to see that a proper standard of quality is maintained." In conclusion, the Commissioners refer to the two legislative factors which must be looked to for effecting the sanitary improvement of Melbourne; one of them the Public Health Act, already passed, and just now referred to; the other the establishment of a Board of Works, which is still *in futuro*. If such a Board were to be a large body of which the members might be elected on political and partisan grounds, like another Board we have heard of, we should very much doubt its benign influence; but if the wise recommendations of the Commissioners are carried out, and a small Board of practical and working members appointed, they will probably be able to give a better account before long of the sanitary condition of Melbourne.

NOTES.



SPECIAL meeting of the Institute (not largely attended) was held on Monday to announce the result of the general vote of members, by letter, on Professor Roger Smith's resolution passed at the meeting of March 31, the terms of which were given in our leading article of the 12th, but which it may be convenient to reprint here: it was as follows:—

"That while not opposed to the principle of compulsory examination as applied to those about to practise architecture, this Institute is of opinion that the difficulty of restricting by statutory powers the practice of architecture to those who have passed an examination is at present so insuperable that it is undesirable to make an immediate application for such powers."

The result of the voting was that 708 replies were sent to the circular, of which six were too late, and eighteen were put aside as informal. Of the remaining 684, 520 were "for" and "164" against. The majority "for" would probably have been much larger, proportionally, if a larger number of the members had voted, and also if the point

for consideration had been more clearly conveyed; for we surmise that it was probably not by any means clear to many, at all events to those who had not followed out the whole proceedings of the meeting of March 31, precisely to what effect they were voting; and we doubt if the Institute would not have done better for itself in "going to the country" with the original motion, in which it would at all events have been quite clear what was voted on and whence the proposition came, viz.: from people who under pretence of benefitting the profession have been doing all they can to injure the Institute and bring it into contempt to serve their own purposes, though it now suits their tactics to proclaim the contrary. The resolution as sent out, it must also be observed, embodied an adherence in principle to the theory of compulsory examination, to which some who might otherwise have voted may have felt unable at the moment to commit themselves.

PERHAPS no feature of Mr. Goschen's Budget proposals will give more general satisfaction than the announcement that the Government intend to deal with the question of postage to India and the Colonies; and Mr. Henniker Heaton may be congratulated upon the measure of success with which his persistent efforts in the cause of postal reform have at last been attended. The existing rates to India, Australia, and the Cape range from 4d. to 6d., and it has long been urged that a uniform rate of 2½d. to all our colonies and dependencies should be established. Mr. Goschen stated that the Postmaster-General would endeavour to induce the respective Colonial authorities to agree to this being effected in future, by any route. It appears to be inevitable that the step will involve a certain amount of loss, but as it is highly probable that such loss will be greater during the first year than afterwards, it could not be introduced at a more fitting time. The country can best afford it now, and the Chancellor of the Exchequer has done well to make use of the opportunity now presented for dealing with this question. He could not, of course, definitely promise the reduction, but the announcement of his approval of the principle, and of his readiness to adopt it, will doubtless be responded to by our Colonies, who will, however, be called upon to bear some loss at first in connexion with the scheme. At home the proposal would not meet with much opposition in less prosperous times, and we should think that the concession would be equally appreciated in our dependencies. On Monday the postage of circulars was again mentioned in the House of Commons, and the Postmaster-General stated that it is being considered whether the Book-post rules can be modified in this and some other respects. It is notorious that circulars for home distribution are frequently sent abroad wholesale for re-posting to England, a saving being thereby effected by the senders, although the country must be the loser. It is high time that the existing rules were altered in some way. Altogether, the cause of postal reform appears to be in the ascendant just now.

WE learn that the Committee of the British School at Athens, in continuation of the scheme for collecting and publishing a series of drawings of the remains of Byzantine architecture in Greece, have decided to take up, but as a separate and distinct work, examples of the most typical churches in the Monasteries at Mount Athos. Mr. R. W. Schultz and Mr. Sidney H. Barnsley have already made a beginning with drawings of the Monastery of St. Luke, near Livadia, in North Greece, and are at present busy with the churches in Athens and the neighbourhood. They intend continuing their work in the interior of Greece for the present, but hope to be in a position to go to Salonica and Mount Athos towards the end of June, and to spend the summer there. They purpose making careful measured drawings of the architecture of the most important of the churches, and special studies of the most interesting portions of their detail, and they

also hope to include a few of the finest mosaics and frescoes. A representative series of photographs will also be got together, and some time will be devoted to a general description of the various schemes of iconography. The architects also hope to measure several of the smaller brick churches in Salonica which have been insufficiently noticed in Texier and Pullan's work on Byzantine architecture. Mr. Penrose referred to this subject in a letter in our columns a few weeks since, and then mentioned that funds were much wanted to assist in this very valuable work of architectural illustration, and that subscriptions in aid of it would be received either by Mr. Walter Leaf, the Treasurer to the British School, at Old Changi, E.C., or by Mr. E. A. Gardner, the Director, at Athens. We hope some assistance will be forthcoming towards this work, which is being undertaken by very competent persons, and the results of which may form a very important and interesting addition to existing illustrations of ancient architecture.

THE following letter from Professor Aitchison appears in the issue of the *R.L.B.A. Journal* for the 17th:—

"In the interesting account of the late Mr. J. T. Wood, of Ephesian fame, given by Mr. W. Papworth, nothing is said of Wood's architectural works in this country. He built an office at the north-east corner of Kings-street, Cheapside (with one front in Gresham-street), and was the architect of the stations to some English railway. Possibly the requisite information about his works may yet be obtained. It would be superfluous to make any remark on the action of our Government in reference to the archaeological researches made wholly or partly with public money. When a few of the marbles have been brought over and exhibited in the British Museum the Government considers it has done its duty, and all that is mainly valuable for improving our knowledge of antiquity is left to be done by the public spirit of the discoverers. Nothing has been published as yet but Wood's popular book, and now, alas! no further aid or information can be got from the discoverer. Are all his invaluable drawings, sketches, and memoranda to be left to the chances of destruction? Is nothing to be done to have these digested and published, and to obtain the services of a learned architect to make a restoration of the temple? Are no classical scholars and classical archaeologists to be employed in writing an elucidatory text?"

Professor Aitchison, we see, has a letter in Thursday's *Times*, ably setting the matter before the public.

THE Royal Veterinary College, Camden Town, for which a new Museum is about to be erected, stands along the eastern side of Great College-street, and was established in 1791, with the Duke of Northumberland as president, under the not very successful management of a Frenchman, M. St. Bel. After his death, two years later, a committee was formed of some leading medical men of the day, including Abernethy and Sir Astley Cooper. We gather that the Veterinary School attached to the College has, at times, received aid from the State; yet it is only in this country, perhaps, that so useful and indeed so national an institution would be allowed to exist as a virtually private enterprise.

THE *Pall Mall Gazette* is often sadly at fault in its information about London matters, but it has never been more ludicrously wrong than it is in one of its "Occasional Notes" in its issue of Wednesday last, in which it says, writing of the London County Council, that "duty calls the Councillor now to Spring-gardens, now to Guildhall; one moment to the Mansion House, and the next to a sort of annexe in Craven-street." Further on, our oracular contemporary speaks, in the present tense, of "London's Parliament" as alternating "between sitting as a pensioner in the City and working in a two-pair back at home." From the context the writer of the "Occasional Note" is evidently quite unaware of the fact that the Council no longer sits at Guildhall; and we believe that it has never had the least occasion to appear for any purpose at the Mansion House,—which is primarily the official

* See also the *Builder* for April 12, p. 297.

residence of the Lord Mayor, though a small portion of it is used as a police-court. Curiously enough, another column of the same issue of the *Pall Mall* gives an account of the London County Council "at home," in which it is stated that the Council assembled for the first time on Tuesday in its "enlarged and transfigured hall." Here again another blunder is made, for the members' seats are described as "radiating from a base formed by the dais." The arrangement of the seats is really that of four concentric arcs of which the dais may be said to form the chord. The intersecting gangways radiate, not the seats.

MR. THOMAS NELSON, publisher, writes to the *Scotsman* as follows, on the subject of the extension of Princes'-street:—

"The citizens of Edinburgh are rightly jealous of anything that would interfere with the amenity of a place which has, by every one, to be one of the noblest streets in Europe. From Waverley Bridge westward there is little to find fault with—the Gardens and the Castle Rock making it the admiration of visitors from all parts of the world.

But there is one blot at the East End, and that is the North British Railway-station, an unsightly jumble of a place quite unworthy of the city of Edinburgh. It has occurred to me that the matter is not yet past remedy, and that one of the greatest improvements that could be made to Princes'-street could still be carried out, and in a way to benefit the railway itself.

My suggestion is that the entire area of the railway station be converted into a public place, on the level of Princes'-street, with the railway station, as at present, below, but greatly improved. I reckon that the area thus acquired would give to Princes'-street an extension greatly more than the entire area of St. Andrew-square. It could be made suitable for carriages, cabs, foot-passengers to the railway, and promenades. With a little architectural skill this new place might be made one of the finest features in the city. The cost, no doubt, would be considerable, but not more than I think might warrantably be spent between the city and the Railway Company. It would add greatly to the value of the railway property, and immensely to the beauty of Princes'-street."

The "grand place" over the railway-station would, we presume, be constructed after the manner of the Waverley garden over the vegetable market, the lights being placed in the centre of flower-beds. To make the place suitable for carriages would necessitate greater strength in construction. The thing could be done, but, as Mr. Nelson hints, the cost would be considerable.

IN connexion with the London University Extension Society, Mr. Arnold Mitchell intends giving six lectures, or rather three lectures alternating with three demonstrations on architecture, at 3 p.m. on successive Saturdays, commencing on May 3. The lectures will be given at Gresham College, and the demonstrations will be given successively at the Church of St. Bartholomew, Smithfield; Stone Church, Greenhith; and at Westminster Abbey.

A NEW laboratory for electrical engineering has been instituted at King's College, London, by the aid of a gift from Lady Siemens; it is to be called the "William Siemens Laboratory," and is to be constructed and fitted, we are told, with every modern electrical appliance. Dr. Hopkinson, the President of the Institution of Electrical Engineers, has been appointed the first professor in connexion with the Siemens Laboratory.

IT is stated in *Notes and Queries* that Sir Arthur Blomfield is commissioned by the Duke of Buccleuch, who is lord of the manor, to superintend the repairs of the Eleanor cross at Geddington, in Northamptonshire, and that the restoration will be carried out in a strictly conservative spirit. The cross, being triangular on plan, and about 40 ft. high, stands in the centre of the village. It bears the customary coat of arms of Leon, Ponthoise in Ponthieu, and Castile, and at top the figures of three queens lamenting. Nearly two years ago we published an account of its then condition, in an article entitled "A Tour in the Weldon Stone District," with some particulars of other similar crosses,

and of the royal progress from Herdrey to London.* The hexagonal cross at Waltham, which was at first constructed of Caen stone, having been set free from the Falcon Tavern which abutted against it, was a year or two ago restored by Mr. C. E. Ponting, architect; and in 1888 Mr. Hams, of Exeter, completed the sculpture.

OF the six invited designs for a Mausoleum for the Grand Duke of Baden, for which a site has been found in the Fassen Garden of Karlsruhe, not one has been found suitable; and hence another design,—one in Early (German) Gothic, with an open timber roof, proposed by Herr Hemberger,—will most likely be carried out.

AN Exhibition of Architecture will be opened at Amsterdam on May 11. Designs (in drawing or model) of buildings erected within the last ten years, and also drawings or models for ideal projects or competitions made within the last six years, will be on view. A small collection of sketches and measured drawings will also be hung.

THE biennial general meeting of the combined Architectural Societies of the German Empire will be held in Hamburg this August. We will give some particulars as to the arrangements for this meeting at a later date; but it may be well to note that the "Hamburger Architekten-und Ingenieur-Verein" are already hard at work preparing for the event, and that as some eight hundred guests from all parts of Germany are expected, the meeting promises to be a success.

THE *Building and Engineering Journal* of Australia (March 8) contains a report of a deputation of Sydney architects to the Mayor of that town, asking that in future municipal works should be thrown open to the profession generally, instead of being carried out by the City Architect. The deputation, through their spokesman Mr. Mansfield, said they believed New South Wales was the only part of the world in which Government buildings were wholly and entirely carried out by a Government architect. They were not considering a question of persons or of individuals, but one of principle; and he thought if the Mayor would take the matter into consideration he would be doing a duty to the public and conserve the great interests confided to his care. He also mentioned that, under the auspices of the Institute of Architects, certain rules were framed for the conduct of competitions, and which he thought were accepted by the profession generally as most desirable to avoid those evils frequently arising out of competitions; and he suggested, in the event of the views of the deputation being adopted, the advisability of adopting those rules. The Mayor said he had complete sympathy with the views thus put before him, and thought it more in accord with the spirit of the times to get the best results from the widest selection. He considered the City Architect's duty was really more that of an adviser, and it might be that different works in the municipality required different skill. We certainly think it is more for the architectural interest of a city that its principal works should be designed by various independent architects than that they should all be the work of one official mind, however able.

IN a recent report to the Local Government Board on the causes of the prevalence of diphtheria in the Tredegar Urban Sanitary District, Mr. Spenn draws attention to the extraordinarily primitive condition in regard to sanitary matters in parts of this district:—

"The much-infected localities are alike in this, that the air about the dwellings is contaminated with sewage effluvia from defective drains and sewers. George Town South is provided with sewers, chiefly of stone and of the 'box' type, possessing two main outfalls and four minor ones into

the river. The sewers in their outfall portion are laid with a steep descent towards the river, but the street branches have sometimes only a poor gradient. Privies are built right over them without the intervention of any pan or trap, so that sewer air comes freely through the closet seat. Slop-water gullies are likewise untrapped. Moreover, as the houses are built in terraces along the bank side, these direct openings into the sewers, affording the only means by which the latter, he it observed, are ventilated, are often in very confined situations; the slop-water gullies being generally, in fact, in a sort of well yard or area, close by the back doors. A certain number of the houses, again, have no through ventilation, so that sewage effluvia often in such cases pollute the sole source of air supply.

In Vale terrace, diphtheria, as I before said, concentrated itself upon one portion of the row; the further and smaller division, consisting of thirty-houses, entirely escaping. In the division affected a brick culvert, 3 ft. 6 in. in diameter, passes the whole length at the rear, some 24 ft. from the houses. The gradient is so flat that this sewer has habitually to be cleansed by the digging and scraping out of the contents; and yet the privies of every house empty over it, as in the case of the George Town privies, without any pan or trap; it is, in fact, one long cesspool, and the slop-water drains empty likewise into it."

THE exhibition of the Society of Painters in Winter Colours is hardly one of the strongest; as usual, where it is strongest is in landscape. Mr. Alfred Hunt, however, is represented by only one drawing, a small view of "Windsor Castle" (212) from the opposite side of the river, seen under a peculiar effect of rich misty atmosphere. It is refreshing to meet the name of Mr. G. P. Boyce again, too often absent of late years; his one drawing, "Richard's Castle Church, Herefordshire" (197) is in his best style of delicate detail of buildings and foliage, and that peculiarly soft and aerial effect of sky in which he excels. Mr. R. W. Allan is working his recipe of brown buildings and bright blue spots of colour in his figures far too much; all his works are powerful in effect, but it is all one effect, unless we except "Machrie Bay, Arran" (182), which is a variation on the usual theme. Mr. Wilmot Pilsbury is more and more brilliant in his highly-worked realistic scenes, but the sentiment of nature is not there. Mrs. Allingham's finest contribution is perhaps "Bilshere House, Hamstead Heath" (11), a perfect work of art, in which a true picture is made out of the simplest materials; the "Cottage under the Copse" is another beautiful little work (113), remarkable, as usual, for the perfect execution and expression of the small figures that give human interest to the scene. Mr. Thorne Waite's chief contribution is a large field scene, entitled "The Blue Waggon" (59), with a waggon and horses going away from the foreground and forming with the figures in the waggon an admirably-drawn group as the centre of the foreground; the picture has more of open-air freshness about it than some of the artist's recent works, which have occasionally been over refined in sentiment, the landscapes of a dream rather than of real life. Perhaps the same charge might be made against Mr. Tom Lloyd's nevertheless beautiful work, "Rush-Cutters" (29), in which a long barge with some figures in it moves across below the parallel line of a level bank, with a harmonious decorative effect which makes one of the charms of the idyll. Mr. Napier Homy has never done anything more fresh and more full of movement in the boat and the sea than "Bowling Along" (62). Mr. C. B. Philip, one of the more recent members, is one of the most powerful landscape painters in the Society now, and perhaps there is nothing finer and broader in style in the exhibition than his large desolate landscape, "Glen Feshie, Inverness-shire" (163), notable too for the truth of effect and texture conveyed along with this broad handling, as shown especially in the straggling river-bed with its broad pebble shoals. This truth of texture is what is wanting in Miss Montalba's otherwise effective drawings, as in "The Old Mill, Zaandam" (52), where the water is merely a pearly grey surface with no look of water about it; but her little

sketch of the "Ponte della Pnglia, Venice" (5), with its gaily-coloured groups, is a masterpiece of colour-poetry. Among other noticeable works are Mr. Goodwin's picture from "Sindbad the Sailor" (94), though this is not a scene of this earth, and on the whole we prefer his exquisite little paintings of what may be called city scenery; Mr. Herbert Marshall's "Arnheim" (92); Mr. Beavis's "Hrvesting in Pearly" (87); Mr. Alfred Fripp's "Durdle Door" (90), with a wonderfully real effect of sunlight on the sea through a natural arch in the cliff; Mr. Robertson's "Serpent Charming" (188), and "Le Roi S'Amuse" (154); but these brilliantly painted oriental scenes have little interest beyond that of brilliant execution; Mr. Jessop Hardwick's "In the Woods" (172), an exquisite painting of primroses; and Mr. Walter Field's "Hamstead Heath—a Hail-storm coming on" (186), a very fine piece of storm effect. Mr. Bulleid's classical marble and drapery pictures, "In Cynthia's Garden" (162), and "After the Bath" (181), are delightfully decorative in effect, but this is a kind of thing that is too mannered and conventional to retain its interest, in spite of much cleverness of execution.

THE collection of Anton Mauve's works at the Goupil Gallery consists mostly of studies and sketches, with but few finished paintings, as much even as he ever did finish. Mauve was a true painter in his feeling for the composition and sentiment of a scene, and in his perception of colour within certain limits; but a room full of his work has rather a depressing and monotonous effect, owing to the prevalent dinginess of colour and a certain smeariness of execution which goes very well with some of his subjects, but not with all. His "Cavaliers on the Shore" (21) is an admirable rendering of the appearance of a wide expanse of seashore seen from a sloping lane leading down to it, and the dark and pronounced effect of the figures and horses against the bright sand; and "The Flock" (22) is an admirable treatment of sheep in his peculiar way. "A Shower on the Heath" (41), and "Morning near the Canal" (68), are very good pieces of effect; in the latter the delicate way in which the faint morning light on the ground beyond the shadow of the dyke is just indicated is remarkable. His artistic feeling for composition and effect is nowhere better shown than in the little picture called "The Paling" (49), a mere corner of a field with a tree and some palings showing dark against the sky; but Mauve has made a real picture out of it. The painting called "The Brown Cow" (20) is rather exceptional in the collection, being much richer in colour than is usual with the artist; the animal stands in front of and half-shadowed by a dense dark mass of foliage, the feeling of the picture rather recalling the art of Troyon.

THE Executive Council of the British Section at the Paris Exhibition have published their Report, from which we learn that while throughout the Exhibition the average of awards was 50 per cent. of the number of exhibitors, in the British Section it was 90 per cent., and in the Industrial Section taken alone it was 120 per cent., double awards having been given in not a few cases. The Council complain of the manner in which the foreign exhibits were split up into sections in various portions of the building, so as very much to detract from their impression; the British and Colonial Section would they urge, have made a remarkable show if concentrated, whereas it was scattered about over no less than twenty different localities. The Executive Council give their thanks to the jurors, "who accepted without fee or reward a laborious and thankless duty." This, we believe, is painfully true in regard to most of those who actually did the work, though we believe some official honours were bestowed on honorary jurors who never went near the exhibits, while professional men who had left their work in England and were living for a long time at their own cost in

* See *Builder*, July 14 and October 27, 1888.

Paris, and giving unremitting attention to the labours of jurying, had the satisfaction of seeing the honours and the credit given to those who were only ornamental names.

FROM NEW YORK.

THE average American, it has always appeared to us, is never happy until he is a member of a society or organisation of some sort. The New Yorker is especially favoured in that, whatever may be his social position, his creed, his avocation, or his social position, he can find in his own city a society of some sort to which he may become affiliated. There is a Holland Society for the descendants of the old Dutch Settlers; a New England Society for the progeny of the Puritans; a St. Patrick's Society for those of Irish descent; a Southern Society; an Ohio Society for the energetic and thrifty natives of that State, which is to the rest of the Union what Scotland is to England; each College has its Society, as has each profession; and so on down each rung of the social ladder.

We are led to dwell upon this national tendency in view of the fact that American architects have had, so far, no association or society which may worthily represent an important profession in the eyes of the public. There is, it is true, an American Institute of Architects, which has been in existence some thirty years or so, with the expressed object of "uniting in fellowship the architects of this continent, and combining their efforts so as to properly promote the artistic, scientific, and practical efficiency of the profession." The headquarters were originally, and have always remained, in New York; but local associations were formed under its auspices throughout the Union. The Institute has for years suffered from a species of dry-rot, which has impaired its usefulness either to the profession or the public, and the most that could be said for it was that a majority of its members were estimable individuals of a high degree of respectability. Other societies sprang up here and there in different cities, and finally, Chicago, jealous, as is its nature, of all that bears the stamp of New York, evolved a new association of its own. This was only a few years ago, but it is termed, quickly outstripping the sedate Eastern Institute, as far as numbers, and probably influence went. This was, no doubt, due to the fact that all were fish who came to the Western body's net, and as long as the applicant for membership knew a 1-square from a 2-square, he was architect enough for the Association. That there is a sufficiency of smaller and more purely local bodies can readily be imagined, each one of which is, in a measure, diverting some element of strength from the two important societies above referred to. This being the state of affairs, it is with a lively sense of satisfaction that the profession in general has hailed the scheme for the coalition of these various opposing bodies and the consequent disappearance of annoying friction and clash of interests. This happy state of affairs is due to the labours of a Committee appointed some two years ago, and representing both the Institute and the Association. Each has given membership has at length been arrived at. The name of the American Institute of Architects has been preserved, and the new association will admit as members all practising architects, no matter what their professional ability. Local chapters will retain their individuality, and will be represented in the Institute by delegates, and it is hoped that thus constituted the body will elevate the profession, and the individual architect, and raise the standard of architecture throughout the country. At a joint convention of the two organisations, held in Cincinnati, a couple of months ago, the President outlined the purpose of the new Institute as follows:—

"We have much before us in the line of improving the present system of designing our Government buildings, and in this we cannot hope to accomplish the needed reform until we are able to impress upon the public mind some of the principles which should govern the carrying out of such undertakings, and bring those in authority to see the manifest advantages which should be the result of placing the designing of buildings intended for different portions of the country and covering the widest range of materials and uses in the hands of professional men who were constantly dealing with the same factors and conditions in their every-day work.

A great deal might also be said in favour of a bureau of legal intelligence, which should include the best attainable talent, to be retained as a sort of district attorney for the whole association, to assist in defining and establishing the rights of the members who most stood in need of such service, and should also include the collecting and compiling of all matters of legal record pertaining to building interests.

We also need a better plan of education for our draughtsmen than that which is within the reach of the average student in an architect's office. It is of infinitely more importance that they should be able to detail a window-frame or other portion of a building in such a manner as to admit of its proper construction and service, or correctly compute the quantities and dimensions of a building, and make complete bills of material, than that they should design a Greek god in solid bronze (made of galvanised iron) to adorn the facade of a city front, or that they should be able to construct (on paper) some of those wonderful creations which are intended to be perpetuated for all time in hemlock scantling and shingles."

The subject of public buildings is an especially burning question in a country where millions of dollars a year are appropriated to this purpose, and where one municipality after another is the result. Mr. Richard M. Hunt, the leading New York architect, and the first president of the new Institute, said only the other day in regard to this very subject:—

"The way national buildings and public buildings are generally created is a disgrace to this country. There is an architectural bureau in Washington from which the plans for all the post-office and public buildings of the land are turned out yearly. A single man is in charge of this work. It makes no difference what his capabilities as an architect and an artist are. He has more buildings to plan each year than fifty conscientious architects would undertake. The result is the worst of the public buildings of the land are practically planned by his employes—mere draughtsmen—men who would command no salaries on score of ability from an independent architect of any standing. Besides that, the nation's architect is saddled with the job of keeping all the national buildings the country over in repair. And all this he does for a salary which would not compensate a fairly good architect in private business for his own yearly business. It is outrageous; it is no wonder that the country is filled with public buildings of hideous design and in bad repair."

An architect of our acquaintance, who is of a somewhat statistical turn of mind, so to speak, gave us some figures the other day, for the accuracy of which he vouched. "There are," said he, "in New York and its immediate vicinity over 800 practising architects—so-called. Of these there are not more than thirty-five whose names can be said to be fairly well-known. That is to say, thirty-five out of 800, or less than five per cent., make good incomes, while the remaining 765 starve more or less gracefully." This may be an exaggeration, but there is a modicum of truth in it, for while there is a vast amount of building going on in the city, there is not a great deal of architectural work apparent, and the number of capable draughtsmen out of employment must be very large.

The New Madison-square "Garden" which, when completed, will perhaps be the most elaborate and comprehensive edifice devoted to the purposes of amusement in America, is rapidly rising above the ground. Its position in the very heart of the city is enough to ensure it a constant patronage, even if the ingenious combination under one roof of a circus or amphitheatre, a concert-hall, a banquetting chamber, and a theatre proper should prove insufficient.

We are informed by Mr. R. Clipston Sturgis, the secretary of the Boston Architectural Club, that that body proposes to hold an exhibition of architectural work in the Horticultural Hall, Boston, for three weeks, beginning May 12, 1890, and that contributions are requested from all those who are interested in art and architecture. The exhibits will be grouped into seven sections, including sketches of historical buildings, &c., architectural designs, photographs of executed work, interior work, special exhibits illustrative of the allied arts, including stained glass, decoration, iron work, furniture, &c.

The Enlarged Council Chamber at Spring-gardens.—In our description last week it should have been stated that the scagliola columns were manufactured by Messrs. Bellman & Ivey.

MODERN INDIAN ART.*

THE arts of India in which we are most interested are, like ourselves, aliens to the country; they belong more to the military splendour of the conquering Mongols than to the pastoral simplicity of Aryan Hindu life. The period of Roman and Greek history which left such glorious remains in Europe is scarcely represented in India by existing monuments or works of importance, and, setting architecture aside, it is only by rich arms, metal, glass, and jade vessels, woven and embroidered stuffs, and such-like objects, from the time of Akbar, that we form the standard by which modern Indian art can be judged; and a glance into the history of that period is sufficient to show how very unfair it is to compare the objects produced under such very different circumstances with the ready-made goods offered to travellers by the *bonnivalas* and merchants of the Indian cities.

We do not know how far it was the system of Hindu princes to maintain in their Courts artificers of various trades, but as it is the custom amongst the higher class of Hindus to have many things made in their houses, either by members of their own family or workmen hired for the purpose, it is probable that the princes maintained a staff of workmen always engaged in producing for the Court. But as several of the Hindu princes use the Persian "Karkhaneh," or workshop, for this portion of their establishment, it may be that this custom was only introduced in imitation of the Moghul Court. It was in these royal *karkhanehs* that all the great work was done, and as these artificers were allowed to work for outsiders rich enough to pay them liberally, a very high standard of excellence was set, which the small workers of the bazaars tried to emulate.

Very much of the high quality of the work may be attributed to two great causes. Time was not of the slightest object, as the workmen were in receipt of regular allowances, and even their families were supported. Each of these courts also had what might be called a committee of taste in the leading artificers themselves—such as the master builders, jewellers, calligraphers, illuminators, and seal engravers—who were often professional draughtsmen, thoroughly skilled in the scientific as well as the artistic branches of pattern design.

There is no greater mistake made by many writers on Oriental art than that of asserting that the knowledge of ornament is instinctive with this or other Oriental nations. Speaking with more than twenty years' experience as a teacher and a traveller, I can confidently assert that everywhere there is about the same average of people who can draw and design instinctively. In some countries there are better opportunities, or a condition of affairs more suitable to the development of art; but in the individual the quality we denominate "good taste" and its opposite "vulgarity," are both fairly meted out irrespective of position or race.

There is also not that diversity of design which is so often mentioned in relation to Eastern ornament. On the contrary, although it is difficult to find two objects exactly of a size, yet there is very little variety in their forms or surface decoration.

These Eastern peoples have done in remote antiquity what we attempt from time to time, that is, to lay down rules for the regulation of form and colour in ornamental decoration. These are known to have existed amongst the ancient Egyptians, and a canon of proportion exists in the art of the masters of the Greek and Russian Church. The Silpashastras of India do not only refer to building, but also give rules for the preservation and reproduction of the forms and features of their gods, and use secret means for hurrying these ornamental forms into simple lines of writing, from which every curve and feature can be reproduced by anyone knowing the key.

Mr. James Wild, when studying in Egypt nearly fifty years since, found the Arab workmen producing geometrical designs by empirical means, rules of thumb; and Mr. Crace, some years back, in Damascus, was shown books of similar design which, however, he was not allowed to acquire. A few years later, in Persia, where I was completing the building of the Embassy, my workmen brought me, secretly, curious book rolls of design, both for plans and buildings, and every kind

* From a paper by Mr. C. Purdon Clarke, F.R.I.B.A., read before the Society of Arts on the 15th inst.

of ornamental decoration, floral and geometrical. These were not shown to people outside of their trade, but were learnt by the men, who apparently invented beautiful designs when called upon to show their skill. When at Jaypore, Major (now Colonel) Jacob showed me some patterns with rule-of-thumb methods for producing the curves of the ogee or cusped arches similar to those I had seen in Persia, and in Cashmere I came across certain bundles of paper closely covered with columns of writing in secret character, which a weaver could transform into the curve and colour of floral forms, or inversely; if given a design—no matter how complicated—he could translate it into these columns of written character.

All these belonged to the old system under which the Oriental arts were produced and perpetuated; and the high quality of the work was due to a slight development of the style in cultured hands, working their very best in court and temple for the approval of princes and the blessing of the gods. From this state of things we come to the totally different condition under which modern art exists, and, therefore, we should not wonder if, with causes so different, the results should not be the same.

Analogous changes have been at work all over the world, and if we look at home also it is easy to see that the arts of the past have very little in common with this positive, scientific nineteenth century.

In a few places, such as Jaypore, Ulwar, and Vizianagram, royal *harkhanahs* still exist, but somehow, owing to a mistaken sense of their utility, they could be scarcely said to be producing works of art, except at the Ulwar Court, where much decorative work is going on, and I found there a bookbinder who stated that his family had been in the Palace at Delhi from the time of Shah Jehan, and when driven out, after the Mutiny they had been taken under the protection of the Ruler of Ulwar, a very intelligent and liberal-minded prince.

At Jaypore the *harkhanah* had developed into a School of Art, in charge of a very well-intentioned Bengali gentleman, who, however, seemed to try to make it self-supporting, and consequently its productions were wanting in the true artistic character.

It was only towards the close of the last century that we began to leave our mark on Indian art. This we did by first of all attempting, as far as possible, to stamp it out, as we had succeeded in doing with our national Gothic and Elizabethan styles at home, substituting for it a bald and cold so-called Classical style which, in our houses, was about as far from the actual dwelling-houses of Greeks and Romans as it was from the beautiful exteriors and interiors we were endeavouring to supersede.

Instead of this paper it would require a heavy book to describe our various attempts at raising monuments of shame for ourselves in India. And after running the gamut of the styles in Greek, Strawberry Hill Gothic, and representations of the several periods of Pointed architecture in colleges and churches, we eventually woke up to the fact that India had a style more suited to the country than any of those we had tried to introduce, and, without waiting to consider, at once started people who had little previous experience or education in Oriental design to erect important works, which, though certainly far more appropriate than any of our previous efforts, yet, unfortunately, will remain—as they are generally very well built—for a very long time as records of our want of appreciation of the essential Eastern art.

Not in architecture alone but in other ornamental arts has the same hind course been followed.

For more than twenty-five years Schools of Art have been established in different parts of India, and for a time their influence was most disastrous, although it was impossible to have procured better men as directors than the Government was fortunate enough in selecting. In all cases the directors of these schools were most enthusiastic about native art, but, unfortunately, they were fettered with a two-fold chain. On the one hand, they had in a manner to follow our system of art-education, which, do what we can, turns out more painters than designers; and, secondly, they had the wrong material in their students, and were cut off from the assistance of the master craftsmen of the art-trades, whose system of teaching was radically different from our own academic course.

As in Europe in the Middle Ages, drawing was taught in every workshop in India, and every apprentice soon became skilled in the delineation of the ornamental forms used in his craft. He had no general education in drawing or ornament beyond this; therefore his mind was free from uncertainty and weakness in the treatment of his work. Here and there a clever man would introduce some slight change or improvement; and, if this was really good, it held its own, and was adopted by others, and thus the style slowly developed. Every detail in ornament had its special name, often apparently fanciful, but always with some hidden or symbolical meaning. There were quaint histories attached to many, and an unbroken thread of meaning running through all prevented any great alteration or interference.

As the apprentices learnt to draw,—sometimes with their fingers on the sanded floor, or with charcoal on a tracing-board,—they simultaneously learnt to use tools, whether chasing in metal, carving in wood, or weaving on a loom; and with this knowledge of what the tool could do always in their minds they did not depict upon paper inappropriate forms, or those impossible to be artistically rendered in the material they were treating; and the whole individual mind being concentrated on the one particular class of work, there was the necessary emulation amongst the fellow-craftsmen to perfect it.

But our earlier School of Art system changed all this. Drawing was taught independently of its application to any particular art; a jumble of styles, Greek and Gothic, and pictorial representations of natural objects, launched them on a sea of undigested ideas, without the restrictive rudder of the requirements of any one handicraft to guide them. All the workshop lore, the rule-of-thumb methods, and valuable tradition were absent, and replaced by vague ideas of a possible rivalry with Europeans in European processes, to be rewarded by a European scale of pay.

Against this system the later School of Art masters had to struggle, and Bombay, Lahore, and Madras did so with some success by turning their schools into art workshops, where the pupils learnt and practised ornamental handicrafts, as well as drawing; and there is no doubt that had there been any combined system of working together, or had the Government shown the slightest true consideration for them, a very great success might have been secured, as also with respect to the great jail manufactures of carpets. But all the Government really cared for was to make their art workshops self-supporting, and, therefore, the superintendents were forced to work down to the level of mercantile people, who only want cheap goods. I do not wish in any way to blame the superintendents of these institutions, on the contrary; they have only done their duty, and I believe they have been in constant strife with the authorities in trying to bring about a better state of things, and invariably with the same result, that when, after several years' insistence, they at last succeeded in getting a consideration of their proposals from the Central Government authorities, — who, in India, rule all matters,—the short term of office of the high officials expired, and the superintendents had to start all over again.

The arts of stone and wood working are in India very closely connected, both in Hindu and Moghul architecture. The two very different modes of construction are so mixed, and borrow so much from each other, that it seems almost a principle that the masons treat stone like carpenters, and the carpenters use wood after the fashion of masons, in solid masses, depending upon weight for stability. The modern form of both arts, excepting in Nepal and the extreme south, has become distinctly Saracenic, retaining always certain peculiarities of the Hindu style, which stamp it with a distinct character, and separate the Hindu Saracenic styles from all other varieties of Mohammedan architecture.

For native use, architectural wood-carving is still a very important industry, and I question whether it has in any way deteriorated. It is so important and widespread that I cannot attempt even to give the leading districts of its production, as I should fail to do justice to the subject for want of space. There remains, therefore, only to notice the inlaid furniture of Hoshiapur, in which *shishan*-wood is inlaid with ivory—often with the most graceful and happy effects—in Saracenic style, and the

purely Hindu carving of Mysore and Kanara, which, for finish, is unequalled in any part of India. The decorations of the latter, unfortunately, are merely transcripts of the designs used in the temples, both wood and stone, and although most exquisite in execution, and often in drawing and composition, the reckless use of labour in their production places them above the reach of ordinary commerce, and the faulty construction of the objects makes them unsuitable for any practical purpose.

Stone-carving belongs principally to the North-west Provinces and Rajputana, and here, again, is an art which cannot in any way be said to have lost ground. All travellers in India know the wonders of the past, the temples at Abn, Akbar's dream in stone at Fatehpur Sikri, and the Taj Mahal; but if they doubt that it is possible to emulate these works, it is only necessary to visit the modern cities of Khoria and Balanshar to see that natives, working for themselves, can still design and do all the work they produced in the old time. Then the college buildings at Ajmere, Colonel Jacob's People's Palace at Jaypore, Mant and Chisholm's royal buildings at Baroda, and Chisholm's Government buildings at Madras, show how much can be done where Indian and European work together; and we should be thankful for a movement in the right direction in time to save us from the reproach of having destroyed a school of architecture which, if it could not claim to rank amongst the great styles of the world, yet at least had many beautiful features, and was certainly the most suitable to the country and its mixed races.

In conclusion, I am forced to repeat that a very great responsibility rests upon ourselves for the part we have taken in destroying the ornamental handicrafts of India. Nor is this much lessened by the costly efforts in recent years to save ourselves from this reproach. Whilst handicrafts are perishing before our eyes, which in many instances are all that is left to us of the great arts of antiquity, we are squandering large sums on antiquarian historical research in India of little practical value. We have spent over 30,000, in useless copies of the cave paintings at Ajanta, and yet we are allowing the few craftsmen to die out who possess the secrets of some of the noblest arts of antiquity, such as true fresco paintings; not the half-wrought work of the Middle Ages, but the marble-like, hard, silicious work which we find at Pompeii, and still practised in India.

The reason of all the anarchy and destruction we have introduced into the artistic productions of India is our failure to appreciate the great value of workshop lore and rule-of-thumb trade secrets, which all the colleges and schools in the world can never replace when once lost; and, worst fault of all, our habit of considering art questions as mere matters of individual taste, and not as pertaining to a science as positive as any other, and only more difficult owing to its vastness, and the want of common agreement as to its terms.

It is to the preservation of the old workshop traditions that we should devote our energies if we are in earnest in all our talk about preserving the industrial arts of India. It is this workshop life of master and apprentice, as old as when Jacob served Laban for seven years, that brought these arts into existence, and only these conditions will in any country maintain true art in vigorous life. Great craftsmen like William Morris and Herkomer have realised that this is the only way of salvation in the ornamental arts, and if there is to be any future for our now middleman-crushed arts, it will come from work produced under such happy conditions as exist at Merton and Bushey.

Last of all, the Indian Government cannot clear itself from blame by spending annually a large sum of money on schools of art, museums, and archaeological work, when it neglects every opportunity for giving effect to the repeated statements of its desire to encourage native art. When presents are exchanged with Indian and other Oriental princes, the best craftsmen in the country should be employed to prepare the gifts, and a fashion set to the princes and wealthy, who would gladly follow such a thoroughly Oriental and congenial example.

The newly-built palace of the Viceroy at Simla afforded such an opportunity, but instead of illustrating the art resources of the country, even from the School of Art point of

view, and overlooking the fact that the fastidious Rothschilds of Paris, and Vanderbilts of New York, were obtaining furniture and decorations from Bombay, the Viceroy in Council handed over the decorations, upholstery, and furnishing to an advertising firm in the Tottenham-court-road, London. It is not to be wondered, therefore, that with this example, the Gaikwar of Baroda followed suit, and, flying a little higher, furnished his palace from the Faubourg St. Antoine at Paris.

There is only one remark I wish to add, and that especially for any Indian gentleman who may be present. I most sincerely believe that as the rulers of India we have ever had but one idea, and that the amelioration of Indian peoples; and if, in carrying out this idea, we have neglected or injured native Indian art, it has been from the same mistaken good motives which led us, during the same ill-starred period, to neglect and injure our own indigenous English art. If we introduced a travesty of Classical architecture in the last century at Calcutta, and have since filled the palaces of rajahs with libels on French furniture and decoration, we were doing the same at home; and if, some years back, the museums of Calcutta and Madras contained English art pottery, Italian stone carvings, and pictures, whilst Indian art works were conspicuous by their absence, we in England, to this day, show just as little respect in our national museums for English art, taking no trouble to systematically collect examples to illustrate its history, although we pay the highest price of any of the nations of the world for anything in the shape of a foreign "curio."

THE SURVEYORS' INSTITUTION.

THE following Student Candidates have passed the examination for the Professional Associateship:—

- Aylon, Cecil Hugh, London Colney, St. Alban's, Herts.
 Bancroft, Frederick Herbert, 83, Mosely-street, Manchester.
 Barclay, Thomas, Lonsdale House, Alcester-road, Moseley, Worcestershire.
 Beadell, Maurice Frederick, 97, Gresham-street, E.C.
 Buckland, Herbert Tudor, The Oaklands, Augustus-road, Mosley, Birmingham.
 †Cobham, George William, 3, Edwin-street, Gravesend, Kent.
 Garrard, Arthur Norman, 8, Kensington-court, W. Green, Alexander Ernest, Kingsdown Lodge, The Common, Ealing, W.
 Hampton, George Frederick William, 8, Pall Mall East, S.W.
 †Hayward, Frederick George, 4, Warwick-road, Upper Clapton.
 Lake, Vivian Davoy, 17, Glanville-road, Tavistock, Devon.
 Leaving, Henry John, 60, Holland-road, Brixton, S.W.
 *Merry, Arthur Walker, Southcourt Farm, Leigh-ton Buzzard, Beds.
 Moynaux, Herbert Ernest, 83, Cazenove-road, Stamford Hill, N.
 Nockolds, Alfred George, Castle Hill House, Saffron Walden, Essex.
 Ogden, Michael Guy, Wensleydale, Lingfield-road, Wimbledon.
 Potter, Herbert George, Gardner House, Hampstead, N.W.
 Savill, Edwin, Chigwell, Essex.
 Smith, James, 8, Oxford-street, High Wycombe, Bucks.
 *Spelman, William Walter Rix, Ivy House, Eaton, Norwich.
 Summerfield, Joseph Charles, Stafford Villa, Forest Hill, Kent.
 Swainson, Francis Charles John, Forest Row Vicarage, East Grinstead, Sussex.
 Verity, Ernest George, 38, Cathcart-road, S.W.
 Watson, Claude Henry, 35, Lincoln's-inn-fields, W.C.
 Webster, Hugh Calthrop, 97, Gresham-street, E.C.

The following Non-Student Candidates have also passed the Examination for the Professional Associateship:—

- Armytage, Francis Reginald, 4, Pump-court, Temple, E.C.
 Body, Arthur, Cliff Cottage, Chippenham, Wilts.
 Booth, Gilbert William, Long-stile Talke, Stoke-on-Trent.
 Boulting, Frederick Edward, 30, Mornington-road, N.W.
 Brackett, Frederick Henry, 23, Rona-road, Hampstead, N.W.
 Cope, Henry James, 30, Westbourne-street, Eaton-square, S.W.

* Institution prizeman, 1890. † Special Prize, 1890.
 ‡ "Crawler" Prize for Field Work, 1890.

- Desborough, Charles Ernest Maitland, 16, Moor-street, Lennox-gardens, S.W.
 Edgood, Frank Minshull, 98, Wimpole-street, W. Ellis, Francis, Chart-road, Reigate, Surrey.
 Fraser, William, 298, St. Vincent-street, Glasgow.
 Forrest, William, 27, Windsor-terrace, Finsbury, near Cardiff.
 Griffiths, Harold, Architects' Department, School Board for London, Victoria-embankment, W.C.
 Grozan, Hedworth Herbert, 125, Piccadilly, W.
 Hodgkinson, James Henry, 3, Ash-view, Staly-bridge.
 Innes, Gilbert Plantagenet Mitchell, Avon House, Downton, Salisbury.
 Kay, Walter Robert, Mount Sion House, Bury, Lancaster.
 Larkin, Richard Webster, Cowley House, Cavendish-road, Balham, S.W.
 Lewis, Arthur Llewelyn, 12, Arminge-road, Shepherd's Bush, W.
 Mould, Graham Harley, 14, Grange Park, Thornton Heath, Surrey.
 Oakley, Harry Ekermans, 83, Elizabeth-street, Eaton-square, S.W.
 Oakley, John Hubert, Cromlix, Chislehurst, Kent.
 Oseinton, George, Jun., Westerham, Kent.
 Partidge, Edward John, 25, Fleet-street, E.C.
 Pinder, Richmond, 49, Upper Baker-street, N.W.
 Prall, Herbert Edward, Prindsbury, Rochester, Kent.
 Rogers, Thomas George, 40, Primrose Hill-road, Hampstead, N.W.
 Slater, Charles Frederick, 5, St. John's-road, Richmond, Surrey.
 Smith, James Frederick Kemp, Market Harborough, Leicestershire.
 Snaillum, Walter Wadman, 33, St. George's-terrace, Trowbridge, Wilts.
 Townsend, George James, The Nook, Trafalgar-road, Twickenham.
 Wood, Edward Bryan, Langley Green, Chippenham, Wilts.
 Wood, Charles Bruce, 37, Irene-road, Parson's Green, S.W.

The result of the examination for the Fellowship will appear next week.

CRYSTAL PALACE ENGINEERING SCHOOL.

ON Saturday, on the closing of the Easter term, Professor Francis Elgar, LL.D., F.R.S.E., C.E., Admiralty Director of Dockyards, presided at the usual meeting of the students and their friends, and others interested in the school, and presented the certificates awarded by the Examiners, who were, on this occasion, Mr. F. Wentworth-Shields, C.E., and Mr. J. P. Knight, A.M. Inst. C.E. It was mentioned in the course of the proceedings, that thirty-five years ago Mr. Wentworth-Shields had been intimately associated with designing and superintending the construction of the tower in which they were assembled, and that Mr. Knight, his co-examiner, had passed through the school as a student.

Professor Elgar, in his address to the students, referred in complimentary terms to Mr. A. M. Struben, a student from South Africa, by whom the award of the medal of the School had been achieved in his having obtained the necessary nine certificates, an evidence of all-round merit more honourable and difficult of attainment than the highest place in single subjects, and well worthy of emulation. To pass well in examination was, of course, most satisfactory; but the after career of the student as an engineer might not correspond with his place in the examination-list; his success would depend upon the manner in which he applied his knowledge, and power of adapting himself to new conditions and circumstances as they occurred. The students who were comparatively low in the examination might, in the future, attain a higher place and greater success than their rank in the examination-list might indicate. There were accidents that interfered with their success, the state of health, not being in good form, errors of judgment, and other causes. The best students did not always turn out the best engineers. On the other hand, it should be remembered that the examination questions did not reach all the useful knowledge of which a student might be possessed, or disclose the qualities essential to success with which he might be endowed.

The Professor then presented the certificates. The lectures for the term were on "Steam and the Steam-engine." The highest number of marks attainable was 296. Sixty-three students attended the lectures; fifty-eight were eligible for examination, thirty-six passed satisfactorily and obtained certificates. Mr. H. E. Heald was first with 263 marks; Heald was also first in the order of merit for work in the Fitting-Shop.

§ Driver Prize, 1890.

Mr. F. D. Maw was second in lecture examination with 243 marks, and an equal first for work in the drawing-office.

In the Drawing-Office nineteen certificates were awarded; T. Nitta, an equal first, with certificate, 197 marks, for lecture examination. For work in the Pattern-Shop twenty-one certificates were awarded. A. F. Franks and G. H. Laidman equal firsts; the last-named had also a certificate for lecture examination, 205 marks.

For work in the Fitting-Shop, eighteen certificates were awarded.—Heald, already-mentioned, first.

For students of the second year's course,—civil engineering,—F. W. Wheadon was first for students of the first term; E. M. Proes for students of the second term; and A. M. Struben (medallist) for students of the third term.

In the Colonial Section, four certificates in three grades were awarded, O. C. Ormsby being awarded a certificate of the last grade.

In his address at the close of the proceedings, Mr. J. W. Wilson, Principal, stated that 832 students had passed through the school, and that he had trustworthy intelligence concerning 370 of these, who were occupying responsible professional positions.

The usual votes of thanks concluded the proceedings.

THE SANITARY INSTITUTE:

EXAMINATIONS FOR INSPECTORS OF NUISANCES.

AT an examination held for Inspectors of Nuisances, April 17 and 18, 1890, 120 candidates presented themselves. Questions were set to be answered in writing on the 17th, and the candidates were examined *visà voce* on the 18th.

The following candidates were certified to be competent, as regards their sanitary knowledge, to discharge the duties of Inspectors of Nuisances:—

- | | | |
|----------------|------------------|-----------------|
| Abbott, A. R. | Groom, W. E. | Saunders, P. |
| Baron, W. | Halstead, R. | Savory, C. |
| Bond, G. | Harris, F. | Simpson, J. |
| Chambers, M. | Holland, P. | Smith, J. S. |
| Clifton, H. C. | Johnson, J. W. | Smith, W. H. |
| Cortick, A. | Knight, R. | Taylor, J. |
| Craven, V. | Lightfoot, W. C. | Thomas, G. |
| Crocker, T. W. | Malcolm, A. | Thompson, J. R. |
| Davies, T. L. | Moody, H. F. | Tomkins, A. |
| Dawson, W. | Mosley, A. | Turner, A. |
| Dick, W. | Nutley, C. V. | Walker, F. |
| Folland, J. P. | Oliver, G. | Walker, W. S. |
| Forrester, W. | Parham, J. | Wallis, A. G. |
| Gander, H. | Parnam, E. | Wansbrough, C. |
| Gee, C. | Quintrell, H. | S. |
| Gibbs, A. G. | Ridler, W. | Wharton, T. P. |
| Graves, M. D. | Ruscoe, E. H. | Wrack, H. P. |

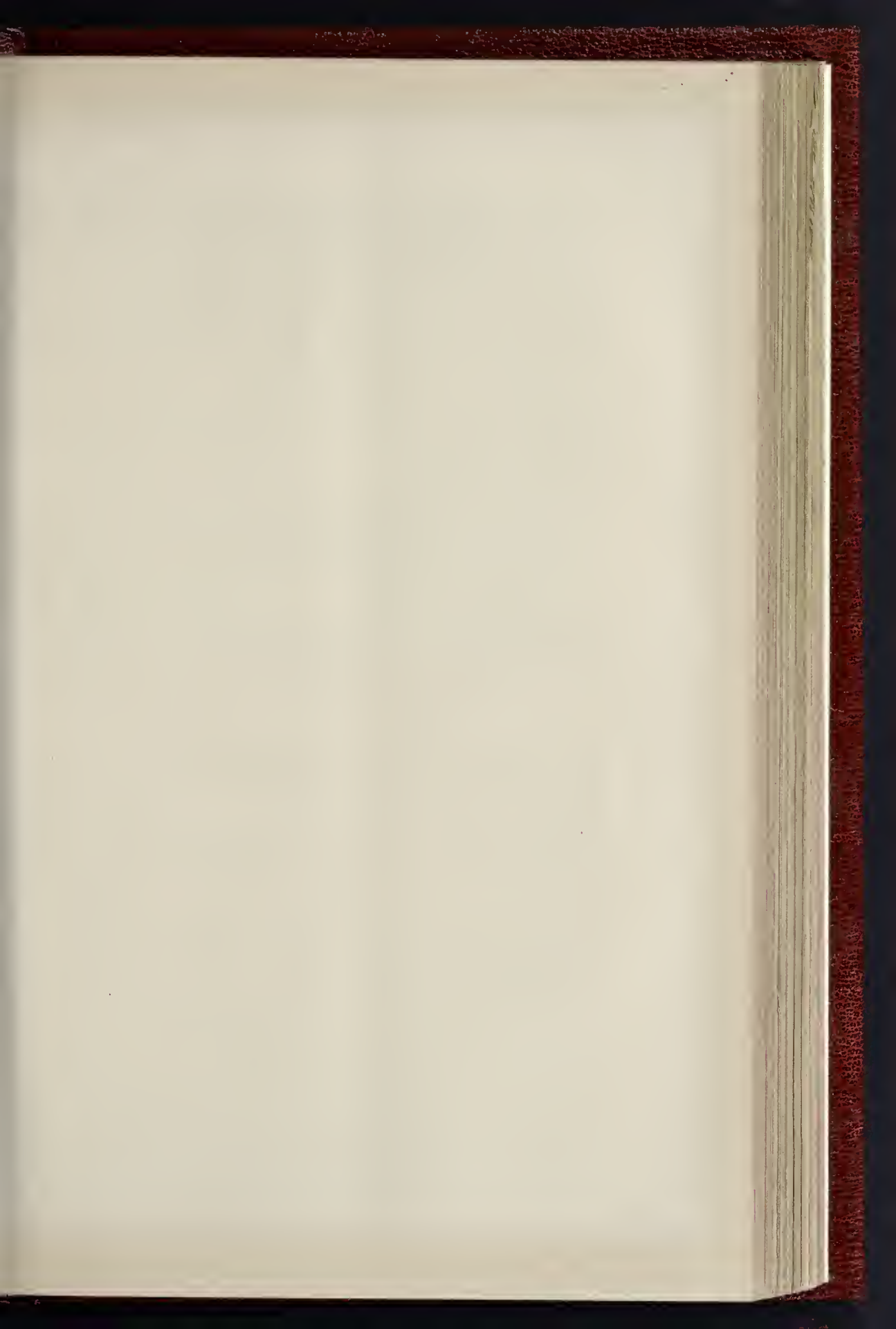
THE LONDON COUNTY COUNCIL.

THE London County Council held its first meeting in its enlarged Council Chamber at Spring-gardens on Tuesday last, the Chairman, Lord Rosebery, presiding.

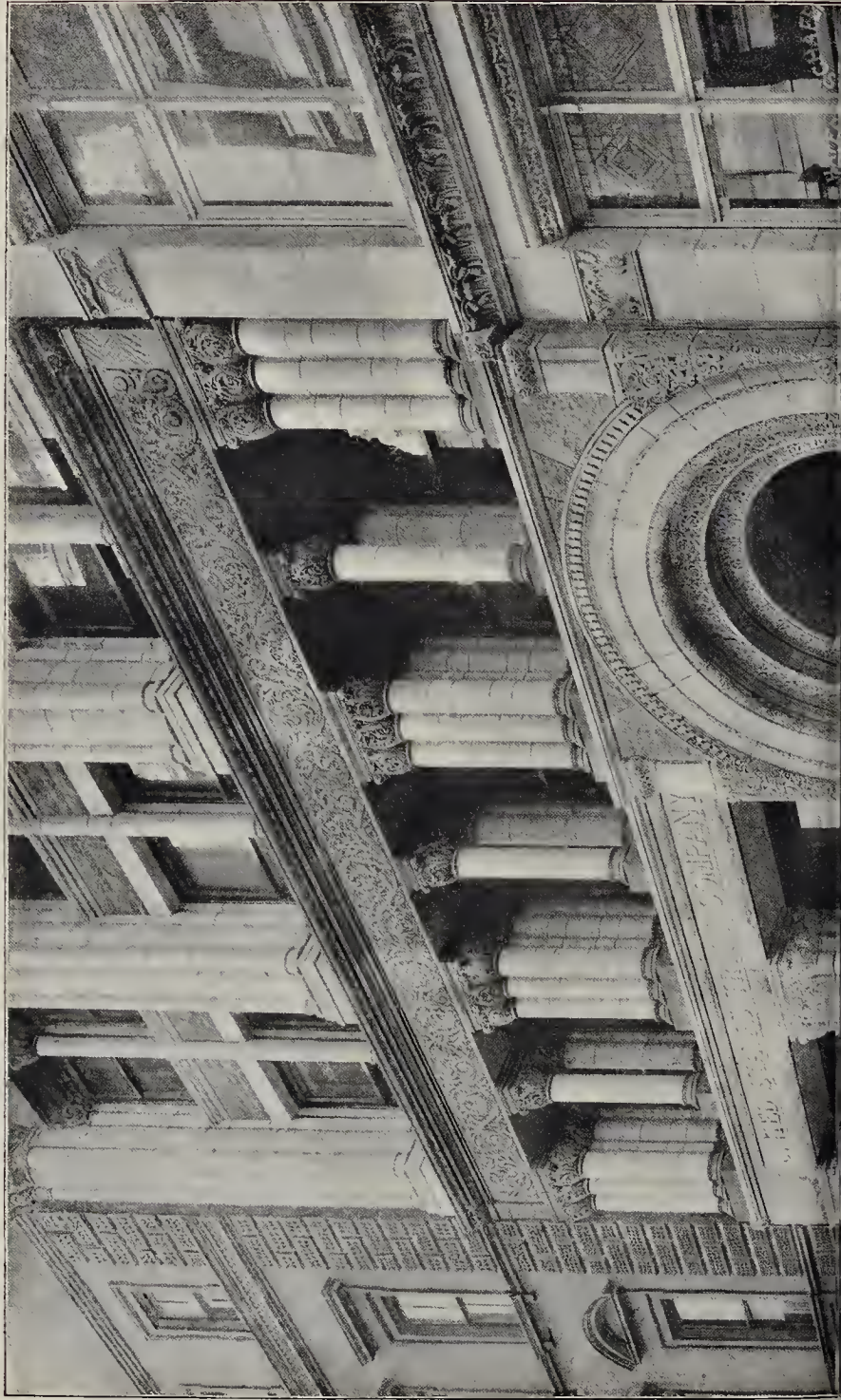
Review of the First Year's Work of the Council.

The minutes of the last meeting having been read and confirmed, the Chairman said he had hoped that day to have been able to lay on the table the annual reports of committees, but unfortunately many of them reached him late, and two of them had not yet arrived at all, and therefore it would not be possible for him to do so. In the meantime, he would commence the review of the year that he proposed to lay before them, and he would continue it at their next meeting.

Council Chamber and Office Accommodation.—His (the Chairman's) first pleasant duty was to bid them welcome back to their home. He hoped that the hall in which they were assembled would be found, probably not so magnificent, but more available for work than the Guildhall. He did not think they could ever sufficiently express their gratitude to the Corporation of London for their hospitality in that hall, but at the same time he thought, without looking a loan horse in the mouth, that he might say that utility had been a little sacrificed to magnificence, and he thought that very often false issues were raised and divisions took place under a mistaken apprehension, because of the bad acoustics of that building. If gentlemen seated on one side could not hear arguments advanced on the other it was quite clear that no satisfactory conclusion could come before the Council for decision. Later on in his speech, the Chairman



THE BUILDER, APRIL 26, 1890.

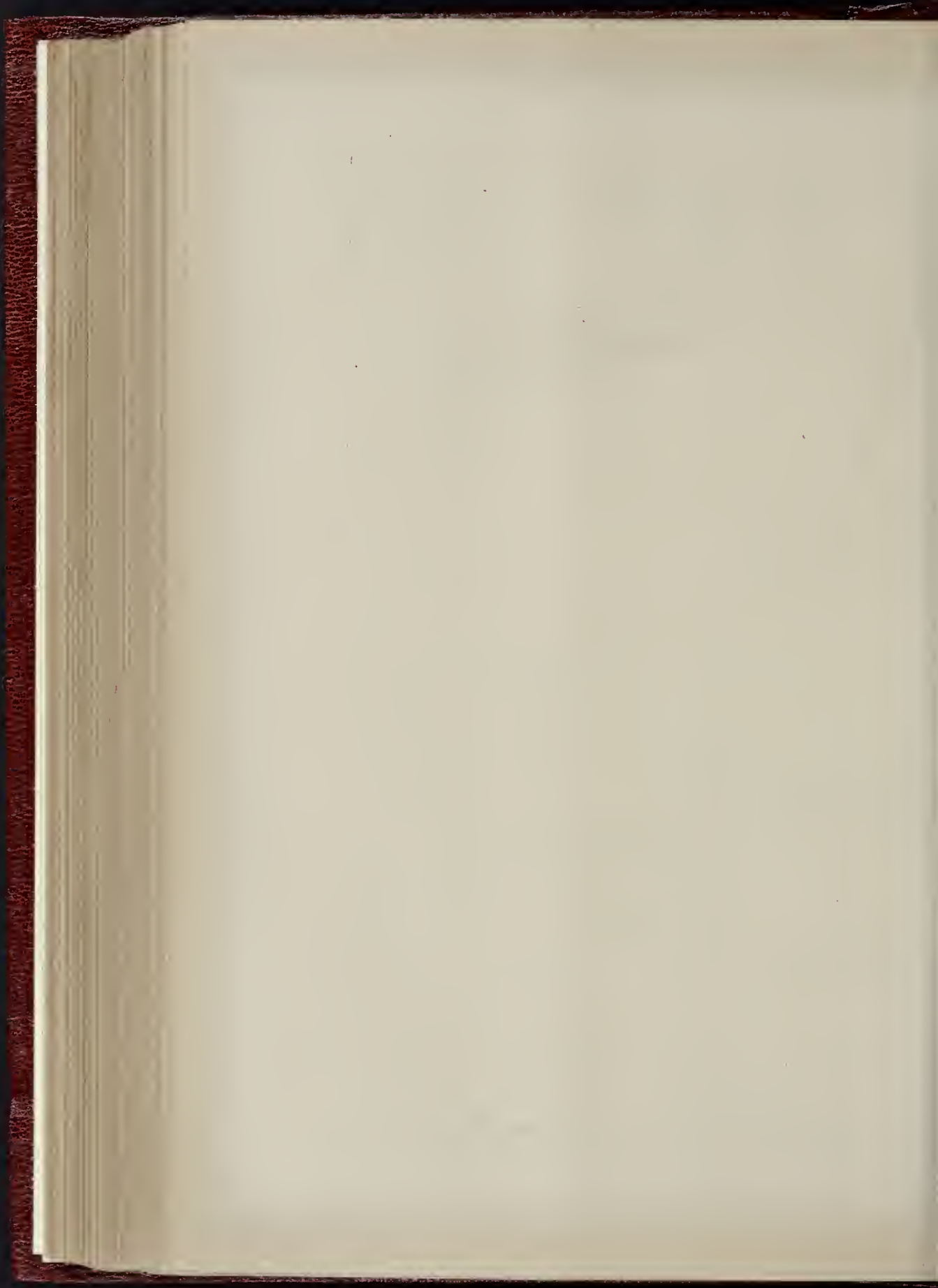




The Phototype Co., 55, Strand, London.

UNITED STATES TRUST COMPANY'S BUILDING, WALL STREET, NEW YORK.

Mr. R. W. GIBSON, ARCHITECT.



aid on this subject that it would be ungrateful at that meeting not to notice the work of the Council Chamber and Offices Committee. Of them it might be said, "*Si monumentum requiris circumpice.*" Of course, it was too early to pronounce definitely on the merits of that chamber. The only thing that they cared very much about was that it should be well ventilated, and that it should be a good room for hearing in; but at any rate it was not too early to congratulate the Committee and Mr. Blashill, their Architect, on the very handsome apartment that they had furnished them with. But they had even more important work than that. Owing to the constantly developing work of the Council they had had to hire 8 and 17, Spring-gardens, 56, Charing-cross, and 40, Craven-street, Strand; and the Chairman of the Committee thought they would soon have to hire another. [Sir W. de Souza: I believe so.] The Chairman, continuing, said that was five houses that they had already to hire outside their own building. Though they might be able to get along for a certain time with that as a makeshift, they could not permanently hope to conduct their business efficiently in them, and it was under that impression that the Council, some short time ago, by a majority of 9—a small majority under the circumstances—determined that this Committee should have authority to look out for a site for the new offices. He did not understand that it was the intention of the Council that they should get a site or try to find a site regardless of expense or other considerations, but it was placed in their power, if they found such a site, to report that they had found one to the Council, and nothing more than that. He believed that they were still looking out for a site. Of course sites did not commonly occur in London of the magnitude required, but he himself did not anticipate that the selection would fall to the present body.

The Work of the Committees.—Speaking of the work of the various Committees of the Council, the Chairman said that one difficulty that they had had to contend with in regard to the Committees was that some of them at times overlapped each others' functions and work, but was marvellous, considering in how great a state the first references to these Committees were settled, how successfully on the whole they had been enabled to be carried out. The fusing of the Working Classes Committee had overlapped the Sanitary and Corporate Property Committees on several points, but by their ample system of conferences this overlapping did not present any serious complexity, and he did not know why it should in the future.

The Housing of the Working Classes Committee had sent in their report, and they stated their wide resolution, as he thought it, not to take rapid or inconsiderate action that might prejudice their future usefulness, but to view their vast field of operations as a whole. He remembered when the Committee first began a good many members said, "Let us do something at once to show that we are in earnest," but he believed the Committee, as a whole, chose more wisely in determining not to do anything at once without the most ample consideration, because to put their foot forward and draw it back in a matter of such importance could not but affect seriously the character for sober acting of the Council. They subdivided themselves into four geographical sub-committees, and they collected from vestries, District Boards, public boards, and private companies all available information. They had further examined the state of the law, and came to the conclusion that amendment or consolidation was imperatively required. They regarded this view on the Home Secretary, and consolidation had been promised by the Government; and he did not doubt that the further recommendations of the Committee, were also under the favourable consideration of the Home Secretary. The Committee further represented that the amendment of Torrens's Acts was necessary if effective action was to be taken with regard to insanitary areas. That this question was urgent was apparent from the fact that the Committee had had under consideration no fewer than 198 insanitary areas, most of them small. They found great difficulty in working Torrens's Act in regard to these insanitary areas because they had to work them through the district authority, and the district authority preferred working them through Lord Cross's Act, but he hoped they might expect from

the Government some assistance in the matter of the amendment of that Act. The Housing of the Working Classes Committee had not been content with this. They went to Glasgow, if not to other towns in the north, and made a very careful inspection of the municipal lodging-houses in the second city of the Empire. They would see by the very careful and able report which the Committee had laid on the table that they had now come to the conclusion that they would take action as the result of that experience and learning. He should propose to defer the consideration of the report as to municipal lodging-houses for at least one week in order to give fuller time for its consideration.

The Parks Committee illustrated very strongly and strikingly the results of popular as compared with indirect election. The late Metropolitan Board of Works felt an interest in parks, but it was not an interest that came from a direct impulse, and he might illustrate that by saying that, whereas in nine months the Parks Committee of the late Board only held twenty-four meetings, the sub-Committees and Committees of the parks now held no fewer than 129. The fact was the members came from their constituencies, finding those constituencies greatly in earnest about the parks question, and with that impulse they set themselves to work with great vigour to deal with it. They divided themselves into four geographical committees, besides again sub-committees, and they knew from their reports with how much earnestness they set themselves to visit the localities which they superintended.

The Main Drainage and Bridges Committees.—These were the two committees which were united by the interesting link of the Engineer—the Main Drainage Committee and the Bridges Committee. The Main Drainage Committee, as they all knew, was one of their most important committees. It had before it probably the greatest problem of any of their committees, and they had suffered very much from the unfortunate fatality that had beset the post of Chief Engineer of the Council. When they considered that Sir Joseph Bazalgette resigned at the commencement of the Council; that after some time taken up in selecting a successor for the vacant post they were fortunate enough to find Mr. Gordon, but unfortunately enough to lose him at the time he had received their whole confidence; that Mr. Dunscombe was attacked by ill-health as soon as he took office, they could well understand the difficulties under which the Main Drainage Committee had laboured during the past year. They wanted every assistance that the Council could give them, and he was sure that his friend Mr. Arnold, the Chairman, would not deem the assistance of any one superfluous in dealing with the vast problem before him. What was the problem? Grave complaints had arisen from the inefficiency of the pumping machinery, and that at any time in the heat of summer a state of things might arise which might produce a most poisonous condition of the metropolis. They had therefore to consider what was required in the way of the repair and reconstruction of the pumping machinery. They had taken over from the Metropolitan Board of Works contracts for an enormous amount—Barking outfall works, 448,567*l.*; similar works at Crossness, 259,816*l.*; sludge vessel (Barking), 24,785*l.* They had had before them the question of the sludge vessels, which was not merely important as raising a vast string of questions, but also as involving the whole position of the sewage system. The sludge they had to take to the sea, or get rid of in the sea, or somewhere or other, was no less than 70,000 tons a month. The Council had shown a reluctance to lay down a principle, that it would abolish this system of taking their sludge by vessels, and they had endeavoured to get time with regard to the consideration of the problem by telling the Committee to hire sludge-vessels as a makeshift. The Committee reported that it was impossible to do this, and although they were able to carry on for the present, they could not very well long postpone the consideration of the great problem which would force itself upon them before the summer recess. In the meantime it was engaging the attention of the Committee. Their main drainage works were planned for London at a time when the population of London was 2,000,000 less than it was at the present moment, it was daily increasing, and, furthermore, they would have places like Erith apply-

ing to be included in their main drainage system; therefore, he thought they had a problem before them which he did not exaggerate in saying was by far the greatest before the Council at the present time. The Council had authorised Sir Benjamin Baker to confer with their present Chief Engineer (Mr. Binnie) as to the best means of dealing with this problem. He believed that in acting in that way the Council had behaved wisely in not rushing to a decision with this drainage problem hanging like the sword of Damocles over their head. The other committee which was connected with the Engineer specially was the Bridges Committee. They had not a long report to send to them, but they had had the Free Ferry at Woolwich to superintend. Members would remember that up to within a day, he thought, of their coming into office they were called upon to open the Free Ferry at Woolwich. He was ordered by the Council to open it, which he did very silently and very reluctantly, because he felt that in opening that ferry they were opening something with which they had nothing whatever to do, and that the honour of opening it should have fallen upon his predecessor in that chair. However, as the Metropolitan Board of Works would not open it, it fell on the Council to open it, and he thought they might congratulate themselves that their very first entry into office coincided with a very great boon to the people. Two and a half millions of people had crossed by that ferry already. That alone showed the advantage it had been. The Bridges Committee had been very much taken up with the re-building of Battersa-bridge, the completion of which was promised for April, but owing to the difficulty of obtaining iron work it would not be open, he was afraid, till July. That was not the fault of the Committee, who had given it all the attention that had been in their power. But, of course, the real problem before the Bridges Committee was one which he hardly dare mention, he meant the Blackwall Tunnel—means of communication at Blackwall, the "provisional works" at Blackwall; as long as he remained in that chair he would never give way to the word "experiments." There was a feeling about the Blackwall Tunnel, that he was afraid prevailed largely in the Council, that they would just as soon hear its name mentioned as that of the coal and wine duties.

Among other Committees whose work was referred to by the Chairman were the *Asylums Committee* and the *Fire Brigade Committee*. The Chairman, having spoken for three-quarters of an hour, postponed the conclusion of his review of the work of the Council until next week.

On the motion of Mr. Boulnois, M.P., seconded by Mr. Lemon, a vote of thanks was passed to the Council Chamber and Offices Committee; and it was also resolved to print the Chairman's statement *in extenso*.

The Council having transacted a great deal of miscellaneous business, and taken its first division in the new lobbies (which resulted in a tie, 43 to 43, on a proposal of the Parks Committee to take over certain open spaces, the Chairman declining to give a casting vote), adjourned, after a sitting of nearly four hours.

The English Iron Trade.—There has been a further depression in the English iron-market this week, the demand being exceedingly quiet on the part of users, who expect to see lower prices still, while producers are unable to offer anything at ruling rates, considering the cost of production. From all pig-iron centres the reports show a very dull market and lower prices. A large business has been done in Scotch warrants, with quotations going down steadily. Scotch makers' iron is quoted from 6*d.* to 2*s.* 6*d.* per ton less. Cleveland pig has lost 1*s.* 6*d.* per ton during the week. Hematites have declined to a like extent. Spiegeleisen has been depreciated 3*s.* a ton since the beginning of March, and old materials are from 1*s.* to 2*s.* lower in prices. The manufactured-iron market is very quiet, values having receded from 2*s.* 6*d.* to 1*s.* on the week. Although steel works are, as yet, fairly well provided with orders, there is very little new business, and steel is cheaper to the extent of from 2*s.* 6*d.* to 7*s.* 6*d.*, and even 1*s.* Ship-builders are not looking forward with any great confidence, while engineers are taking very little fresh work.—*Iron.*

Illustrations.

UNITED STATES TRUST COMPANY'S
PREMISES, NEW YORK.

THIS building, of which we give a view of a portion of the front, is designed by Mr. R. W. Gibson, an English architect now settled in New York. The illustration, as will be at once seen, is from a photograph taken from the actual building, a fact which explains the presence of the motley group of boys who have introduced a human element in the illustration which we could well have spared. The photograph being a very good one otherwise, and the building a good representation of what may be said now to be the modern American style of architecture, we give it as it stands.

The building was the subject of a competition in which Mr. Gibson's design was successful. We append plans of two floors; and the following quotations from the report sent in by the architect with the design will furnish some further information as to the intention and construction of the building:—

"The style adopted is Romanesque. This may fairly be said to be the National style of the United States, and it is the only one distinctly deserving that title. In its ready adaptability to modern purposes it has assumed new beauties, without losing those more ancient. The unaffected dignity of large buildings is perfectly expressed by it. The severest simplicity is permitted in it, and the most elaborate and fanciful carving. It is eminently practical in its construction and weather resistance. It demands no useless expenditures in cutting and polishing facings and pilasters. These are the reasons why American architects are so rapidly appreciating the Romanesque style.

The front is designed with the stories grouped in tiers of carefully-studied proportions.

The first story and basement are massive and almost severe. The second story is of rich horizontal composition, as a finish or ornament to that below. Then the three succeeding stories are grouped in a central tier, expressive of their purpose, with large, round arches resting upon handsome carved capitals. Upon these is one story absolutely plain, for the sake of repose and apparent weight, giving a due importance to those below. The remaining stories form a cornice group. They are designed with long shafts and high proportions, so that they will be effective even when viewed from the somewhat narrow streets.

The Kibbe sandstone and Millford granite are recommended as the materials, although the design could be equally well rendered in others.

An entrance, enriched more than the other parts, gives access to the principal floor. This is raised a few feet above the street level, so as to obtain command and importance, and it affords the advantage of light to the basement, and lesser depth of foundations. The floor can be made nearer street level if desired.

Whether with or without a roving basement the entrance is designed to occupy the height of principal story.

The insignificant doorways of many modern buildings of great pretension are sufficient arguments in favour of this arrangement.

The windows of the front are of ample size for perfect lighting, and the external effects are obtained without making any of them inconveniently high or low within.

The windows of the banking room, and nearly all others, have straight heads close to the ceiling, admitting the most valuable light.

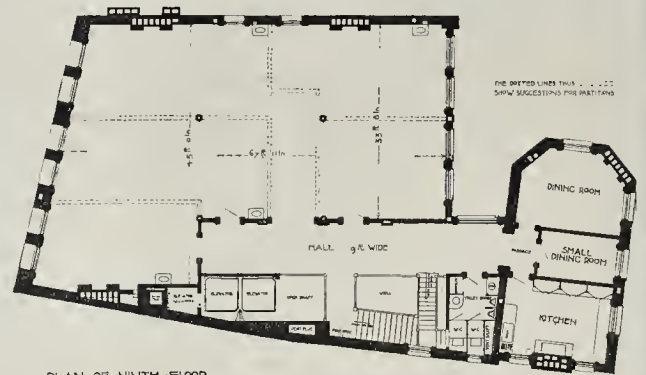
All windows are simple sashes of plate glass. The stonework of the front is all of genuine, massive, truthful character, with no concealed iron supports or imitations. The elaboration by carving can be increased or decreased to any degree required.

The main entrance hall is lighted by the great doorway, and, in addition, by the very large open space only partly occupied by the elevators and stairways. This is 36 ft. long and over 8 ft. wide, built with glazed brickwork and other finishings to reflect the light.

The floor of the public halls and the banking department are to be of Lonsdale marble.

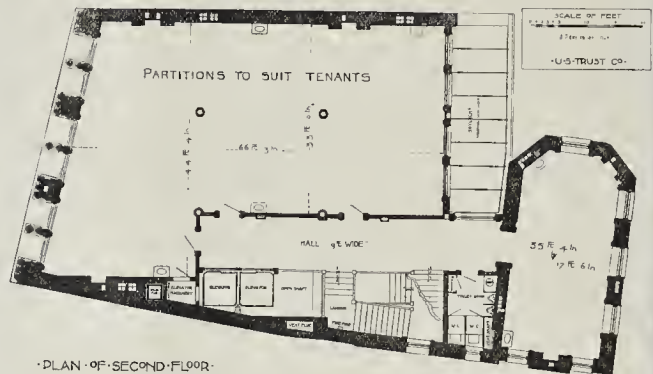
The wainscavings are to be of Champlain marbles, mostly white, with relieving mouldings and bands in colour, mostly yellow. The characteristic of the Champlain marbles is their extreme hardness. They are equal in price with those in general use, and they are among the most beautiful in the world. The white has a soft yellow tinge much warmer than that in general use, and the various colours are equal to the best used in Florentine work. The use of yellows will relieve the monotony of the white without lessening the light and cleanliness. Bronze anchors and bolts will be used to secure the marble work.

Open fireplaces are provided throughout the building, each fitted with which forms an extracting shaft of the best kind. There are also large shafts



PLAN OF NINTH FLOOR

R. W. GIBSON, ARCHITECT, NEW YORK.



PLAN OF SECOND FLOOR

The United States Trust Company's Building, New York.

adjoining the boiler flue, which will be connected to rooms, &c., by pipes horizontally.

Arrangements can be made for cooling certain rooms in summer if desired.

Heating will be accomplished partly by indirect radiation in connexion with the ventilation, and partly by direct radiators.

The strength of the building will be of very high standard; and the stone and granite recommended are both unusually strong. Actual experiment has shown that from 3,000 lb. to 14,000 lb. per square inch are required to crush Kibbe stone, and the granite is of even higher power of resistance. The building has been designed to sustain a load of 200 lb. per square foot upon the floors, and any separate sections will be capable of a greater strain.

The walls are according to the building laws of the City of New York—in some parts are in excess of those provisions.

The cost of the building has been approximately estimated. While it may be influenced, for economy or otherwise, in the detail of finishings, the sum stipulated, viz., 400,000 dol., will give a fair substantial interpretation of this design according to the specifications."

SHEFFIELD MUNICIPAL BUILDINGS
COMPETITION.

WE publish two more of the designs submitted in this competition, that by Mr. J. W. E. Tilley, of Belfast, and that by Mr. W. Henman, of Birmingham.

In regard to the first-named design, Mr. Tilley sends us the following remarks as to some of the points kept in view:—

"The suggestion that the basement floor might be considered a lower ground floor has been acted upon, and there is an entrance to it from Norfolk-street. It contains the health department, and some of the minor rooms of the Water and Borough Surveyors' departments, which were to be on the ground-floor.

It was thought desirable to have a direct entrance to the ground-floor from Surrey-street, in addition to the principal one in Pinstone-street, as by that arrangement the Accountant's general office would be well suited for a general rate office, for which, it is said, it will probably be used at some future time

As the plans show the general arrangement, it need only be said that the positions of the several departments agree with the "Instructions," and the rooms in the majority of cases are larger than the given minimum sizes; also, that all drawing offices have a north light.

The Council chamber has been placed in such a position as would secure quietness and good lighting, as well as a separate entrance for burgesses to the gallery, without their having to otherwise enter the building.

The reception and dining rooms and the Mayor's parlour are arranged en suite, and can be used as one room or divided into three, as desired.

As suggested, the office lavatories are grouped together on the lower, ground, and second floors; while the two public lavatories are on the lower ground floor, at the Cheney-row end of the Pinstone-street front.

The future extension of the building would be an additional story towards Cheney-row.

The building would be fireproof, the floors throughout being of steel decking. The fronts would be faced with some stone that has been proved to weather well in Sheffield, and the roofs slated.

The heating would be by low-pressure steam, fresh air being drawn in at a turret at the corner of Surrey-street and Norfolk-street, and heated by steam-pipes in air-chambers under the different corridors before being discharged into the building, while outlet flues near the ceilings would remove the foul air.

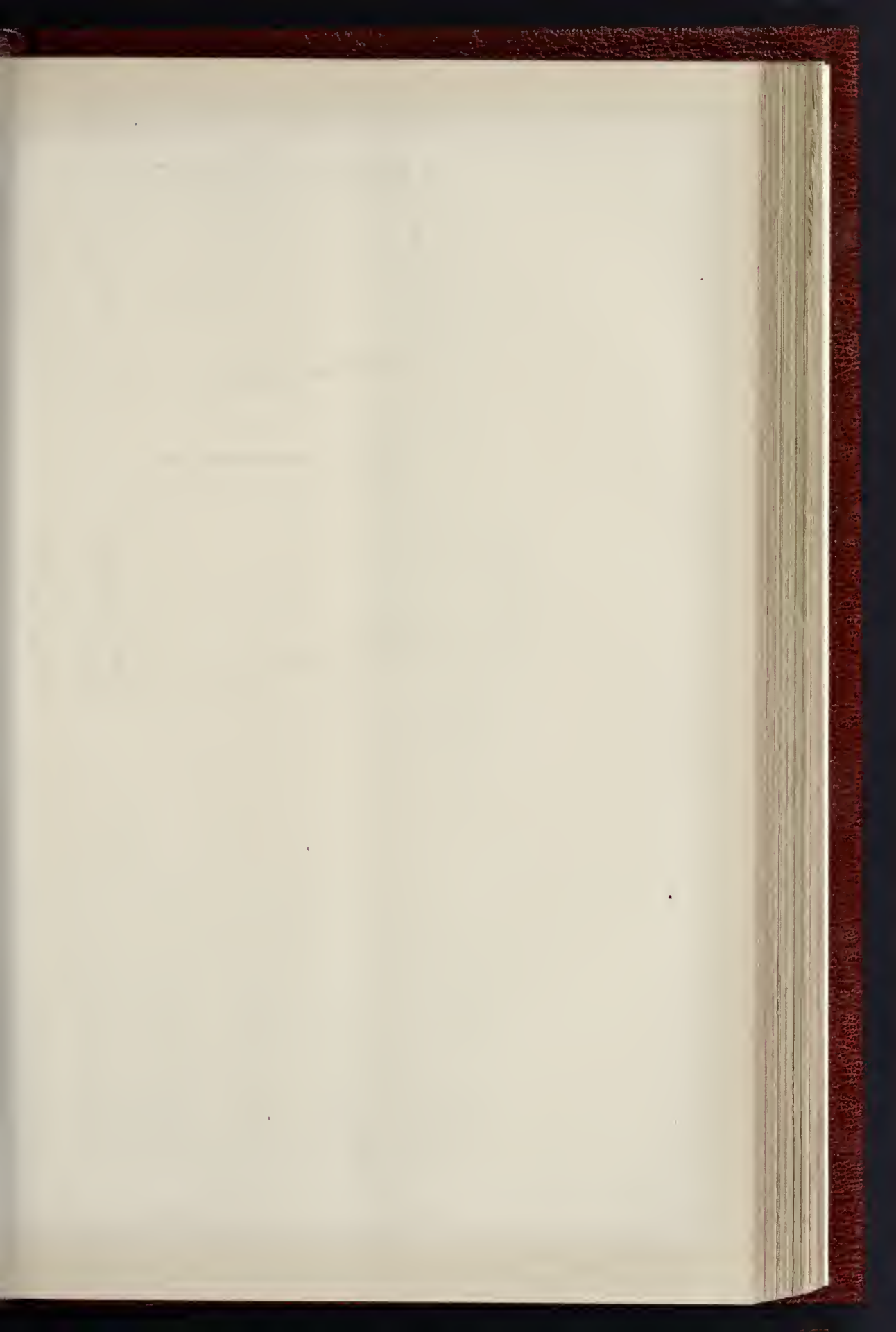
In addition to the above, radiators would be placed at the entrances, and near the windows in offices without fireplaces. The ventilation of the lavatories would be kept entirely distinct from that of the main building.

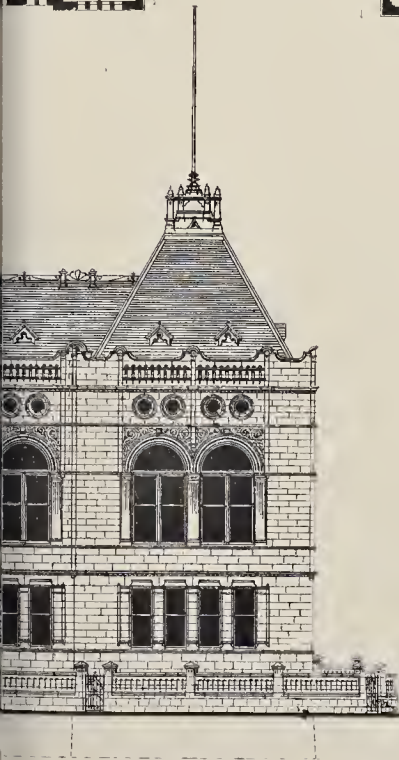
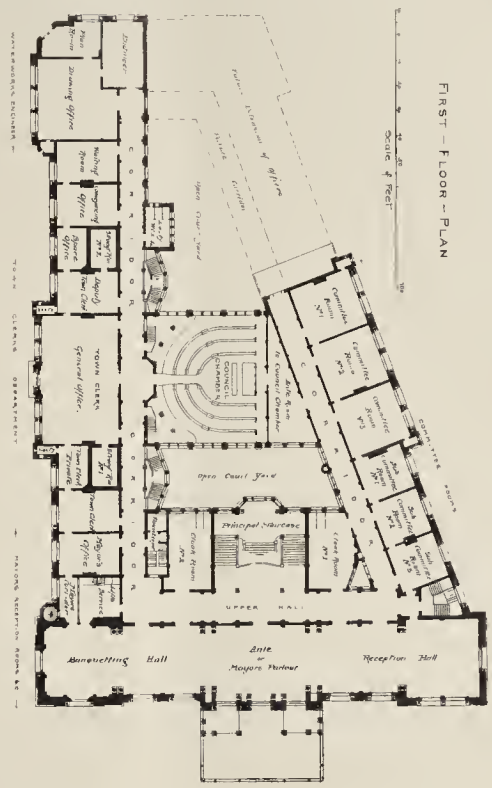
The lighting throughout would be by electricity, the boilers, engines, and dynamos being in an out-basement towards the Norfolk-street end of the building."

In regard to Mr. Henman's design we quote the following passages from his report which accompanied the drawings:—

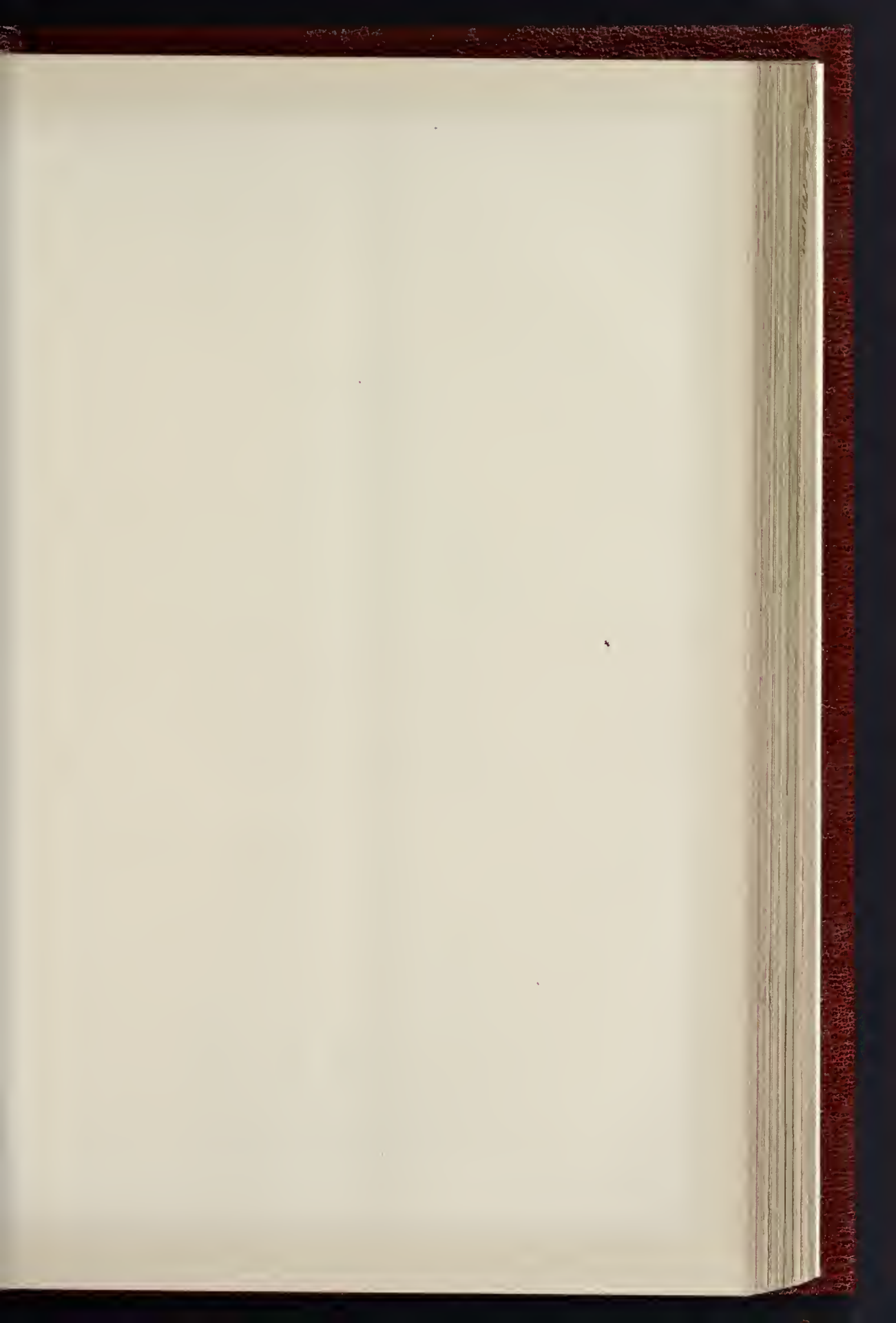
"In the general arrangement of the plan adopted and the external design I have been influenced by the following, among other, important considerations, viz.,—

1. The convenient grouping of the offices, &c., in the separate departments,





SHEFFIELD MUNICIPAL BUILDINGS COMPETITION
 DESIGN SUBMITTED BY MR. W. HENMAN, A.R.I.B.A.





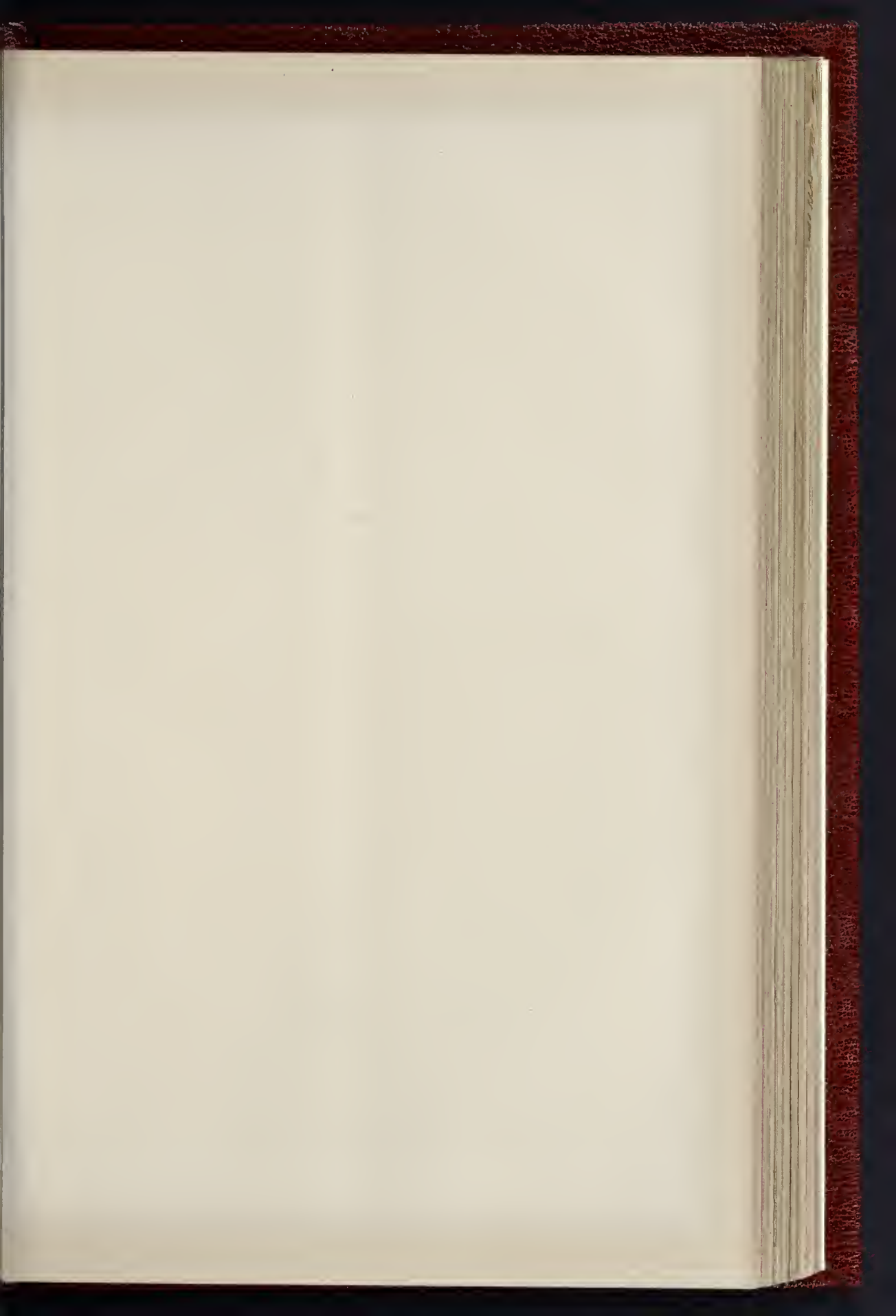
THE PHOTO. SPRAGUE & CO. 22, MARTIN LANE. LONDON BY LONDON. E.C.

"TURENNE ENFANT."—M. HERCULE, SCULPTOR.



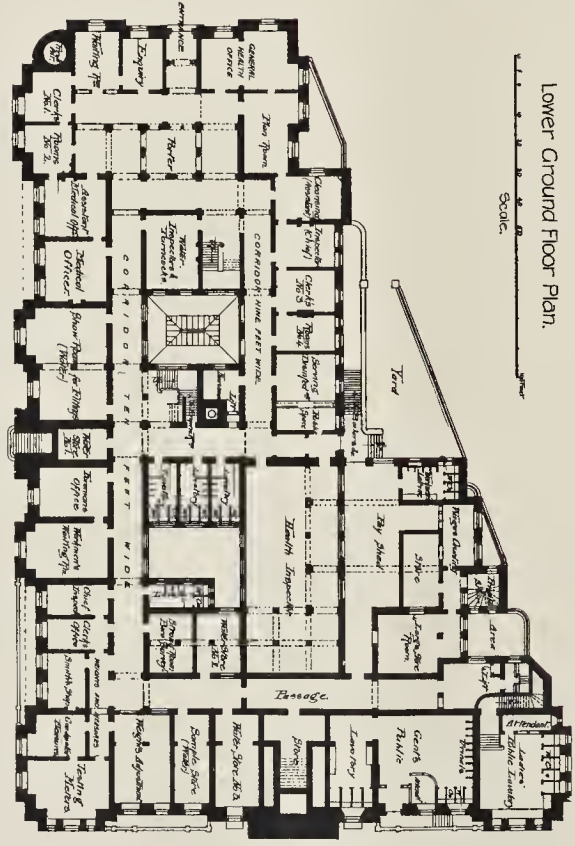
* THE PHOTO SPRAGUE & CO. 22, MARTIN LANE, CANNON ST., LONDON, E.C.

"LULLY ENFANT."—M. GAUDEZ, SCULPTOR.



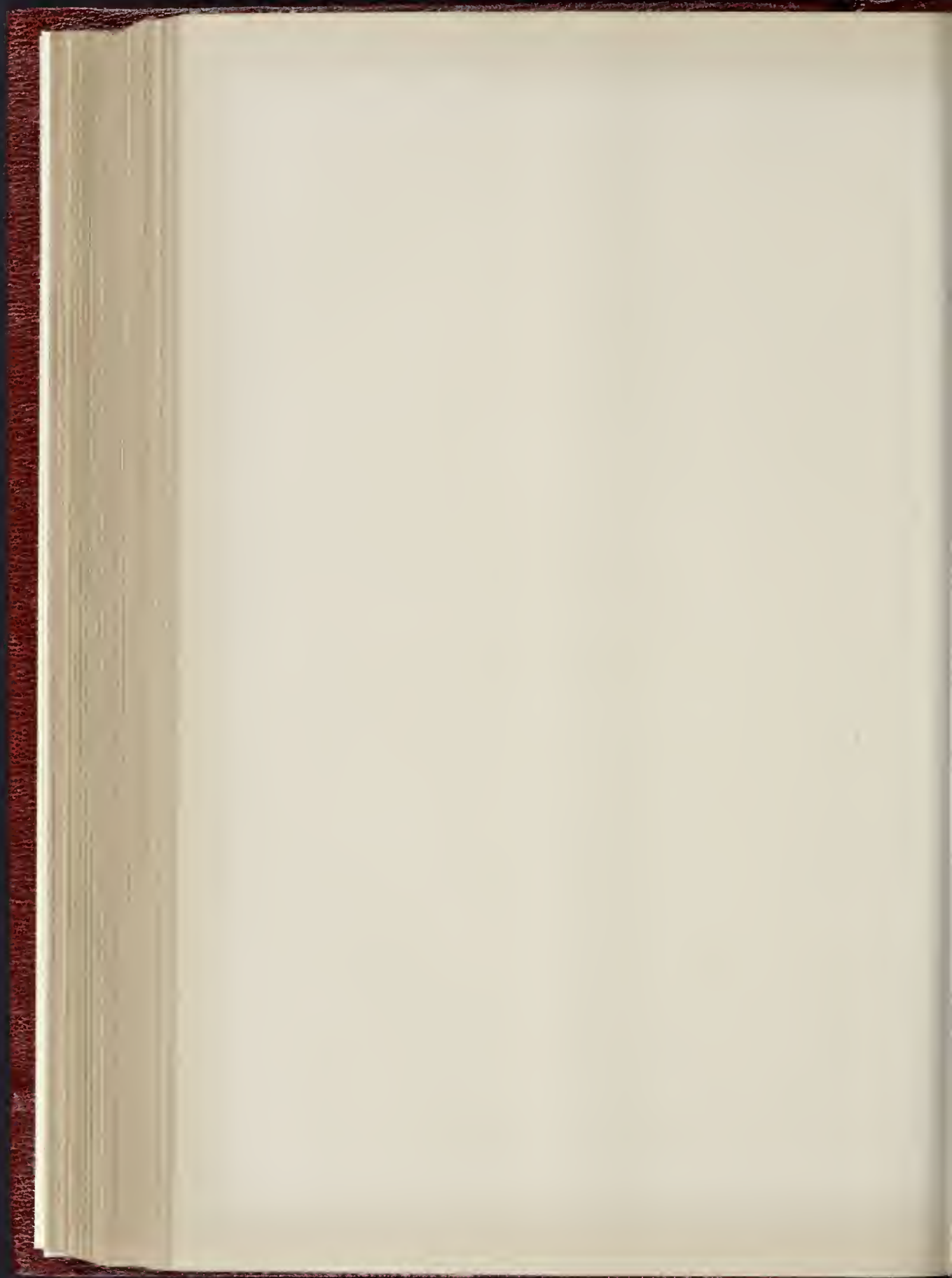


ELEVATION



Lower Ground Floor Plan.





Convenient access between those departments well-lighted corridors and easy staircases.

To give, as nearly as the requirements of actual construction admit, offices, &c., of the size specified in the 'Instructions,' and to place them on the floors indicated.

To arrange the several rooms of different sizes and the proportions of each without the intrusion of mezzanine floors, which, in public offices, of questionable convenience.

To utilise the fall in the ground so that towards east and the lower floor becomes in reality the ground-floor.

To provide externally an effective predominating feature, which, while not clashing with recent buildings, will mark the edifice as being of important municipal character.

To take the last consideration first, I am of opinion that the near proximity of the Tower of St. Martin's Church, with its dome-like termination, precludes the introduction of a dome as the principal feature of the new building as well as of a central tower, but, inasmuch as Surrey-street, Fargate, Fould-street, and Barker-pool, all converge towards the north-west corner of the site, and that at the principal front towards Pinstone-street (west from the church tower, indicate that there should be the main feature in the design.

On turning up this argument, and in consideration of the minute details of the surrounding streets, it is evident that to give an imposing character to the Municipal Buildings such tower should be of ample dimensions, both in bulk and height.

The smoky atmosphere of Sheffield gives a gloss to buildings severely Classic in design, and the minute details of later Gothic and Baroque styles are quickly marred thereby. I have opted a free treatment, Romanesque in character, in order to secure the boldness of the former, combined with the piquancy of the latter, which, however, can only be faintly indicated by the small-scale elevation.

The front is recessed to secure a play of shadow and variety, as well as good light to the lowest floor.

Lighting.—Particular care has been exercised in order to secure the perfect lighting of all rooms, corridors, staircases, &c.; the windows are numerous and of ample dimensions. It is intended that the light should be abundant, but there is an abundance of space on the lowest floor for the installation of electric-lighting plant.

Heating.—Space for boilers in a central position provided below the lower ground floor, so that all principal rooms, offices, corridors, &c., may be warmed by hot water, open fireplaces being provided for use in the private offices, &c.

Ventilation.—It is proposed that proper ventilation shall be effected by a system of propulsion, fresh air being drawn from a suitable source, warmed in cold weather, and forced by fans of a Blackham fan-wheel through channels along the corridors, with suitable openings into the several rooms, exhaust-shafts being provided for the exit of the air.

Materials.—Externally, all the street-frontages of the building towards the churchyard to be faced with selected stone of good colour, granite bases being supplied for the columns to principal entrance-porches. Around the inner courtyards flags of cream-coloured bricks with stone dressings to be employed. Internally, except to the entrance-hall and grand staircase, which are to be of stone and marble, the walls, ceilings, &c., are to be finished in plaster. The floors to be of fireproof construction, laid with encaustic tiles mosaic to the halls, corridors, &c.; boarded to the rooms, offices, &c.; in oak to the principal apartments, with parquet borders.

SCULPTURE: "TURENNE ENFANT" AND "LULLY ENFANT."

THESE two statues, both of which have been purchased by the Municipality of Paris, are interesting examples of a kind of ideal portrait sculpture to which French sculptors have never taken of late years, viz.: the representation of the boyhood of eminent men.

The statue of Turanne was in the Salon of 1878; the sculptor, M. Hercule, was a pupil of Caffrey, and some years since executed a work titled "Primevère" which attracted much notice and was purchased by the Corporation of Paris, and is now in the Salon at Auteuil. The "Turanne" will probably be either erected in some public site in Paris, or also placed in an Art Museum.

The figure of Lully the musician, who filled a considerable place in the early development of modern instrumental music, is by M. Gaudet. The figure is in bronze, and is to ornament one of the squares or public gardens of Paris.

Appointments.—Mr. C. J. Dawson, F.R.I.B.A., Barking, has been appointed architect to the newly-formed School Board for Barking, Essex.

COMPETITIONS.

Proposed Municipal Buildings, South Shields.

On Monday, the 21st inst., a meeting of a committee of the South Shields Town Council was held at the Marine Board Offices, Mill Dam, to receive the report of Mr. G. G. Hoskins, F.R.I.B.A., the assessor appointed to make a selection from the thirty-three sets of competition drawings sent in for this building. The scheme is estimated to cost 10,000*l.* The three sets selected by Mr. Hoskins in order of merit are those bearing the following mottoes:—(1) "Constable;" (2) "Ad Rem;" (3) "Magistrate." Mr. Hoskins's report having been unanimously adopted, the sealed envelopes were opened, when the names of the successful competitors were found to stand as follows:—(1) Messrs. Perkin & Bulmer, of Leeds; (2) Messrs. Clarke & Moscrop, of Darlington; (3) Mr. J. H. Morton, of South Shields.

Yardley Board Schools.—We are officially informed that, acting on the advice of Mr. William Henman, A.R.I.B.A., of Birmingham, who was appointed the assessor in this (limited) competition for schools at Red Hill, Coventry-road, for 1,000 children, the Board has selected the design of Messrs. Crouch and Butler for execution, and awarded a premium of 15*l.* to Mr. W. N. Gething and one of 10*l.* to Mr. F. J. Yates. Six sets of designs were received.

ARCHITECTURAL SOCIETIES.

Cardiff Architects' Society.—The architects of Cardiff held a meeting on the 16th inst., and adopted rules drafted by a committee appointed for the purpose at a previous meeting held on March 12, when it was resolved to form the Cardiff Architects' Society, for the advancement of the profession of architecture, and the consideration of questions of professional practice. The architects in practice in Cardiff number about thirty, and the Society will, it is believed, include all these as members, in addition to many others in the surrounding district. The Hon. Secretary is Mr. F. Baldwin, of Church-street, Cardiff.

Edinburgh Architectural Association.—On Saturday, the members of this Association, under the leadership of Mr. David Macgibbon, visited that relic of the younger branch of the Douglases, Tantallon Castle. On arriving, attention was drawn to the immense size and strength of the wall of encinte, with its central keep and gateway, and to the method which James V. had adopted to render the walls fit to resist artillery. The remains of the outer ditches and of the earthworks, which had probably been thrown up during some of the sieges of the castle, were also examined. The operations recently executed by Sir Walter Dalrymple were then pointed out. By these a great deal of the rubbish which had accumulated in the ruins has been removed, and safe access has been provided to various portions of the structure formerly inaccessible. Particularly, the stairs leading to the battlements of the great wall of encinte have been restored, and the party were enabled to mount to the top and enjoy the fine prospect obtained from there. The defensive arrangements of the battlements and the central tower were noticed, and also some round shot of iron, 6 in. in diameter, which have probably survived since the siege of Cromwell. The large hall and other buildings remaining of those which formerly surrounded the courtyard were commented on as indicative of the work of a late period. Tantallon was originally a Royal castle. In 1377 Alan de Lauder was constable. Like Doune Castle, it belonged to and was possibly rebuilt by Murdoch, Duke of Albany. In 1475 it passed into the hands of the Earls of Angus, with whom it remained till taken by the Covenanters in 1639, and was afterwards destroyed by Cromwell.—*Scotsman.*

The Albany Club at Kingston-on-Thames. occupying the fine old mansion of the late Sir Charles Freaque, recently known as "Bank Grove," was formally opened on the 12th inst. It is delightfully situated on the banks of the Thames, with a frontage of 420 ft., overlooking one of the most charming parts of the river. The club-house contains commodious dining and drawing-rooms, library, morning, billiard, smoking, and card-rooms, and the whole have been furnished by Messrs. Oetzmann.

"GOTHIC ARCHITECTURE."

SIR,—The notice of my book, "Development and Character of Gothic Architecture," published in your issue of March 15, seems to me somewhat unfair; and I trust you will allow me space to offer to your readers the following remarks in reply to a few of its statements:—

I have not, I believe, as you imply, written from prejudice, or with a desire to detract anything from the true merits of the Pointed Architecture of England—an architecture which few Englishmen, I suppose, appreciate better than I do—and I am not conscious of having had a wish to establish any ill-founded or fanciful theory. On the contrary, certain marked characteristics of French Gothic architecture had, in the course of my study of it, forced themselves upon my attention as fundamentally distinguishing this architecture from all others. Whichever style one may prefer, every intelligent student must, I think, sooner or later reach the conclusion that the French and the English styles are radically different both in structural organisation and in artistic character. And since the distinctive qualities of the French Gothic derived from the logical carrying out of a certain set of architectural principles, and since also this cannot be said of any other Pointed architecture, it seemed to me that confusion might be avoided by confining the term "Gothic" to this developed French work; while, as I say in my preface, the general term *pointed architecture* might be used to designate the various styles of other countries. These latter styles are, as I try to show, essentially but decorative modifications of the Romanesque. The Gothic idea was never fully or consistently carried out in them.

Two important considerations, it is said, I seem to have overlooked, namely: (1) That "it does not always follow that the most complete carrying out of a system to its logical conclusions produces the most satisfactory artistic results;" and it is questioned "whether the system of reducing the piers to the smallest possible area and propping everything with a scaffolding of flying buttresses, which has been carried out so completely in many typical French cathedrals, is really consistent with the aims and the highest expression of architecture;"—it is a questionable credit to French Gothic to have carried out a system . . . at the expense of monumental mass and solidity of expression;" and (2) "the importance of mouldings and ornamental details in characterising style." I believe that I may assert that I have overlooked neither of these considerations. In regard to the first, there was no occasion to speak in the book for typical French cathedrals of the true Gothic period never exhibit any extreme reduction of piers, &c. It appears to have always been recognised by the builders of the best time, that the exigencies of the eye must be regarded as well as other exigencies. A strictly monumental and dignified aspect is pre-eminently characteristic of typical French Gothic. In the declining style we do indeed meet with instances of the extreme carrying out of the principles of the system. And in the Church of St. Urban of Troyes, for example, the monumental aspect of the building is seriously impaired thereby. But it did not fall within the scope of my book to treat of the declining style. As to the importance of mouldings and ornamental details in characterising style, I supposed that I had duly recognised it in giving separate chapters to their consideration—besides including them in my general introductory definition. But I have endeavoured to show that these have but a secondary importance, as, in fact, you admit where you say: "It is true that this consistency of construction and of constructive expression is the most important element in style."

But the chief misrepresentation, which even inadvertence can hardly excuse, is that which occurs where the reviewer says: "It must be observed also that while Mr. Moore is never tired of picking out the logical defects of English architecture, he appears completely blind to defects of logical design in French architecture." He quotes (in illustrations) a bay of the Cathedral of Sens as showing how the ground plan was laid out and the sections of the piers determined by the intended plan of the vaulting, entirely ignoring the fact of the intermediate circular pier having no suggestion on plan of the transverse groins of the expanded vaulting, or the fact of the vaulting shafts for this beginning over again, with a new base of its own, from the abacus of the ground-story cylindrical pier. This system of placing little bases for the vaulting shafts on the abacus of the lower piers, which was more used in early French Gothic than anywhere else, is in fact one of the most illogical and distinctly un-Gothic features in early Gothic architecture; it entirely breaks the connection between the vaulting and the ground-story, and very materially weakens the homogeneous character of the design; yet this the author passes over without reproband, and even in silence, because it is a French defect." It is true that I did not criticise the circular ground-story pier in this place, but a little further on (p. 61), when I come to treat of the development of the typical Gothic pier, I say, referring to similar circular piers of Laon and Paris: "These round columns were soon felt to be

unsatisfactory, as affording no independent supports for the various members of the superstructure. Such columns did not partake of the new principles that now characterized every other constructive member of the building. Attempts to improve them were therefore made, and a new and strictly functional form was soon devised, a very early, perhaps the first, example of which may be studied in the nave of the Cathedral of Paris." It is, therefore, far from correct to say that I pass this matter over in silence because it is a French defect.

The reviewer accuses me of "picking out, in various matters of detail, undoubted weaknesses of English Gothic and representing them as typical." To this I may remark that in no way could I have more effectually weakened my argument, and exposed myself to merited blame, than by having done so. I have, however, a hope that unbiassed readers will see that I have fairly set forth the leading characteristics of pointed buildings in England. If I have not done this, let it, by all means, be shown.

On what you call "the author's blindness to English characteristics," concerning which "it is sufficient to note that he has not a word to say about so graceful and characteristic an invention as fan-vaulting," I need only observe that this invention was posterior to the epoch of which my book treats, and that special reference to it was, therefore, uncalled for. Had the index been consulted, it would have been found, however, that incidental mention of fan-vaulting occurs on p. 144.

CHARLES HERBERT MOORE.

Cambridge, Mass., April 10, 1890.
 * * * Writers who are prejudiced never are aware of the fact, or it would not be "prejudice," but something else. Mr. Moore's reply is quite beside the real point of our criticism. The main defect of his logic lies in taking a particular plan of building, with three aisles and a chevet termination, and defining that as "Gothic." We pointed out that he might just as well take the plan of the Parthenon as representing Greek architecture, and say the Breechtheon was not Greek architecture. As to the question of his "passing over in silence" a certain feature because it was a French defect, our statement was strictly correct in regard to the illustrations we were speaking of. The author gives illustrations (pages 45 and 47) with the intermediate pier-circular on plan and with a vaulting shaft illogically placed on the capital of the pier (or rather column), and says, "it will be seen that the architect not only intended from the first to vault this choir, but that he perfectly understood what the form and construction of the vaulting was to be; that he had in fact settled in advance his scheme for the vaulting in every detail"; while the very illustration employed shows the contrary, and shows an illogical treatment which, as we said before, we are quite certain the author would not have passed over if the illustration had been taken from English Gothic. As to fan-vaulting, the index was searched with that precise object, and what we found was the following sentence: "This peculiarity marks an early step in the direction of the so-called fan-vaulting system which subsequently became so conspicuous a feature of English pointed design." That remark, without any illustrations, is the whole reference to fan-vaulting in the book. As to the general question of Mr. Moore's firmness in his representation of English Gothic we may give the reader an illustration by reproducing the accompanying sketch of an Early English capital which Mr. Moore has the assurance to present to the reader as a typical form of the Early English capital. This kind of thing leaves only one of two conclusions possible: either Mr. Moore is ignorant of the details of the English Gothic at which he scoffs, or he is deliberately misleading his American readers (who may possibly know no better) to subserve his own argument. His book, in spite of a great deal of ability displayed in it, is one-sided, dogmatic, and misleading, and an entirely unsafe guide to the study of Gothic architecture: it is a piece of advocacy to subserve a captious theory. —Ed.



Early English capital as illustrated (1) by Mr. Moore for the information of American students.

His book, in spite of a great deal of ability displayed in it, is one-sided, dogmatic, and misleading, and an entirely unsafe guide to the study of Gothic architecture: it is a piece of advocacy to subserve a captious theory. —Ed.

DAMAGE TO GAS PIPES BY STEAM-ROLLERS.

SIR,—In reply to "A Borough Engineer," whose letter on the above subject appears in the last issue of the *Builder*, I think the case he has in his mind is that of The Gas-light and Coke Company v. Vestry of St. George's, Hanover-square, which came before the Queen's Bench Division of the High Court of Justice in December, 1887, and in which the company were successful in restraining the vestry from using steam-rollers of such weight

as to damage their pipes. I am afraid, however, that this case will not assist him in resisting the claim of the Gas Corporation (or is it a company?) in question, if they have fulfilled the condition precedent to making such claim—namely, laid their mains in a proper manner. As far as my recollection serves me, this was the whole question in the case cited above. The Company's mains were laid so as to resist "legitimate pressure" from the surface, they were submitted to unusual—i.e., illegitimate—pressure by the use of a steam-roller; and the users of the roller were told in plain language not to do it again at their peril. I know of two instances in which local authorities have recognised their liabilities in cases of damaged mains, and have settled with the companies rather than let the matter go into court.

With regard to the question of liability, a learned Judge once said that any one who took into a public thoroughfare an element of danger,—for, instance, a bear,—did so at his own risk, and consequently he was responsible for any damage resulting from his act. Gas companies have the use of the subsoil of the public ways, and they convey beneath it an element of danger,—a "bear," but properly chained and muzzled in service-mains, "well-made and properly laid," to use the words so frequently repeated in the Gas-light and Coke Company's case. The local authorities, as the parties responsible for the proper condition of the roads, also take into the streets an element of danger in the shape of a heavy steam-roller,—a "bear" of another kind. Now, does the passage of this roller over the street subject the pipes beneath to legitimate or illegitimate pressure? That is the whole question, as it seems to me. If in the "Borough Engineers'" case he can show that the pipes were laid too near the surface, or upon improper soil, loosely thrown in so as to allow subsidence with little pressure from above, it would appear that he would be in a position to resist a gas company's claim for damages. If, on the other hand, the pipes were "well made and properly laid" to resist ordinary pressure, I think their claim will be upheld, if the matter is taken into court. X. Q. S.

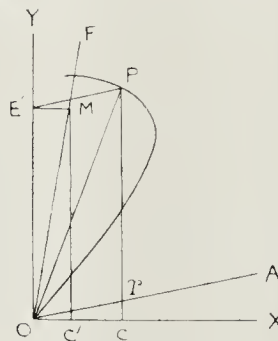
London, April 19, 1890.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—XVII.

SHUNT-WOUND DYNAMO-MACHINE (continued).

THE characteristic curve for a shunt-wound dynamo may be constructed by methods similar to those employed for the separately excited and series machines.



The diagram (fig. 45) is, however, a little more complicated from the fact that, whereas in the two former cases the whole of the armature-current flows into the external circuit, in the present case a part of it is diverted through the field-magnet coils, and the proportion of the field-current to the armature-current varies as the external circuit is altered.

Let OA be the line for the resistance of the armature; OF that for the field magnet coils. If the armature is producing a current represented by OC, PC is the E.M.F. set up in it. But a part of this electro-motive force, viz., PC, is absorbed in the armature itself, so that Pp is the E.M.F., or difference of potential, between the terminals of the machine, and it is this E.M.F. which drives the exciting current round the field magnets. Draw P'E' parallel to OA, then O'E'=Ip, and if E'M is drawn parallel to OX, E'M represents the current in the field magnet coils; O'C' is the projection

of this line on to OX, and the balance of current, C'C, is that available for use in the external circuit.

If the line OP is drawn, then tan POC, or $\frac{P}{C}$

is the total resistance in circuit, and $\frac{Pp}{CO}$ is the resistance of the circuit external to the armature; it must, however, be pointed out that the circuit consists of the field-magnet coils and an external circuit proper, placed abreast.

Many interesting comparisons may be made between series and shunt-wound machines. A shunt machine, open circuited, becomes simply a series machine, whose field-magnet coils have an abnormally high resistance, short circuited, a series machine open circuited can produce no effect because no current can flow round the field-magnets; similarly, if a shunt machine short circuited it can be seen, from fig. 45 or by looking at the connections in fig. 44, that it can produce no effect for the same reason; hence, a shunt machine short circuited, and a series machine open circuited, are in practically the same condition.

If the line OP turns about O towards OX and ultimately becomes a tangent to the curve at C and the machine ceases to work; in the shunt-wound machine, therefore, there is also a critical resistance, but one below which no current is produced.

When a machine is always required, as frequently happens in the case of small dynamos, to send a certain current through a constant resistance, the type of machine used is of little importance. The point P on the curve never moves, so that the shape of the curve, which reveals the peculiarities of the particular machine, is a matter of no consequence. With large machines, however, the load will generally, under ordinary working conditions, alter from time to time, and the current which flows between its terminals will probably be used for many independent pieces of plant or apparatus, through which current can be made to flow at will.

If, for example, the external circuit consists of a number of large electric lamps, placed in series, a lamp would be turned off by short-circuiting it, that is, by providing a by-path of no resistance for the current to pass on to the remainder of the lamps as before; although the act of turning off a lamp reduces the resistance of the circuit, the value of the current flowing from the machine must not change. The machine must, therefore, give a constant external current, irrespective of the resistance of the circuit, which will vary from its maximum value, when all the lamps are turned on, down to nil when all the lamps are off, in which latter case the machine will be practically short-circuited.

The smaller electric lamps are usually placed abreast; when a lamp is turned off, the current through it is stopped by open-circuiting it, and the current from the machine correspondingly decreased; but this must not alter the difference of potential between the terminals of the machine, or the remaining lamps will be affected. In this case the machine must, therefore, give a constant external electromotive force, irrespective of the resistance of the circuit, and consequently, of the current flowing, which will vary from its maximum value, when all the lamps are turned on, down to nil when all the lamps are off, the machine being then open-circuited.

A glance at the three characteristics already drawn (figs. 39, 43, and 45) will show that none of the machines hitherto described could fulfill the requirements of either of the above cases. The external characteristic of a constant-current machine is a line parallel to OY, of a constant-potential machine a line parallel to OX.

The output from the armature of a machine may be controlled by altering (1) the speed, (2) the position of the brushes, (3) the magnetisation of the field magnets.

If the motive-power is a steam-engine it may be fitted with an electric governor, which can be made to work over almost any range, but a considerable change of speed constantly taking place is open to objection, though, as a supplementary means of obtaining more perfect regulation, it is of great value. Shifting the diameter of commutation is at best but a clumsy device, and, with a machine of no great size, the sparks produced at the commutator are so mischievous that special measures have to be adopted for extinguishing them. The third method possesses distinct advantages over all others, and, in some form or other, has long

n used for regulating electricity supply from dynamo-machines. If a shunt of variable resistance be attached the field magnet coils of a series-wound machine (fig. 40), or if a variable resistance put in series with the field magnet coils a shunt-wound machine (fig. 41), the necessary excitation of the field magnets can be controlled by hand, or by some suitable electro-magnetic device. The same end, however, can be attained without involving the use of a variable resistance, or, indeed, any special apparatus at all, by what is known as compound-winding the field magnets of a machine.

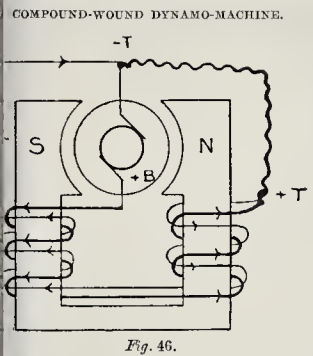


Fig. 46.

Fig. 46 shows the connexions in one method of compounding. The current comes from the machine through the positive brush +B, and is taken a few times round the limbs of the field magnets, emerging from the machine at the shunt terminal +T. From +T a sufficient quantity of finer wire is coiled round the shunt magnets, and the other end attached to the negative terminal -T. If fig. 46 is compared with figs. 40 and 45, it will be seen that the compound-wound machine may be regarded as a combination of an ordinary series and shunt machine.

Continuous current dynamo-machines are not frequently compounded for giving a constant external electro-motive force or difference of potential between +T and -T (fig. 46); but shall therefore consider how this may be accomplished; indeed, it must be shown that a machine such as that shown in fig. 46 is capable of maintaining a constant E.M.F. in the external circuit. It is important to note that if the difference of potential between +T and -T (fig. 46) is constant, the current through the shunt will be constant too, the machine will therefore be, from an electrical point of view, a combination of a separately excited and series dynamo-machine, rather than of a shunt and series machine as the connexions seem to indicate. The constructions will be the reverse of that hitherto adopted, for we shall first draw the shunt characteristic, and then determine what winding of the field-magnets will produce it.

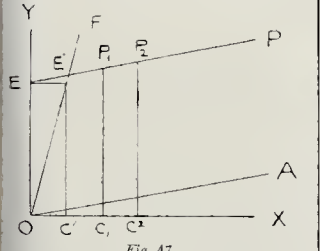


Fig. 47.

At point O E, fig. 47, equal to the external E.M.F. required, then the characteristic will lie in the line E P drawn parallel to O A, the resistance line for the armature and the winding on the shunt in series with it. Draw O F the resistance line for the shunt winding, and as in the case of the simple shunt-machine, find the current C' which flows through them. Take two points, P₁ and P₂, on the characteristic and draw P₁ C and P₂ C₂ parallel to O Y.

On O Y (fig. 48) set off the lengths O S', O S₁, O S₂ proportional to O C', O C₁, O C₂ (fig. 47) respectively, so as to represent on a suitable scale the magnetising effect of the armature

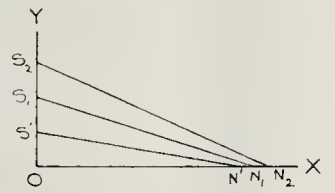


Fig. 48.

currents on field. Along O X set off on the same scale O N', O N₁, O N₂ to represent the resultant field in each case, and proportional to C' E', C₁ P₁, C₂ P₂ respectively; S' N', S₁ N₁, S₂ N₂ are respectively the fields which the field magnets must produce in each case (compare

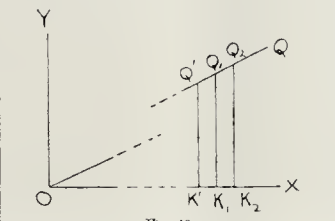


Fig. 49.

fig. 48 with figs. 38 and 42). If O Q, fig. 49, is the curve for the flux through the field magnets, lay off K' Q', K₁ Q₁, K₂ Q₂ proportional to the lengths N' S', N₁ S₁, N₂ S₂ respectively, fig. 48, then O K', O K₁, O K₂ are the numbers of ampere turns required on the field magnets to produce the necessary field. Unfortunately the figures are too small to show how far the obviously-desired condition K' K₁ : K₁ K₂ = C' C₁ : C₁ C₂ is fulfilled.

But a consideration of the geometry of the various steps will show that if Q' Q₁ Q₂ are approximately in a straight line, the true characteristic of the machine will also be very nearly straight. Now, the earlier part of O Q is very nearly straight, so that the machine can be made to automatically regulate, provided that the current drawn from it is not such as to cause the field magnets to show any signs of approaching saturation. From O K₁ the number of turns in both sets of coils can be calculated, from K' K₁ that of the series coils alone.

The constancy of the external E.M.F., which the compound wound-machines of good makers maintain, is very remarkable.

Books.

A History of Cumberland. By RICHARD S. FERGUSON, M.A., Chancellor of Carlisle. Elliot Stock.

IN this contribution to the useful series of "Popular County Histories," the author takes a very much stricter view of his task than most of his predecessors. In fact, he begins by limiting himself to the somewhat narrow scope which the old-fashioned county historian took in the "General Introduction" prefixed to his ponderous volumes. Mr. Ferguson is probably right in thus interpreting a county history to mean a history of the county and nothing more, but this treatment of his subject has some very decided disadvantages. It precludes him from dealing with individual persons and places, and from varying his narrative with accounts of abbeys and churches, castles and manor-houses, and of the "worthies" who have helped to make their hitherplace illustrious. The result is that his book is not so entertaining to read as it might have been; but, on the other hand, it is extremely instructive, and affords as complete a history of the condition of Cumberland from prehistoric to modern times as one could desire. On the earliest period there is, indeed, little to be said, for up to the present time no implements of the Paleolithic Age have been found,

either in caves or river-drift, in any part of the North of England. Glaciers, in all probability, covered the whole area, and when these disappeared and the land was occupied by the Neolithic races, Cumberland was a tract of un-cleared forest, moor, and mountain, with, perhaps, three great meres filling the valley of the Eden. When the Romans invaded the country, it was little better in most parts than a cold and watery desert; the air was chilly and the sun but seldom seen. But however uninviting a region, the invaders thought it worth retaining, and the evidences they have left of their occupation of the land are among its most remarkable features. These are depicted with considerable skill by Mr. Ferguson, who takes the reader on a circular tour through the district, and endeavours to call up before his eyes what they would there have looked upon in the year 300 A.D.

The tourist and his guide find at Ravenglass,—now an insignificant town, with a harbour choked with sand,—a busy scene, full of craft loading and unloading. Wild-looking men from Hibernia are discharging cargoes of cattle, with a total absence of regard for what the cattle feel; while Spaniards and Italians, with much more care, are unloading from their craft great amphore full of wine, olives, anchovies, sardines, garum, and other luxuries which the Romans love, and have taught the Britons to love, or to pretend to do. In return they are shipping, among other commodities, large sporting dogs and dejected-looking natives, some of whom are recruits for military service, others to be sold as slaves. The beach is strewn with bales and packing-cases. Foreign sailors stroll to and fro, and mix with the soldiers of the garrison who are off duty, and chatter with the women of the town. By special invitation we take up our abode for the night in the Tribune's villa, and from the guests at his table we learn much as to the trade and commerce of the district, while the Tribune's wife shows us with pride a necklace of British pearls, collected from one of the rivers which form the harbour. She also calls our attention to the rose-coloured plaster of the walls, on which mythological and other figures are floating in mid-air, as it might be; while in a niche, in the western wall of one of the rooms, stands a marble bust of the Emperor, presented by himself to the Tribune.

What amount of truth there may be in this fancy picture of Roman Cumberland we will not pretend to say, but the extract will show that Mr. Ferguson is by no means a dry historian, dealing only with hard facts and figures. In truth, he is rather open to the charge of want of dignity in his treatment of history. Such expressions as, "No lapidary inscriptions, bar one, have been found at Ravenglass"; "The Celtic race was, compared with their non-Aryan, predecessors, a set of very ugly customers, &c., are unnecessarily lively, and the author's excursions into that land of freedom from whence derivations are brought back deserve the same epithet. He tells us, for instance, that from the Danish term *by*, corresponding with the Saxon *ton*, we get "hye-laws"—i.e., "town laws," and that the *lug-mark*—a bit cut out of a sheep's ear that it may be recognised by its owner—is really the *lög-mark* or legal mark, from the Icelandic *lög*, i.e., law. We are quite ready to recognise the great influence on the nomenclature of the district exerted by the Scandinavian settlers, but its acceptance will not be promoted by such advocacy as is here involved.

We cannot follow Mr. Ferguson in tracing the gradual growth of the kingdom of Cumbria,—the name seems to have been first applied to the district of Galloway, Strathclyde, and parts around Carlisle at the end of the ninth century,—nor the Norman settlement, with the various baronies into which the territory was carved. The subject is well treated by Mr. Ferguson, who seems to have a very complete knowledge, not of the country only, but of its successive lords. He gives an excellent account of Carlisle, a royal city, enjoying special privileges; and the narrative of Border warfare,—peculiar to no one age, but becoming systematic and for a set purpose in the reign of Henry VIII. and afterwards,—is extremely good. An entire chapter is rightly given to the risings in '15 and '45, and one may say that with the Battle of Culloden the history of Cumberland comes to an end. There was, indeed, a contest of another character between the Pentricks and the Lowthers, which was fought out to the bitter end in the eighteenth century, and of this Mr. Ferguson has given a full account; but of other

incidents the county chronicle is destitute. By slow degrees commerce and agriculture have improved, and with the development of the latter, and the consequent enclosure of common lands, the manly race of "statesmen" (estatesmen) has decayed, and is fast dying out. However inevitable the circumstance, we cannot but regret it. We remember, with gratitude, what all England owes to it.

Factory Accounts, their Principles and Practice.
By E. GARCKE and J. M. FELLIS. London: Crosby Lockwood & Co.

THE accountant of bygone days would find that the modern methods of production had, in many instances, rendered it necessary for him to multiply his books and greatly extend his operations. Indeed, the different branches of work in a large manufactory present many distinct features, each requiring a separate education; and our authors show that the "works" accounts of a factory,—as distinct from the office or commercial accounts of the same concern,—may advantageously be treated on a scientific basis. The sooner the rough-and-ready element is made to give place to systematic and accurate records, the more satisfactory it always proves both to employer and employed. We have recently commented upon the disinclination frequently evinced by the latter, in the case of strikes, to accept corroboration from books of the statements made by their employers. Their view is, probably, that books and figures can be made to prove anything, and that they themselves are powerless to prevent undue advantage being taken of this. Our authors' opinion upon this point is that, under a well-organised system of factory accounts "each employer feels that he is contributing to the attainment of accurate records of costs; and thus, on the occasion of strikes, have less hesitation than they otherwise would in accepting the results shown by the books as correct, and as based upon fair principles." This satisfactory state of things, we apprehend, will hardly be brought about until the workman is also educated up to a more intelligent and correct idea of the real nature of the relations between himself and his work on the one hand, and his employer and his capital on the other,—points which the leaders of some of the recent strikes have persistently misrepresented. This was particularly noticeable during the recent strike at the Spillegate Ironworks, Grantham,—a case, of course, in which the authors' remarks would apply with more force than in those of the miners and dock labourers. The work before us deals exhaustively and clearly with all the multifarious details of the different departments of factories, and is copiously illustrated by specimen rulings and useful diagrams. Among the important matters dealt with in the appendices are the Acts relating to Income-tax, Insurance, and Rating of Machinery. The latter subject is of especial interest at the present time, as it is once more before Parliament. Several cases and authorities are quoted, full reference being given throughout the book for such quotations. It is carefully arranged, and is accompanied by a short glossary of terms, and a very complete index.

VARIORUM.

"FIRE BRIGADE DRILLS, with Hints on Management," and "Rules and Regulations for Volunteer and other Fire Brigades," are two very excellent little handbooks, just re-issued in new and revised editions by Messrs. Shand, Mason, & Co., of Upper Ground-street, Blackfriars. The first-named handbook is supplemented by some useful rules for ambulance work. The second of the two handbooks is prefaced by a hint that the use of the term "volunteer," as applied to fire-brigades, should, as far as possible, be avoided, "as its use has been made the excuse for non-payment of legitimate charges for assistance and appliances by insurance offices, and also owners of property, who have suffered by fire." So mean and paltry an excuse has, we regret to learn, "been admitted in more than one test case before eminent judges." This handbook gives some very useful directions to be observed by inmates of buildings in the event of fire, the precautions to be taken against the occurrence of fires, and hints on the choice and management of petroleum lamps. The two handbooks together will be found very useful in large establishments and public institutions.

—The Year-book of Photography and Pho-

topographic News Almanac for 1890" (London: Piper & Carter) purports to contain "the results of photographic experimenting during the year 1889, and special contributions by leading photographic authorities, professional and amateur." Dry-plates and other improvements have made photography so popular as an aid to the student and the tourist that we can have no doubt as to the utility of the "Year-book" now before us, which contains lists of photographic societies and clubs, standard formulæ and memoranda, and a great mass of information on photographic subjects. It also contains a portrait of the distinguished French savant, M. Alexandre Edmond Becquerel, who has done much for photography.

—"The Handbook of Stations, Junctions, Sidings, Collieries, &c., on the Railways in the United Kingdom," by Henry Oliver and John Airey, of the Railway Clearing-House, London (published there and by McCorquodale & Co.), has now reached its seventh edition. It is alphabetically arranged, and purports to show "the accommodation at each station, maximum crane-power, country, railway on which situated, and exact position." It is clearly arranged and well printed, and cannot but be found useful in every business house.

—"The Garden Oracle" for 1890, by Shirley Hibberd, Editor of the *Gardeners' Magazine* (London: 4, Ave-Maria-lane), has now attained to its thirty-second year of publication—a fact which in itself attests the value and usefulness of this "illustrated floricultural year-book," to give it its subsidiary title.—Index to the First Volume of the Parish Registers of Gainford, in the County of Durham. Part II. Marriages: 1569-1761" (London: Elliot Stock). This is the second instalment of a very useful though unpretending work, the first part of which we noticed last year. The compiler, whose name does not appear on the title-page, is setting an example which might be followed with advantage by people of leisure and means in other parishes. Such work deserves the thanks of antiquaries, genealogists, and historians. The vicar, we understand, is bearing the cost of printing the work.

—New Zealand's material resources and commercial activity are very clearly treated of in "Two Addresses by the Presidents of the Chamber of Commerce, Canterbury, N.Z., in 1886 and 1889, and now republished by Messrs. Wm. Clowes & Son (Limited), Charing-cross. The address for 1886 is by Mr. G. G. Stead, and that for 1889 by Mr. A. Kaye." The *Asclepiad*, No. 25, vol. vii. (London: Longmans, Green, & Co.) is the most recently-issued part of what claims to be "a book of original research and observation in the science, art, and literature of Medicine, preventive and curative." It is entirely written by Dr. B. W. Richardson, F.R.S., and, needless to say, contains a good deal of matter interesting to the sanitarian and even to the "general reader." Dr. Richardson has been known for many years as a "cyclist" and a friend of "cycling;" but in his article on "Cycling and Physique," in the present number of the *Asclepiad*, he strongly deprecates the too ardent pursuit of that means of physical exercise. Without laying down as a hard and fast rule that cycling ought never to be commenced by boys or girls, Dr. Richardson says he is satisfied that "it is always best to delay the commencement of cycling until the body is closely approaching to maturity." There is an interesting monograph, with portrait, of Alexander Monro, M.D., F.R.S., the founder of the Edinburgh Medical School. "Monro Primus," as he is called, to distinguish him from his son Alexander, was born in 1687, and died in 1762. He was mainly instrumental in building the first Edinburgh Royal Infirmary (rebuilt some fifteen or twenty years back), and assisted the architect Adam (not "Adams," as Dr. Richardson, or the printer, puts it) in planning it. The work of erecting the Infirmary was, it appears, taken up by the inhabitants with great spirit and unanimity. "The proprietors of many stone quarries made presents of stone, others of lime; merchants contributed timber; carpenters and masons were not wanting in their contributions; the neighbouring farmers agreed to carry the materials gratis; the journeyman masons contributed their labours for a certain quantity of hewn stones; and, as the undertaking was for the relief of the diseased, maimed, and lame poor, even the day labourers would not be exempted, but agreed to work one day in the month gratis towards the erection of the building." As Dr. Richardson remarks, this

is a very pleasant picture of sympathetic devotion to a great work.—*Science for All* is the title of a new serial work, the issue of which has just been commenced by Messrs. Cassell & Co., Limited (Bell's Sauvage-yard). Part I, which is before us, gives as a frontispiece a diagram printed in colours, showing the order of succession of the various rocks composing the crust of the earth, with an especial reference to those found in England. The work is clearly printed on good paper, and is well illustrated. One of the most interesting articles in Part I. is on "A Piece of Limestone" written by Prof. H. Alleyne Nicholson. The new serial is likely to meet with wide appreciation.—*Cassell's Family Magazine*, which issues from the same press, continues to maintain its reputation for varied and interesting reading. One of the best articles in the April number is on "A Yorkshire Dale," by T. Vickars-Gaskell. It is well illustrated.—*The Leisure Hour* (published at 56, Paternoster-row) for March contains an interesting article on "The Newspaper Printing Press of To-day" with special reference to "cut-work." The various "processes" by which blocks are made, and the methods of printing them, are described in detail. Some useful hints are given for the guidance of draughtsmen who have to prepare drawings by reproduction by "process." The April number of the same periodical gives an interesting "unwritten chapter" about Chat Moss, upon which it appears that Mr. William Roscoe introduced a railway, designed by Mr. Robert Stannard about the year 1816. The railway was designed to assist in the work of cultivating the Moss, and the rails were of wrought iron, like inverted V, thus \wedge , the wheels being V-grooved so as to fit the rail.—*The Sunday at Home* published at the same office, contains, in its April number, a second series of "bell mottoes" collected by Mr. W. J. Gordon. It also gives an illustration, by permission of Messrs. Doulton of Mr. George Tinworth's terra-cotta panel "At the Foot of the Cross."—Among other magazines reaching us from the same office are the *Boys' Own Paper* and the *Girls' Own Paper*, both of them excellent publications for youth. The two last numbers of the *Girls' Own Paper*, for March and April, contain interesting articles by Mrs. Holman Hunt describing Mr. Flinders Petrie's discoveries in "The Fayum," Egypt, copiously (somewhat roughly and "sketchily") illustrated. The same two numbers also contain articles on "Celebrated Monuments of Eminent Women," very ably illustrated by page engravings by Taylor from drawings by Mr. H. W. Brewster. The monument illustrated in the March number is that of Lady Berry, in Stepney Church, whose name is associated with the well-known legend of the ring and the fish. The April number gives an account and illustration of Lady Bankes's monument in Risleip (or, as it is not spelt, Ruislip) Church, near Pinner, Middlesex.—*The Church Monthly* (edited by Frederic Sherlock, and published at 30, Bridge-street, Westminster) is perhaps the best of the cheap magazines available for parochial circulation. It is published for a penny, is varied in its contents, and fairly well illustrated. One article in the March number is on the interesting parish church of Holy Trinity, Dartford, of which two illustrations, specially engraved from photographs, are given. The article is written by Mr. Robert Crane, who refers to the discovery, in 1833, of an ancient fresco, measuring some 20 ft. by 12 ft., illustrating the story of St. George and the Dragon. The writer says that this fresco was formerly fully visible, but that some years back the organ was placed in front of it (almost completely obscuring it) by the vicar, the Rev. J. G. Blomfield, M.A., and his cousin, Mr. (now Sir) Arthur Blomfield, the well-known architect. Can this statement be correct?—"Everybody's Pocket Cyclopaedia of Things Worth Knowing, Things Difficult to Remember, and Tables of Reference" (London: Saxon & Co.) is a useful little book, but we see this without being able to guarantee its accuracy in all respects. Some of the matter under the heads "Architectural" and "Science" is questionable. The book sells for 6d.—Shelle & Co.'s "Complete Press Directory for 1890" (published at 5, Leadenhall-street, E.C.) is a very handy publication for the office. It is a special feature of its own, not the least useful being a summary of the leading newspaper cases for the year 1889, recording important decisions affecting copyright and the law of libel. It is well printed and arranged, and sells for 1

Maps.

FROM Mr. Edward Stanford, of Cockspur-reet, we have received two useful maps of London. One of them shows the areas granted to the electric light companies under the Electric Lighting Acts of 1882 and 1888. The areas granted are mostly at the West End. The East End is not at present interfered with by any of the companies, but a considerable portion of the south-eastern district has been allotted to the London Electric Supply Corporation. The other map shows railway and tramway lines, and other works (including those proposed by the London County Council) for which powers are being sought in the present session of Parliament. Both maps are clearly printed and coloured, and will be found very useful for reference.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

8,019, Ventilation by Sash-windows. W. Macdonald.

This invention consists in placing a continuous sheet of wood or metal to block up the bottom sash. This piece is formed with a rebate and head behind the sash, and is supported by a series of small pieces of wood or metal, which are fixed to the sash. This block is in position when the sash is lowered, and is some distance above the meeting-rail of the upper sash, and the space thus maintained is a continuous source of ventilation all along the length of the sash.

8,129, Parquetry. S. Ingham (and others).

The ordinary method of making and fixing parquetry is to prepare the small pieces or patterns in the workshop, afterwards fixing them upon the floors already laid to receive them. This is laborious and costly, and the present invention is designed to remedy this. The pieces of prepared parquetry are attached at the manufactory to suitable lengths of floor-boards, passed through thickening and smoothing machines, then taken to the floor, and fixed in large or small blocks or sections cut by the workman to fit special positions when necessary.

8,182, Kitchen Fireplaces. J. Burford.

According to this invention, swing and movable grates are used for the bottom and front of the grate, which being actuated admit of the height of the fire being kept uniform relatively to the height of the opening at back, but varying the height of the fire at front. Arrangements are also incorporated in the improvements for increasing and directing the draught.

8,444, Sash-fastener. W. Macdonald.

In order to effectually secure the windows to which the improvements noted in the first paragraph (8,019) have been fitted, the inventor has designed a special fastener, which consists of a piece of metal screwed to and projecting from the inside of the window-frame, and through this works a pin or bolt, secured into a hole on the upper sash. There being only two or a limited number of holes the sash can only be raised a certain height.

8,795, Roofing, &c. A. N. Ford.

In manufacturing an improved material for roofing, wire netting of a suitable mesh is, according to this invention, secured into a fabric such as canvas. This is passed through a series of rollers, and a heated liquid composition is fed on to the material.

8,808, Plasterers' Lathing. B. Westerdahl (Sweden).

This improved lathing consists of a series of wood strips of angular shape, connected together by means of wires, which wires are twisted together between each pair of splints, preferably in different directions on opposite sides of the same splint.

NEW APPLICATIONS FOR PATENTS.

April 1.—5,029, J. Treloning and J. Westaway, Improv'd Curtains for Theatres, &c.—5,082, J. Hinge or Fastener.

April 2.—3,096, O. Wagner and E. Howard, Patentings for Windows.—5,104 and 5,105, H. Ver, Automatic Sash-fastener.—5,112, T. Collen 1 R. Wilson, Opening and Closing Window-frames.—5,118, H. Beeson, Machinery for Beveiling Sashes.—5,129, J. Plumridge and others, Band Sashes.—5,181, J. Gillespie, Water-closets.

April 3.—5,175, G. Shanks and others, Stock and Bindings for Brick Moulds.

April 5.—5,268, S. Jennings, Draw-off Taps for Cans, &c.—5,270, G. Jennings, Removable Stoppers for Manhole Covers, &c., for Drainage Purposes, &c.

April 8.—5,310, Sharp, Roofing with Slates.—5,311, C. Weber and C. Freeman, Artificial Stone Tiles, &c.—5,363, S. Chambaz and L. Schmid, Sash-keepers.

If we read this description aright, something very like it has absolutely identical to what appears to be described, has been in use for many years.

April 9.—5,403, J. Smeaton, Flushing and Water-waste-preventing Apparatus for Closets, &c.—5,415, W. Horn, Brick-machine.

April 10.—5,459, W. Vears and others, Storage Cisterns or Water-waste Preventers.—5,466, W. Thompson, Hiding Doors or Window Sashes in a more or less open position.—5,475, A. Booth, Sawing-machines.

April 11.—5,515, P. Justice, Material for Building Purposes.—5,533, O. McLean, Asphalte Paving.

April 12.—5,544, J. Prida, Cowl or Ventilator.—5,554, G. Salter and H. Trubshaw, Locks and Latches.—5,555, T. Benson, Ventilating Rooms and Buildings.—5,572, W. Millington, Tubular Boiler for Fireplaces or Stoves.—5,581, G. Skalsey, Cement Kilns, &c.—5,588, R. Chantray and W. Peters, Water Waste Preventers.—5,593, H. Newey, Water Waste Preventing Cistern for Flushing Closets, &c.—5,595, W. Ingram, Adjusting Spirit Levels to any required gradient.

PROVISIONAL SPECIFICATIONS ACCEPTED.

2,828, R. Friend, Opening and Closing Skylights, &c.—3,162, J. Merryweather, Paving Material.—3,340, S. Sutcliffe, Hinge.—3,346, F. Barnett, Low-level Composite Bridges.—3,671, B. Mills, Hinges and Door Checks.—3,994, J. Anderson, Morticing Machines.—4,129, G. Sykes, Window Fasteners.—4,316, J. Day, Sash Fasteners.—4,377, J. Marsh, Attaching Door-knobs or Handles to Spindles.—4,497, J. Bradley, Hot Water Apparatus.—4,504, E. Lee, Kiln for Burning Bricks.—4,603, C. Mackey, Roses of Door-knobs, &c.—3,431, J. Naylor and H. Williams, Moulding and Pressing Sandry Bricks.—3,459, J. Thomas and T. Stabb, Raising and Lowering Window Sashes.—3,882, T. Birtwistle, Safety Hinge for Folding Ladders.—3,883, C. Whitfield, Fireplaces.—3,942, G. Smith and B. Cooper, Joining Lead Pipes.—4,147, E. Miller, Wood Working Machinery.—4,155, C. Crosby, Firegrates.—4,289, J. Cullen, Gas Bracket and Pendant.—4,662, J. Bayly, Beveiling Square.—4,705, G. Tweedy and E. Lanrouca, Wood Blocks, &c.—4,735, F. Averil, Flush Bolts.—4,900, R. Roberts, Chimney Tops, &c.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

8,511, E. Bussy, Bricks, White Enamel, &c.—8,554, F. Davies, Fastenings for Doors, &c.—14,787, A. Mitchell, Joint for Drain-Pipes, &c.—17,447, E. Christie, Door Chain and Latch.—18,249, J. Wilson, Fireproof Hinges, &c.—19,724, H. Aland, Fans for Producing or Inducing Currents of Air.—205, W. Kneen, Attaching Door Knobs to their Spindles.—2,619, J. Schultz and E. Hopf, Flooring for Roofs, &c.—2,966, G. Bayley, Fastenings for Window-sashes.—9,045, G. Belling, Window-sash Fastener.—10,524, J. Brunton and L. Griffiths, Mixing Materials for making Artificial Stone, &c.—16,214, A. Bout, Metallic Crossbars.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

April 14.—By C. D. FIELD & SONS. Covent Garden—206, Wellington-st., &c. £209. Southwark—206 and 208, Southwark Pk.-rd., 30 yrs., &c., £13. 2s.

Kilburn—11, 12, and 13, Alpha-mews, ut. 67 yrs., &c. £11. 10s., &c. £75.

April 15.—By H. HAINES & SON (at Mason's Tavern). Hackney—2 to 12 (even), Frampton Pk.-rd., ut. 65 yrs., &c. £48. £166.

Wandsworth.—By A. G. THOMSON & CO. Nos. 110 to 6, Levanth-rd., ut. 72 yrs., &c. £45.

Stroud Green—25, Albany-rd., ut. 94 yrs., &c. £10.

City.—The letting of 34, Old Change, area 6,420 ft., realised £1,200 pa.

Camberwell—25 and 27, Chumley-st., ut. 15 yrs., &c. £6. 16s., &c. £44.

Hyde Pk.—154, Westbourne-ter., ut. 92 yrs., &c. £5, &c. £140.

Oakley-sq.—No. 39, ut. 64 yrs., &c. £23, &c. £200.

Camberwell—Frg. of 442, with reversion in 8 yrs. Charing Cross—Moisty of 13 and 13a, Cockspur-st., ut. 47 yrs., &c. £200.

Fulham-rd.—Nos. 227, 229 and 231, f. r. £225 pa.

Nos. 69 and 73, Fulham-rd., f. r. £290 pa.

Nos. 18 and 19, York-mews, f. r. £30 pa.

Brompton-rd.—Nos. 48 to 54 (even), Chapel-pl., f. r. £106. 8s.

Fulham-rd.—Nos. 243 and 245, ut. 22 yrs., &c. £20, &c. £150.

Nos. 96, 98, 102 and 104, Fulham-rd., ut. 60 yrs., &c. £240, &c. £445.

Nos. 80 and 92, Fulham-rd., ut. 61 yrs., &c. £20, &c. £292. 15s.

By WILKINSON, SON & WELCH (at Brighton). Brighton, Norfolk-buildings—Sets of stabling, f. r. 6, Norfolk-buildings, ut. 13 yrs., &c. £40.

5, Victoria-rd., f. r. £40 pa.

6, Chilton-pl., f. r. £32 pa.

High-st.—"The Royal Albert" beer-house, ut. 9 yrs., &c. £1. 11s. 3d.

April 16.—By MOORE & TEMPLE. Canonbury—39 and 32, Northampton-pk., ut. 36 yrs., &c. £2. 13s.

By A. RICHARDS—(At Enfield). Enfield—The Old Post-office, &c. £500.

By LUCKHURST & LLOYD. Clapham, Cavendish-rd.—"Turret House," f. r. 600.

By CANE & CO. East Dulwich—63, Oakhurst-grove, ut. 77 yrs., &c. £10, &c. £33.

By MOSS & JAMESON. Brixton—F Block of stabling, f. r. 540 pa.

By D. YOUNG. New Cross-rd.—Nos. 233 and 235, ut. 55 yrs., &c. £14, &c. £100.

By G. RAWLEY CROSS. Chiswick—"Rupert House," and a plot of land, f. r. 2,110.

West Kensington—75, Westwick-gardens, f. r. 590.

Shepherd's-bush-rd.—No. 31, ut. 38 yrs., &c. £23, &c. £69.

West Kensington—Frg. of £49, with reversion in 88 yrs.

April 17.—By A. H. SAYAGE & SON. Mile End-rd.—Nos. 469 and 471, ut. 121 yrs., &c. £28.

By PENNING & DANIEL. Kensington—33, Victoria-rd., ut. 40 yrs., &c. £12.

By SEAGRAVE, TAYLOR, & CO. Pentonville, Warren-st.—A range of stabling and warehouses, ut. 50 yrs., &c. £62.

By NEWBORN & HARBING. Stoke Newington—21 and 23, Woodland-row, ut. 74 yrs., &c. £10, &c. £52.

By FARREBROTHER, ELLIS, & CO. Lee-rd.—Frg. of £30 pa., with reversion in 71 yrs.

Frg. of £210 pa., with reversion in 26 yrs.

Frg. of £10 pa., with reversion in 23 yrs.

High-rd.—"The Prince Arthur" beer-house, f. r. £45.

Nos. 202 to 272 (even), High-rd., f. r. £227.

Frg. of £8 pa., with reversion in 63 yrs.

By MULLETT, BOOKER, & CO. Hyde Pk.—33, Connaught-sq., ut. 33 yrs., &c. £15.

2, Cumberland-mews, ut. 25 yrs., &c. £3.

By E. STIMSON. Peckham—19 and 21, Kirkwood-rd., ut. 75 yrs., &c. £10.

Walworth—14, Sutherland-sq., f. r. £32 pa.

New Cross—3, Casella-rd., ut. 67 yrs., &c. £5.

f. r. £36.

14, Casella-rd., ut. 67 yrs., &c. £5, &c. £28.

Southwark—31, Merrick-st., ut. 35 yrs., &c. £6.

30 and 31, Great Bland-st., ut. 61 yrs., &c. £9.

f. r. £92. 8s.

Lambeth—25 and 27, Glasshouse-st., f. r. £66.

Walworth—83, Lorrimer-rd., ut. 61 yrs., &c. £5.

By A. H. TURNER & CO. City—12, Crane-cr., f. r. £55 pa.

Brayton-sq.—35, Brown-st., ut. 11 yrs., &c. £10, &c. £10.

St. Luke's—62, Moreland-st., f. r. £20.

Hampstead, Holy Mount—"Hollybush Cottages," &c. £25.

Talington—6, Prospect-pl., f. r. £20.

St. Luke's—62, Moreland-st., f. r. £20.

Hendon—f. r. of £145. 4s., with reversion in 76 yrs.

April 18.—By J. T. AYTON. Bethnal Green—88 and 92, Green-st., ut. 20 yrs., &c. £10. 6s.

45 and 47, Nottingham-st., ut. 18 yrs., &c. £10, &c. £41. 12s.

Mile End—274 and 276, Burdett-rd., ut. 71 yrs., &c. £14, &c. £84.

By VENTM, HULL, & COOPER. Kilburn—127, High-rd., ut. 21 yrs., &c. £70, &c. £130.

(Contracts used by these Messrs.—Frg. for freehold ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for improved ground-rent; g. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.)

MEETINGS.

SATURDAY, APRIL 26. Association of Municipal and Sanitary Engineers and Surveyors.—Home District Meeting at Acton, Ealing, and Hampton.

Royal Institution.—Captain W. de W. Abney, F.R.S., on "Colour and its Chemical Action." II. 3 p.m.

Junior Engineering Society.—Visit to the Deptford Central Station Works of the London Electric Supply Corporation.

MONDAY, APRIL 28. Surveyors' Institution.—Mr. F. Marshall on "The Principles of the Exemption of Public Undertakings from Rateability." 8 p.m.

Leeds and Yorkshire Architectural Society.—7.30 p.m.

TUESDAY, APRIL 29. Institution of Civil Engineers.—(1) Further discussion on Sir Frederick Bramwell's paper on "The Application of Electricity to Welding, Stamping, and other Cognate Purposes." (2) Mr. J. Robinson on "The Barry Dock Works." 8 p.m.

WEDNESDAY, APRIL 30. Civil and Mechanical Engineers' Society.—Presentation of Report and Election of Council. 7 p.m.

Society of Arts.—Mr. T. R. Dalmeier on "Photographic Lenses." 8 p.m.

THURSDAY, MAY 1. Guild and School of Handicraft.—Mr. E. Prieleau Warren on "Parlour Architecture." 8 p.m.

Society for the Encouragement of the Fine Arts.—

Mr. Phil. R. Morris, A.R.A., on "Impressionism, Realism, and Philistinism."

Institution of Mechanical Engineers.—(1) The President, Mr. J. Tomlinson, will deliver his Inaugural Address. (2) Paper by Professor A. B. W. Kennedy, F.R.S. 7.30 p.m.

Royal Archaeological Institute.—(1) The Worshipful Chancellor Ferguson on "Dunbar Grenadiers from the County Hotel, Carlisle." (2) Mr. J. P. Harrison on "Anglo-Norman Ornament Compared with Designs in Anglo-Saxon MSS." 4 p.m.

Society of Arts.—Mr. Lewis F. Day on "Design Applied to Wood-carving." 8 p.m.

Royal Institution.—Annual meeting, 1.30 p.m.

FRIDAY, MAY 2.

Architectural Association.—Mr. Keith D. Young on "Hospitals." 7.30 p.m.

Institution of Mechanical Engineers.—Ordinary General Meeting (continued). 7.30 p.m.

SATURDAY, MAY 3.

Royal Institution.—Captain W. de W. Abney, F.R.S., on "Colour and its Chemical Action." III. 3 p.m.

Miscellaneous.

Kells Abbey.—Mr. Webb is about to bring under the notice of the Chief Secretary for Ireland a state of things which would have moved Monkbarons to righteous anger, and the story of which Sir John Lubbock, the author of the Ancient Monuments Protection Act, will scarcely hear without a shudder. It is stated that a portion of the Abbey of Kells, County Kilkenny, is being used for building walls elsewhere; that the ruins at Kilmallock, some of the finest in Ireland, urgently need protection; that the great tombs at Rathmore are being carted away to repair the neighbouring roads; and that there are numerous other instances in which, if immediate steps be not taken, ancient Irish monuments of great interest will be seriously injured, and possibly destroyed. Existing statutes, it seems, afford no sufficient protection in such cases, and Mr. Webb asks whether there is any intention of legislating with a view of preserving these interesting relics of the past. Surely there should be no difficulty in getting a short Bill through which should effect this desirable object. — *Daily Chronicle.*

Association of Municipal and Sanitary Engineers and Surveyors.—The ninth voluntary pass examination of candidates for the offices of municipal engineers and surveyors to Local Boards, carried out by this Association, was held at the Institution of Civil Engineers on Friday and Saturday, the 18th and 19th inst. Nine entered for the examination, the written portion of which was taken on the first day. The greater portion of the second day was occupied with the *visu mee* portion of the examination. The examiners were—(1) For Engineering as applied to Municipal Work, Mr. Joseph Lobley, M.Inst.C.E., Borough Engineer, Hanley (Past President); (2) Building Construction, Mr. Jas. Lemon, M.Inst.C.E., F.R.I.B.A., Consulting Engineer, Southampton; (3) Sanitary Science, Mr. C. Jones, A.M.Inst.C.E., Surveyor to the Local Board, Ealing; (4) Public Health Law, Mr. T. De C. Meade, A.M.Inst.C.E., Surveyor to the Hornsey Local Board. The next examination will be held in London in October, 1890.

Vienna.—According to the *Wochenschrift des Nieder-Oestr. Generebe Dereins*, 371 buildings, with 5,739 dwellings, have been officially surveyed and given over for public use during the year 1889. Only sixty-two houses, with 727 lodgements, have been pulled down during the same year, and hence the number of dwellings in the Austrian capital has been increased by 5,012, a number far too high in proportion to the increase of population. If this unreflecting activity in the building trade continues, the time for the prophesied "crash" cannot be far hence.

Bank of Spain, Madrid.—We are informed that this large building is to be heated throughout with hot water, and that Mr. Renton Gibbs, of Liverpool, has secured the contract for this part of the work. It is one of the largest contracts of the kind ever undertaken by any firm of heating engineers, and will occupy about six months to complete. There will be no less than twelve miles of piping and twenty-one of Mr. Gibbs' largest boilers, besides 119 coil-cases.

Royal Academy: Architectural School.—The course of lessons on Architectural Modelling has terminated for the session, and Mr. Stannus will commence a series of demonstrations on "Architectural Ornament: in Panel, Frieze, and Capital" on Monday, May 5, at 6.15 p.m.

Weighing Machinery.—At a meeting of the Society of Engineers, held at the Town-hall, Westminster, on Monday, the 14th inst., Mr. Henry Adams, President, in the chair, a paper was read by Mr. William Henry Brothers on "Weighing Machinery and Automatic Apparatus in connexion therewith." The author commenced by commenting on the interest which was beginning to be felt in weighing machinery. He thought it surprising that so little was popularly known of the scientific principles which underlie the construction of appliances of such general utility. There were extant one or two pamphlet treatises on the balance, and fugitive articles were to be found in the encyclopedias, but there was no standard literature on the subject in the English language. The increased interest in weighing machinery was probably due to recent legislation, rather than to the peculiar mechanical conditions which it exemplified. The author pointed out that the Weights and Measures Act of last Session removed a glaring anachronism in previous enactments, in that it provided for the verification and stamping of weighing instruments, whereas those operations had hitherto been confined to weights. The demand for accurate and reliable weighing instruments was on the increase, the many-sided requirements of trade could not now be content with the simple balance with equal or with unequal arms—the *libra* and *statera* of the Romans—and many important improvements in such apparatus had been devised for the convenience of the public. The statement that the fundamental principles of the balance remained unchanged from the earliest times, preceded a description of the American torsion balance, which aimed at superseding the knife-edge fulcrum. Weighing machinery in this country was shown to be of an exceedingly diversified character, adapted to the various purposes of trade. The author pointed out how obviously unreasonable it was to expect weights and measures inspectors, who were, as a rule, without technical or mechanical training—to adjudicate intelligently upon the complicated weighing machinery in use at the present day; and referred to the new edict requiring all newly-appointed inspectors to pass a technical examination. If to this guarantee of a certain degree of special knowledge in inspectors were added the official recognition of such forms of weighing instruments only as would answer to scientific requirements, and not tend to the commission of fraud, the author confidently anticipated that the weighing apparatus in use in the United Kingdom would eventually come up to a standard of excellence commensurate with the importance of the work it was called upon to perform. The German laws relating to weights and measures were cited as worthy of imitation in many respects; and several notable precision balances of English make were described in proof that the British manufacturer is not behind his competitors of other countries. The author then proceeded to trace the gradual evolution of automatic weighing apparatus, from the simple but ineffective pendulum balance down to the Snelgrove electric self-operating and self-indicating weighing machine, manufactured by Messrs. Avery, of Birmingham. A number of automatic machines were passed in review, most of them being illustrated by diagrams.

New Buildings for the Salvation Army.—At Walthamstow six large shops and "Citadel" buildings, capable of accommodating 1,000 persons, are to be erected in the High-street, for the Salvation Army. The total cost will be about 4,500. Mr. J. Williams Dunford, of London, is the architect.—At Sunderland, the site of the old Lyceum Theatre, which has been vacant for some time past, situate off High-street, has just been acquired by the Salvation Army for 2,000. Mr. Dunford is preparing plans for the erection on the site of a large "Citadel" capable of accommodating 3,000 persons, at an estimated cost of 3,500.

The Turners' Company again offer their Silver Medal, the Freedom of the Company, 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 of turning in pottery, stone, and glass. The specimens must be sent in during the week ending October 25. Further particulars can be obtained from Mr. Edgar Sydney, at 53, Gresham House, Old Broad-street.

The Lighting of Warehouses.—The greatly increased value of land, and the overcrowded state of buildings in the City of London frequently oblige warehousemen and merchants, wishing to extend old premises or to erect new ones, to build them either in whole or in part in positions where day-light cannot be obtained by ordinary windows either in front, back, or sides. A possible means of obviating these difficulties to a very great extent is now to be seen in a large block of buildings situated in such a position that ordinary windows are not possible. We refer to the large extensions which the Fore-street Warehouse Company have recently made to their premises at the back of Fore-street. The architect is Mr. Herbert Ford, of 21, Aldermanbury. The extensions consist of two blocks having an area of about 4,000 ft. and 2,100 ft. respectively, and both blocks are practically roofed with polished plate-glass in large squares (9 ft. by 2 ft.). To accomplish this Mr. Ford has availed himself of the Bessemer steel lead-clothed glass (British Patent) system of glazing. The large plates of glass are held firmly in their places by means of a narrow frame of steel and lead, which automatically allows for expansion and contraction, and also makes a water-tight joint impervious to rain or dust. The light thus admitted at the top is, with little interruption, flooded down and distributed by means of galleries on the different floors over the whole area. Goods, we are assured, can be most perfectly seen and their texture and colour matched in any part of the building, even in the basement. Roofs glazed on the above plan (of which there are a good many now in the City) are exceedingly light, and at the same time very strong. We called attention to this method of lighting four years ago.

The Architectural Association Soiree was held on Friday, the 18th inst., in the Westminster Town-hall. There was, as usual, a large attendance of members. The first part of the programme consisted of a concert, in which Messrs. C. D. Imhof, J. Dixon Butler, A. C. Bulmer Booth, E. A. Lambert, Edgar H. Homan, Arthur Thomas, C. Gordon Killmister and Captain J. Watson took part. The songs of Captain Watson and Mr. Arthur Thomas, and the violin performances of Messrs. Lambert and Homan, received well-merited encores. The second part of the proceedings consisted of what was described on the programme as "Grand Variety Entertainment," entitled "Looking Forward, or a Professional Meeting of the Future."—The very remote future, we may safely say, it was, in fact, a "palger entertainment." The President of this "meeting of the future" wore a full-bottomed wig and a purple robe, and his address dealt with and "afforded an easy solution" of "many of the much vexed topics of the time," including professional education, examination, and registration. There were a few striking "bits" in the dialogue, which was interspersed with songs and dances. Questions of professional practice, such as the of competitions, were humorously dealt with by "the meeting," and jokes were cracked at the expense of "good old 'Gwilt.'" The performers in this amusing travesty were Mr. H. O. Creswell ("President"), Messrs. A. C. Bulmer Booth and C. H. Brodie ("Secretaries"), Messrs. J. Dunn, P. Bowyer, R. Welsford, and T. Rutter (banjoists); Mr. E. Garth (singer); Mr. C. G. Killmister (pianoforte), Mr. S. J. Beale (bones), and Mr. E. A. Lambert (tamboourine). They all acquitted themselves well of their several parts.

Fine Art Exhibition at Cordwainers' Hall.—An interesting exhibition of works of art was opened on Monday last, in the Hall of the Worshipful Company of Cordwainers, 3, Cannon-street, E.C. All the pictures and other works exhibited are the property of members of the Company, there being no outside exhibitors. Though the number of contributors is small, the collection is very interesting one, including as it does pictures by George Morland, F. Sand Teniers, Wouvermans, Wynants, Terburg, C. Greuze, Nicolas Poussin, Old Crone, Constable and other masters. There is also a good sh of engravings by Albert Durer, Bartolozzi, and others. Water-colours, miniatures, porcelain and pottery, bronzes, and rare printed books are also well represented. The only exhibits all associated with the craft over which the Cordwainers' Guild formerly held sway are good ancient and modern specimens of book-binding. The exhibition will remain open every week-day from 11 a.m. to 6 p.m. until May 1.

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 entries like Construction of Mixing House, Sewage Works, Erection and Completion of Parcelled Buildings, etc.

PUBLIC APPOINTMENTS.

Table with 5 columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Includes entries like Temporary Assistant, County Surveyor's Office, Borough Surveyor, etc.

BISHOP'S STORTFORD.—For the erection of a new police-station, &c., at Bishop's Stortford, for the Standing Joint Committee of the Quarter Sessions and the County Council for Hertfordshire. Mr. Urban Smith, County Surveyor, architect. Quantities by Mr. Alfred Barr.

HEMEL HEMPSTEAD.—For the erection of a new Congregational Church and Sunday-school classrooms. Mr. A. Fisher, architect, Hemel Hempstead. Quantities supplied.— Church. Class-rooms. Total.

BLOEMFONTEIN (Orange Free State, South Africa).—For the erection of a new Raadaal (House of Deputies) in the City of Bloemfontein, for the Orange Free State Government. Mr. Lennox Canning, A.R.I.B.A., and Mr. Fred. G. Good, C.E., joint architects, Bloemfontein and Johannesburg. Quantities by the architects and Mr. W. Leck.

REvised Tenders for Church, less allowance for Old Materials, Boundary Walling, &c. Judge £1,993 0 0. Seal 1,980 0 0. Martin & Co. 1,869 0 0. Miskin 1,960 0 0. Payne 1,932 0 0. Hora (accepted) 1,843 0 0. [Architect's estimate, £1,970.]

BOURNEMOUTH.—For erecting the new Richmond Hill Congregational Church, Bournemouth. Messrs. Lawson & Donkin, architects and surveyors, Bournemouth. Quantities supplied.— Stephens, Bastow & Co, Bristol. £12,999 0 0. W. Hoare, Bournemouth 12,730 11 4. Jenkins & Sons, Bournemouth 12,500 0 0. J. Shillito & Sons, Bury St. Edmund 12,390 0 0. F. Hoare & Sons, Bournemouth 12,178 0 0. J. T. Chappell, London 11,890 0 0. George & Harding, Bournemouth 11,845 0 0. F. Merrick & Son, Glastonbury 11,775 0 0. J. S. Kimberley, Banbury 11,322 0 0. T. H. Kimberley, Oxford 10,649 0 0. * Accepted.

LEIGHTON BUZZARD.—For the erection of a detached private residence at Leighton Buzzard, Beds, for Mr. T. H. Bishop, Mr. St. Pierre Harris, architect, 1, Basinghall-street, E.C. Quantities by Messrs. C. Stanger & Son, 21, Finsbury-pavement:— Holt & Son, Croydon £1,860 0 0. H. Edwards, Leighton 1,860 0 0. Tutt Bros, Leighton 1,690 0 0. Cook & Sons, Leighton 1,680 0 0. Webster & Gannon, Aylesbury 1,656 0 0. G. Garcia, Leighton 1,390 0 0. W. Gilven, Eastington 1,424 0 0. W. & W. Scott, Newcastle 1,389 0 0. J. Tremble, Hetton (accepted) 1,328 12 0. J. Heslop, Pittington 1,258 12 5. * Accepted.

BOURNEMOUTH.—For supplying two sets of three throw pumps for the Bournemouth Commissioners. Mr. T. W. Lacey, Engineer and Surveyor.— S. Owens & Co., London £1,050 0 0. Bible, Hobson & Co., London 818 0 0. Ed. Humphries, Limited, Pershore 608 0 0. Wood & Co., Bournemouth 548 0 0. Warner & Sons, Cripplegate, E.C. 546 0 0. Crossley Bros., Manchester 512 15 3. Conduley, Iron Works Com-pany, Bow, E. 590 0 0. G. Waller & Co., London 498 0 0. Day & Co., Bath (accepted) 385 0 0.

LONDON.—For erecting residence in Beaumont-street, W. Mr. T. Durran, architect, 41, Upper Baker-street, N.W.:— Stevenson £3,600 0 0. White 3,590 0 0. Ward, Clarke & Co. 3,475 0 0. Bovis 3,387 0 0. Atchison 3,390 0 0. Higgs 2,437 0 0. [Architect's estimate, £2,500.]

LONDON.—For pulling down and rebuilding No. 324, Holloway-road, for Mr. Mathews. Mr. Truettit, architect, 5, Bloomsbury-square.— Drey £1,776 0 0. Ward & Langle 1,677 0 0. Gould & Brand 1,630 0 0. Hunt 1,419 0 0.

LONDON.—For new roof and sundry other works at the School of Medicine for Women, No. 7, Hunter-street, and 30, Handel-street, Brunswick-square.— McCormick & Sons, 34, Canonbury-road, N. (accepted) £450 0 0.

LONDON.—For alterations at the "Nightingale" Hotel, Southgate-road, Wood Green, Mr. R. A. Lewcock, architect, 85, Bishopsgate-street Within.— F. Voller (accepted) £398 0 0.

The Metropolitan Water Companies and the Public.—The London County Council have not failed to see that the quinquennial assessment of property in London, which will come into force next year, will largely increase the sum of money which must eventually be paid by the ratepayers when London becomes assessed of the property of the Water Companies. The Council has therefore determined to bring a Bill to suspend the powers of the Water Companies to increase their charges for water consequent upon any increase at may be made in the assessment of property in the country. This resolution will recommend itself to London ratepayers. The stem of charging upon the rateable value of house is not equitable, seeing that rateable value and the amount of water consumed often have no relation to each other, and already rough the existing arrangements many London householders are paying largely in excess of that which would be a proper amount for the water used. The Vestry of St. James, Westminster, has determined to memorialise Parliament in support of the Council's views, and it may be expected that other local authorities will adopt the same course. The resolution of the Council makes more necessary in London the requirement by London of its water-supplies, but the basis of compensation one which is not now casier of settlement in when the subject was under consideration years ago.—The Lancet.

PRICES CURRENT OF MATERIALS.

Table with 4 columns: Timber, Metals, Oils. Lists various materials and their prices in £, s., d. format.

TENDERS.

communications for insertion under this heading to reach us not later than 12 noon on Thursdays.

SCOT.—For new residence at Kennel Ride, for Mrs. Throokmorton, Mr. A. H. Atwater, architect, 42, Dorset-street, W. — G. F. Keatley, Uxbridge (accepted) £2,028 0 0.

LONDON.—For pulling down and rebuilding No. 454, Holloway-road, for Mrs. Beazley. Mr. Truett, architect, 6, Bloomsbury-square:—
 Stewart £1,840 0 0
 Goddard 1,590 0 0
 Tennant 1,466 0 0
 Ward & Lambie 1,433 0 0
 Hunt 1,397 0 0
 Macfarlane Bros. 1,198 0 0

LONDON.—For pulling down and rebuilding No. 436, Holloway-road, for Mr. Matthews. Mr. Brown, architect, 29, Parliament-street:—
 Drew £1,690 0 0
 Ward & Lambie 1,597 0 0
 Gould & Brandl 1,513 0 0
 Hunt 1,408 0 0

LONDON.—For alterations and additions after fire to Nos. 8, 10, and 12, Mason-street, Westminster-bridge-road, for the Alliance Dairy Company, Limited. Mr. James M. Cable, architect:—
 Hill Bros. £455 0 0
 Pencock 392 4 0
 T. Hooper 373 0 0
 Tasker 350 0 0

WOOLWICH.—For alterations at the "King's Arms" Hotel, Woolwich Common. Mr. R. A. Lewcock, architect, 85, Bishopsgate-street Within, E.C.:—
 J. Beale (accepted) £640 0 0

LONDON.—For alterations at the "Unicorn" tavern, Norton Folgate, E.C. Mr. R. A. Lewcock, architect, 85, Bishopsgate-street Within:—
 Harris & Wardrop (accepted) £694 0 0

LONDON.—For alterations at the "Duke of Ormond's Head," Prince-street, Westminster. Mr. R. A. Lewcock, architect, 85, Bishopsgate-street Within:—
 Woolley (accepted) £400 0 0

LONDON.—For the conversion of No. 15, Portobello-road, Notting-hill, into stables. Messrs. Glasier & Sons, Surveyors:—
 S. Dowling & Sons £339 0 0
 Clarke & Maunooch 330 0 0
 T. G. Davis (accepted) 300 0 0

LONDON.—For erecting dwelling-houses, Plough-lane, Kensal-green. Mr. H. W. Budd, architect:—
 Lambie (accepted) £1,287 0 0

LONDON.—For new drains and sanitary works at "Stanbridge," No. 41, Nicoll-road, Willesden, N.W., for Mr. Edwd. Luckey:—
 McCormick & Sons (accepted) £108 0 0

LONDON.—For painting and decorating works at No. 10, Saville-row, W.:—
 McCormick & Sons (accepted) £200 0 0

LONDON.—For making road, putting in the sewer, and laying the mains for water supply to Eyot-gardens, Hammersmith. Messrs. Robinson & Fisher, surveyors, 21, Old Bond-street:—
 Brown & Co. (accepted) £250 0 0

ORPINGTON (Kent).—To alterations and additions to private residence at Orpington, Kent. Mr. St. Pierre Harris, architect, 1, Bastings-street, E.C., and Orpington, Kent:—
 Somerford & Son £226 0 0
 Holt & G. Glassap 200 0 0

RICHMOND (Surrey).—For the erection of seven shops. Mr. Robert Evans, architect:—
 Munday Lane & Co. (accepted) £7,900 0 0

TAYPORT (near Dundee).—For the sewage and sea outfall works at Tayport, near Dundee. Mr. W. H. Radford, engineer, Nottingham:—
 Wm. G. Flett, Glasgow £4,368 8 2
 Brown & Young, Glasgow 3,995 0 0
 R. C. Brebner, Edinburgh 3,428 17 0
 Holmes Bros., Nottingham 2,960 0 0
 Mitchell & Bond, Dundee 2,936 10 0
 G. Mackay & Son, Broughty Ferry, near Dundee (accepted) 2,308 17 4

WEST DRAYTON (Middlesex).—For extension to buildings for the Electrical Engineering Corporation, Limited:—
 C. F. Kearley, Uxbridge (accepted) £1,717 0 0

WALTHAMSTOW.—For road and sewers on the "Woodlands" Estate, Walthamstow. Messrs. E. E. Croucher & Co., surveyors, 76, Chancery-lane:—
 G. Reil, less allowance for house £602 0 0
 T. Adams 636 0 0
 W. Nicholls 643 0 0
 J. Jackson 483 0 0

WEST HAM.—For works in connexion with the West Ham Main Drainage Extension (contract No. 7), for the Corporation of West Ham. Mr. Lewis Angel, Borough Engineer:—
 Dickinson, Loughborough Junction £8,291 0 0
 Dickson, St. Albans 7,151 0 0
 Adams, Kingsland 6,730 12 3
 Jackson, Plaistow 5,900 0 0
 Cooke & Co., Battersea 5,896 10 0
 Beutley, Iettester 5,704 9 0
 Neave, South Woodford (accepted) 5,663 0 0

WIMBLEDON.—For the erection of new fire-engine station at Wimbledon:—
 J. F. Collinson, Teldington* £890 0 0
 Accepted.

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TO CORRESPONDENTS.

V. N.—H. & H. (It is not a matter in which we can well interfere without knowing all the circumstances).—W. H. K.—U. A. S.—B. & Co.—E. P.—H. R.—W. S.—S. (the position in your letter is not quite legal. It is not to be assumed that a sum equal to the whole value of all the competing architect's time should be offered in premium).—H. D. H. (too small).—L. G. & Co. (should send estimate).—K. & F.—E. A.—R. W. (too late).—J. G.—E. A. E. (too late).—C. & F. (text tender).—G. L. (should send estimate).

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The Builder.

VOL. LVIII. No. 245.

SATURDAY, MAY 3, 1890.

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Church of St. Victor, Xanten, Germany: Interior of the Choir.—Drawn by Mr. H. W. Brewer.....	Double-Page Photo-Litho.
Residence, Ingwood, California.—Messrs. Curlett, Eisen, & Cuthbertson, Architects.....	Double-Page Photo-Litho.
Decorated Chapel at Houghton-le-Dale, Norfolk.—Drawn by Mr. Arnold Mitchell.....	Single-Page Ink-Photo.
Church of St. John, Macclesfield: View showing South Porch, &c.—Mr. C. G. Killmister and Mr. R. A. Briggs, Architects.....	Single-Page Ink-Photo.
Carved Decorations, "Blackheath," Friston.—Mr. E. F. Bishopp, Architect.....	Single-Page Ink-Photo.
Residence, "Grey Friars," Dunwich: View from the South-east.—Mr. E. F. Bishopp, Architect.....	Single-Page Ink-Photo.

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Architecture at the Royal Academy.

WHEN the Royal Academy first decided to devote one room in their extensive galleries to the representation of architecture at the annual exhibitions, they were regarded by the architectural profession as having fulfilled a long-standing duty, and by others as having been beguiled into a quixotic piece of complaisance. The Academy annual exhibition was an exhibition of pictures, with a little sculpture thrown in for those who liked to look at it. Sculpture used to be treated worse than architecture is now, and relegated to a small room without light: it has at length taken something more like its proper place in the annual exhibition. And when first there was talk of a separate room for architecture, it was said that the Academy had at last recognised its duties to that central and oldest art. But ideas about art march quickly now; we are in an age of progress in regard to the critical appreciation of art at all events; and we doubt if the hanging of a collection of small drawings in the smallest room in the Academy suite of galleries will long content those who know what architecture really means and how much it includes; and it may even be doubted whether the public will not before long be conscious of a disproportion between the space allotted to pictures and that allotted to architecture. The mind of the exhibition-going public was a good deal enlightened by the process of devoting the new water-colour gallery (a large room) at a loan exhibition two or three years ago, to works in decorative art. It was found that this was the most popular room that year. An experiment which was tried at a loan exhibition might just as well be tried at one of the May exhibitions. Perhaps the result might be as surprising.

People are never tired of talking now about architecture being the central art, the mother of the arts, and all that. We have heard the sentiment at times even from distinguished painters among the R.A.s, but more in private than in public. Painters as a rule do not in public commit themselves to any such ill-regulated and imprudent expressions. But plenty of critics have said it for them. It is a

curious commentary on this to look at the plan of the Burlington House rooms, and compare the space set apart for architecture with that devoted to pictures. And it is in great measure owing to this confinement within narrow bounds that the architectural exhibition is uninteresting to the public. It consists necessarily of a limited number of mostly small drawings, representations of architecture to a miniature scale. The architects are not to blame for this. If they were minded to send in such large geometrical drawings with every detail fully shown, such models, and such drawings of full-size detail, as French architects are fond of sending to exhibitions, they know very well that it is useless; there is no room to hang or to place such things if they were sent. We are reduced for the most part to sending small pictures of buildings; and these, regarded as pictures, are no doubt of inferior interest to many of the pictures in the other galleries. But the illustration of architecture is not to be carried out solely or in the best manner in mere pictures. It is a matter of plan, of detail, of modelling, and of decoration. And if the Royal Academy gave facilities for its full and adequate treatment at the annual exhibitions, we believe there would be a great deal more public interest manifested in the architectural section than there is or ever can be so long as it is confined to the exhibition of small drawings in a small corner room.

The Royal Academy professes to be an academy "of art," not a school of painting merely. Let them act up to that, and give us the long gallery for architecture, the central and largest gallery for the central art. Let them announce that they have space to hang large and elaborate drawings on the walls. Let them devote the centre area of the rooms to architectural models; both models of whole buildings to a small scale, and models of detail, and specimens of architectural ornament of various types, models of relief work in the round, examples of mosaic and inlay and other architectural decoration. They will soon fill their room, and they will find a new interest added to their annual exhibitions; and the public will not be so ready to think the architectural room dull, or regard it as a department *pro forma* only, and with which visitors are not expected to concern themselves.

To some of the painters (the people who tell us "they never look at the sculpture") we have no doubt this proposition would

seem merely matter for laughter; but we are not at all so sure that it would be so regarded outside the Academy. The more educated section of the public are slowly beginning to find out what architecture means, and would probably give such a proposition a considerable support. What is certain to us is that the present treatment of architecture at the Academy is ridiculous: that the art cannot be represented or illustrated properly in the manner and within the bounds now allotted to it; and that the relegation of an art which is really the centre around which all other arts are grouped, to a small out-of-the-way room at one corner of the establishment, is an anachronism, in the present state of artistic knowledge and perception, which the Academy will have to be made to recognise before long, unless they take the lead in recognising it themselves.

The present year's show, in this inadequate gallery, is on the whole equal to the average; perhaps not equal to that of one or two other recent years; there are not so many designs of the first interest or importance. There are a considerable number of smaller things, however, that are of interest and merit, and, undoubtedly a sufficient variety both in subject, style, and drawing. We will confine ourselves in this article to speaking of a few of the more prominent works; going through the majority of the remainder in order of hanging, in subsequent issues.

The central position at one end of the room is occupied by Professor Aitchison's restoration of the interior of the House of Pansa (1893). We stand in the atrium with the impluvium in the centre, laid with marble flags of various tones, but in no very pronounced design; near the impluvium is a small checker-work of dark and light squares, and larger squares of dark marble accentuate the position of the piers at each side. The walls are coloured red and black in the accepted Pompeian style, the larger masses of red forming a background to the statues on pedestals which are ranged along the wall at equal distances. Between them are curtained openings, the space over which is occupied by a trellis, and over that a black panel with the thin graceful Pompeian festoon ornament painted on it. Through this we see beyond the peristyle open to the sky, with columns of yellow tone (gilt?) in the lower portion, and white above. The blue sky is seen through the roof openings. The general effect is very agreeable, but in order to get at the softness of aerial

effect desired the details are hardly shown with the sharpness and precision which one would wish for in a drawing the essential object of which is the restoration of an elaborate scheme of architectural decoration. The whole however, forms a very suitable and interesting pendant to Professor Aitchison's restoration of the Thermæ of Caracalla which occupied a prominent place in a former year.

At the top of the room, above this, is a large drawing for a frieze decoration, "Hedonon Potamos" (1886), "the river of pleasures," which is very effective where seen, and looks as if it might have claimed a better place in the hanging; it represents a row of nude or semi-nude figures, in various attitudes but forming a continuous chain, painted in delicate cream tones against a dark red background; over the figures is a decorative frieze with triglyphs (is it not time something were invented to take the place of the triglyph on these occasions?), and below is a horizontal string with brackets forming the margin of a decorative river into which the figures seem preparing to plunge. The drawing is hung too high to judge of the separate merit or interest of the figures taken separately, but the effect of the whole in a decorative sense is very good.

Another centre-piece is Mr. Norman Shaw's "New Scotland Yard—part of South Front" (1838), a large and powerful but also highly-finished pen drawing signed with the name of Mr. Gerald C. Horsley. A peculiarity in the design is that the lower portion of the wall, containing (as we see by the size and treatment of the windows) the more prison-like portion of the building, is treated differently from the upper portion as regards the character of the masonry, but without the orthodox string-course to divide the one from the other; an omission highly characteristic in effect. The lower portion is in not quite regular masonry of squared stones; the upper portion is built of brick with flat stone bands at intervals. The whole treatment speaks the purpose of the building very well; the upper portion, with its evenly-spaced large windows with cornice heads, is essentially official and administrative; the lower portion, with smaller windows spaced unevenly and without reference to those above, and some of them grated, is, as observed before, essentially prison-like. The doorway, with its boldly-rusticated pilasters and heavy cornice, is also prison-like, unless we except the iron balcony projected between the two halves of the broken pediment, a feature the object of which is not quite evident: perhaps to read the Riot Act from in the case of an attack on the prison by a mob. The heavy circular corbelled-out turrets at the angles assist the rather stern aspect of the whole, which is quite in keeping with the object of the building. The wrought-iron V.L. and crown bracketed out from the masonry at the angle, so as to stand free, is another characteristic touch in the detail. There is little other ornament about the design; but the whole is a satisfactory and solid-looking piece of building.

We referred to the fact that the drawing was a highly-finished though powerful one, not without intention, inasmuch as we cannot but think that the tendency to "rough but effective" drawing is being carried too far occasionally in these days. The interior of Mr. Sedding's "St. Peter's, Ealing" (1777), for instance, is clever and original enough in design to claim a good place, it may be said, in almost any style of drawing; but it would certainly have been none the worse for a less careless and scrupulously style of execution; and although we have frequently protested against the Academy Architectural room being made a mere draughtsman's exhibition, we are nevertheless of the mind that a certain standard of execution should be kept up in drawings for exhibition in this room, and that the practice of running up a drawing for exhibition at the last moment, and trusting to spirited effect to atone for roughness of execution, though it is not an error on the worst side, is yet not a system that should

be encouraged. There is a curious kind of paradox in the method of dealing with these things at the Academy; there are designs to be seen there often which obviously owe their position entirely to the skill and craft of the draughtsman, and we even see the same hand and style of drawing coupled openly with the names of architects who have connexion with each other, but who have put their work through the same drawing-manufactory. On the other hand, there appear to be favoured persons (we will not name names, but the consciences of one or two may accuse them) who may send in any kind of scrawl and get hung; we have even heard of those who make a boast that they never commence their Academy drawings till the day before sending in. Now as this is, after all, not an exhibition of architecture (for that we can only have out in the streets), but of architectural drawings, it is certain that drawing ought to go for something; and architectural drawing is a beautiful branch of art in itself and worth keeping up as an end and not only as a means. The true principle would be that the architect whose name appears in the catalogue should make his own drawing; there are eminent men in the profession who do, and have done so for many years, thereby setting an example to be much encouraged and followed. The interior of Mr. Sedding's church, the drawing of which suggested these reflections, was illustrated in the *Builder* for November 16, 1889, and therefore we may refer the reader to that number for further knowledge of it, repeating here our appreciation of its bold and picturesque originality of treatment. Mr. Bodley's water-colour drawing of "Interior of St. Mary's, Clumber" (1780), which hangs next to the last-named, and occupies the central position on the west wall, is a curious contrast, as a completely archaeological Gothic church, very correct and very good of course of its kind, but a mere repetition, as far as the main architectural design is concerned, of a Medieval church. There is an elaborate chancel-screen with open-work tracery and the usual coved cornice proper to the period. A heavy roof-beam above carries a central cross and two side statues, and beyond is seen a glitter of decorative work in the chancel, very well expressed in the drawing. Next to this hangs another large church interior, Mr. F. B. Walters' "Church of the Sacred Heart, Wimbledon" (1785), an elaborate pen drawing, with a strong effect of massed shadow behind the rather heavy foliated arch in front of the altar. This also has its roof beam, rather curiously designed, with two egee arches commenced below the line of the beam and interpenetrated through it to form finials above, which are crowned with statues; this is a treatment better suited no doubt to woodwork than to stonework, but not quite pleasing even there, and the heavy bracket depending from the centre of the beam seems to hang too much weight on it; a large crucifix rises above the centre. The style is of the Late Decorated period. Transverse arches are built solid across the aisle at each pier. These three drawings form an effective group in the centre of this wall.

Mr. Garner exhibits a "First Design for the Reredos at St. Paul's Cathedral" (1759) which we wish had been carried out in place of the actual one, and which shows that first thoughts are sometimes the best. This is a reredos placed transversely on the chord of the apse, as it should be, and which evades the difficulty of connexion with Wren's architecture (a difficulty which is clumsily ignored in the existing reredos) by keeping the architectural design to the centre only, and filling up the side spaces with a light but elaborate and graceful wrought-iron grille. The centre portion resembles considerably the centre of the executed reredos, being in fact a kind of baldachino with gilt and twisted columns; the subject of the crucifixion is shown in bas relief under the central arch. The design is more modest and less obtrusive on the building, by far, than that which has been carried

Of Mr. T. G. Jackson's exhibits a very pleasing example is "Northington Church, Haunts, exterior" (1769), in late Gothic style with a square tower with richly-treated pinnacles and open tracered balustrade; the east end is octagonal and diversified with stone inlay decoration on the walls, an arched ornament of this type being carried round this part of the building, under the windows, with very good effect; the tower is partially decorated with the same type of work. The same architect's "Brasenose College; one bay of the new front" (1794) is remarkable for the unusual and rich effect of the sumptuous open-work carved cresting to the projecting bays, a very fine and bold piece of detail which gives great individuality of character to what is in the main a quiet piece of collegiate architecture of domestic Gothic style. Mr. Waterhouse's only contribution to the architectural room (he exhibits a landscape in another department of the exhibition) is a water-colour drawing of the "Offices of the Prudential Assurance Company, West Regent-street, Glasgow" (1828), a solid-looking brick building with a strong bracketed cornice, and two heavy corbelled-out circular turrets on the canted angle of the front, which are sprung in a novel and effective manner from large brackets below their centre, which are turned over each way in two arches or coves ornamented with radiated fluting, after the manner commonly used for the heads of niches in one period of Renaissance work. Among the designs for business buildings a very notable one is the "New Buildings for the Metropolitan Life Assurance Society" (1793) by Mr. Aston Webb and Mr. Ingress Bell. This is something quite unusual in London street architecture of the commercial class, in its richness and originality of treatment. The drawing is a coloured one, and shows a plain granite (?) plinth, over which the ground story is treated very plainly with square-headed

columns separated by plain engaged columns of no special "order" but with a design of their own; on the next floor the windows have partially arched archivolts springing from shafts, divided by a pier plain in the lower part but developing into a flat fluted pilaster above; the bases of these pilasters are carried by a projecting corbel the effect of which we do not quite like, as it gives the feature rather a stuck-on appearance; on the next floor the arch form is more developed in the window heads, and the wall between remains a flat plane but with a sunk carved enrichment in the upper portion, the effect of which is excellent; on the top story the piers and windows are doubled in number and form a continuous range, the exterior angle of the piers between them being treated as a shaft. Each story has a special and original treatment, increasing in richness as it goes up; and the angle of the building, canted off, is also specially enriched by bas relief sculpture between the windows. For originality combined with effectiveness this is one of the best secular buildings illustrated.

In the matter of collegiate architecture we have, besides Mr. Jackson's Brasenose College, just mentioned, two charming little coloured elevations by Mr. Pearson of new chambers at Sidney Sussex College, Cambridge; the "Quad side" (1771) and the "Garden side" (1788). The former shows a cloister of three-centred arches on columns, built in stone; over this the main portion of the building is brick; three gables of Elizabethan type break the roof line, under each of which are single arched windows in the two stories, in a wide expanse of wall; between these points is a special treatment with three stone pilasters finishing in finials above, and the windows, balustrade, and wall decorations forming continuous horizontal lines between them; the contrast of this richer portion with the rest is most picturesque and characteristic. The "garden side" elevation shows somewhat similar characteristics, without the cluster arcade; but why were the pilasters finished with halls and long spikes like decanter stoppers? The one blot in a charming

design. It is a pity to see this sort of commonplace in detail under the shelter of so good a name. Among other collegiate designs Sir Arthur Blomfield exhibits two views of his design for the "Church House" (1,889 and 1,897), pen drawings showing an exceedingly simple, suitable, and unaffected building with the low square centre tower over the entrance which has become a kind of accepted typical feature of buildings of this class. Messrs. Micklethwaite and Somers Clarke also exhibit a geometrical elevation and section of their design for the Church House, a fine and dignified Gothic façade of which one side appears to be intended as a great vaulted hall with large traceried windows and buttresses, with a low ground story under it; the façade is divided in the centre by a rich and effective tower with massive octagonal angle turrets the lower portions of which form abutments to a wide segmental pointed arch spanning the whole space between them. The wall of the tower over this arch is enriched with niches, tracery, and sculpture, stopped above by a battlemented cornice. The portion of the building to the right of the tower is kept lower and treated in a more simple and domestic manner. The whole is a stately design, but is perhaps a little too much so for the proposed purpose, a little too cathedral-like in style.

The recent Sheffield competition contributes its quota to the architectural room in the shape of various monuments of blighted architectural hopes. Among these Mr. Arnold Mitchell's is by far the finest and most striking drawing; he has worked out the design of himself and his partner Mr. Butler into a large brown-tinted perspective drawing in his finest style, making a design for the return end of the front block, not required to be shown in the competition drawings. The façade has a centre tower kept very plain below and treated with great richness at the crowning stage, with balustrades, angle turrets, and a central lantern; the detail is peculiar and original, with a semi-Oriental effect about it, as a whole, though made up of rococo details. The return gable is enriched in the same effective manner. The treatment of the large windows of the principal story, projecting slightly as bays, and stopping under the projection of the cornice, is very effective. The angles are treated with octagonal angle turrets, with open balustraded canopies as finials. A porte-cochère appears in this design, which is also richly and effectively treated, but which does not alter our opinion that a porte-cochère is and always must be architecturally an excess and an injury to the effect of a building. It seems quite a pity that so original and picturesque a design should have missed fire in the competition, but we fear the plan which is appended explains this: for one thing, the Town Clerk's department is arranged, compactly enough in itself, in a block at the farthest end from the principal entrance, and also at the furthest point from the Mayor's territory. Now the Town Clerk is of all officials the one who should be most central in a municipal building: the public constantly want to see him or his functionaries, and he constantly wants to communicate with the Mayor; to put him at the furthest point from both was a fatal error in planning. Mr. H. H. Statham exhibits (1,720) an enlarged drawing of the sketch elevation made for the design submitted by Mr. J. Slater and himself in conjunction, of which for obvious reasons we say nothing here, except to remark that in the first editions of the catalogue ("under revision") this has by some accident been wrongly named, and is called "competition design for Birmingham Law Courts," which should be the title of No. 1,870, another enlarged drawing from a small-scale competition sketch elevation. Messrs. Morris and Hunter send their original sketch-elevation to 16th-inch scale (1,872), a very neat and sensible elevation apparently designed with a laudable desire to keep within the stipulated cost; it is a classic design with a rusticated ground story and

basement, and an Ionic order in the upper story; a campanile rises behind, but has no connexion with the principal façade. There is no balustrade and the roof is frankly shown. There is a semi-circular turret at the right-hand angle with a little cupola over, which however sits rather awkwardly on the roof, the main cornice being carried through. The long level line of roof and cornice seems rather to want something to break it in the centre, but the building would have had a dignified effect in execution, and the drawing is a good specimen of the class of "sketch elevation" on a small scale. Messrs. A. G. Gordon and D. Brown send also their original sketch elevation (1,873), a more ambitious one with a good deal of merit; the Campanile (in the rear) is rather prodigious in proportions but gracefully designed; the centre of the front is well accentuated, and the octagonal turret is a pleasing feature, as also the continuous arcading under the cornice. No plans are appended to these, nor to the design by Mr. Woollard (1,929), who sends a neatly-executed pencil perspective of his idea for the building, a design of the now prevalent type of thin pilasters with large mullioned windows between, square-beaded below and arched above; the centre gable is flanked by two octagon turrets, and a lantern rises from the centre of the roof ridge. The whole is picturesque and in good taste: no plan is given. Nos. 1,720, 1,825, and 1,872 will be published in our illustration pages shortly, with the plans of each.

There is much more to say about the architectural drawings, which include a fair proportion also of good decorative work.

BUILDERS' PRICE-BOOKS FOR 1890.

IN examining the price-books of the year,* the marked improvement which has taken place in their arrangement, accuracy, and comprehensiveness within a few years cannot fail to impress the experienced reader. There is, however, still room for further improvement. In the whole of them the majority of the prices are higher than any current contract rates, and the profit included is certainly not uniform. The importation of a trained measuring surveyor into a suit at law would be apt to modify the confidence of those persons who bold the view set forth in "Laxton's" preface that it is "the acknowledged standard to which, in disputed cases in the various law courts, reference is made."

The most valuable information in "Laxton," "Lockwood," and "Spon" respectively is that on building stones, in which relative labour is compared by a ratio; we believe this originated with the first-named.

These books would do good service if they would supply the constants in all cases; some of considerable importance are omitted. Greater precision, moreover, in the description of some of the stones is desirable; for example, the labour on White Mansfield is given as "about equal to Portland," but there is a difference of probably 25 per cent. in the labour on ordinary White Mansfield and that on a first-rate stone such as Mansfield Woodhouse.

The tabular form adopted by "Spon," which is possibly imitated from the report prepared by the Commission on the stone for the Houses of Parliament, is most convenient for reference.

It has become the custom in price-books published in recent years to preface each trade with directions for measurement and construction. These directions are generally either superficial or obsolete; indeed it is difficult to furnish any good reason for the introduction of such information. In the restricted space available in price-books it is

* "Laxton's Builders' Price-Book." Seventy-third edition. London: Kelly & Co. 1890.
 "Lockwood's Builders', Architects', Contractors', and Engineers' Price-Book." London: Crosby Lockwood & Son. 1890.
 "Spon's Architects' and Builders' Price-Book." London: E. & F. N. Spon, 125, Strand. 1890.

impossible to do justice to the subject, nor does any judicious builder attempt to learn his business from them. The current text-books are plentiful enough, and deal with these studies in a thorough manner. Space must be considered of little importance by the publisher of the following piece of information:—"To find the number of cubic yards contained in an excavation, multiply the length by the width, and that product by the depth, which being divided by 27, gives the number of cubic yards. The superficial area is obtained by multiplying the length by the width and dividing the product by 9 instead of 27; the result will be the area in superficial yards."

We may instance also the recommendation in one of these books to measure labour to openings in brickwork,—an unreasonable suggestion derived from Northern and Midland practice, and inconsistent with the London habit of pricing, which is based upon the Metropolitan system of measuring. Reference to a priced bill of quantities for work in the Northern counties will show a very low price for brickwork compared with London prices, but the extra labours not measured in London go far to bring the price up to the same level.

That the practice of the London measuring surveyor is in the main superior to any provincial system is generally admitted. Some of the worst features of country practice are mere ignorant survivals of methods which the London surveyor has long discarded, and any return to them must be deprecated as tending to retard the assimilation of methods of measurement and consequent valuation. On this score it must be a matter for regret that there has appeared within the last few years a "Northern Builders' Price-book," which may assist in some degree to emphasise the divergence.

The orderly arrangement of advertisements, and the tables of weights, capacity, and area, given in these books are of value to the estimator. The introduction of various Acts of Parliament affecting building operations is also useful enough, and the same may be said for conditions and form of contract: but both these latter require consideration to adapt them to particular cases.

The memorandum in "Laxton's" at the end of a suggested form of contract, "In cases where the quantities are provided, it is recommended that, unless a surveyor may be mutually agreed upon by the architect and builder, two surveyors be employed to take off the quantities, one appointed by the architect and the other by the builder at a meeting convened for the purpose," is a proposal to revert to a condition of things which never had much to recommend it, except in the case of very large works, and is not likely to be revived.

The new colonial woods, we observe, are making their appearance in these books; the prices for American white wood and basswood, however, are not to be found in any of them.

In examining particular prices one finds that the hire of building plant is still higher than is ever allowed by experienced persons, in spite of the increased value consequent on the Employers' Liability Act.

The price for drain-pipes in "Laxton" is the list price without comment; in "Lockwood," list price, and so described; in "Spon," a little over prime cost, described as prime cost of pipes.

Digging in common soils and throwing out, not exceeding 6 ft. in depth, is priced 7d., 8d., and 9d. respectively; all three add for basketing 8d. per yard cube, a price dependent upon the distance (of which no mention is made), and too low.

For concrete, composed of 1 part ground lime to 6 of pit ballast, we have 8s. 6d., 6s. 6d. to 10s., and 10s. 6d. respectively.

In "Laxton," for concrete, 1 of Portland cement to 7 of Thames ballast, 16s. 9d. per yard cube is the price given. In "Spon," for concrete of the same specified quantities, 13s. to 15s. 6d. per yard cube. In "Lockwood," for concrete, 1 of Portland cement to 6 of Thames ballast, we have 14s.

Turning to the Bricklayer's prices, we have in "Lockwood," for brickwork, labour, and mortar, 3*l.* 5*s.* per rod. "Spon," for brickwork, labour, and mortar, 5*l.* per rod.

"Laxton."—Stock brickwork, labour, and materials, 15*l.* 6*s.* per rod.

"Lockwood."—Stock brickwork, labour, and materials, 13*l.* 10*s.* per rod.

"Spon."—Stock brickwork, labour, and materials, 14*l.* 5*s.* 10*d.* per rod.

For paving of common hard stock bricks, laid flat in mortar, per yard superficial, we have:—"Laxton," 4*s.*; "Lockwood," 3*s.* 6*d.*; "Spon," 2*s.* 6*d.* There is a considerable difference in the prices for facing in the various books. Extra for facing of best white glazed bricks appears in two of the books at 2*s.* per foot; it has within the last year been contracted for in several buildings known to us at 1*s.* 9*d.*, including pointing. Pointing is always measured with the extra on facings, and in only one book is it mentioned in that connexion.

"Lockwood" is the only book which deals with terra-cotta in the ordinary way, by the foot cube; it gives moulded terra-cotta and fixing, 7*s.* 3*d.*,—a high price except for small quantities. In the three price-books, the prices per thousand for glazed bricks of "Spon" and "Lockwood" agree; "Laxton" has precisely the same price per thousand "delivered on job." All three use the words "prime cost," which certainly does not in either case mean the price after deduction of trade discount.

The prices of stone display curious differences. Portland stone, averaging 20 ft. cube in a block, which costs 1*s.* 11*d.* at the depot, appears thus:—

	Wharf.	Including hoisting, scaffolding, setting, and cleaning down.	
	s. d.	s. d.	s. d.
"Laxton" ...	2 8	4 9	
"Lockwood" ..	2 10	3 2	
"Spon"	2 5	4 0	

A common contract price per foot cube, including scaffolding, hoisting, setting, and cleaning down, is 3*s.* 3*d.*

"In block at wharf, including hoisting, scaffolding, and setting," is the curious prefix to a price in "Spon" for Portland stone (p. 163).

The Carpenter's measured prices, "Labour only," are somewhat difficult to account for. They are thus headed in "Laxton" and "Lockwood"—"The prices are calculated at the rate of 10*d.* per hour." To the general public such prices are valueless, and they are not available for paying men piecework, as the average carpenter is paid 9*d.* per hour, or less. If intended for valuation of the work of a sub-contractor (a small master of labour), one doubts whether the builder would pay so much as 10*d.* per hour.

"Laxton" also gives the price per square for labour only, 4 in. framed and braced partitions, 6*s.* 2*d.*

This section has an archaic air. "Labour and nails measured per yard superficial" is customary in the northern counties, but the practice is unknown in the south. The valuation by the foot cube is much more reasonable, in addition to being customary.

The price of timber in floors, partitions, &c., is too high in all three books.

The ironmongery prices, when makers' names are not given, may mean anything. Those of the articles for which makers' names are given are trade-list prices.

The price for nails and screws in day-account is, as usual, ridiculous in all three.

The relative value of work in Keene's and Portland cement is not quite in accord with general opinion. Work in Keene's cement is worth 20 per cent. more than in Portland.

For iron welded tubing, both "Laxton" and "Spon," as usual, give a copy of a manufacturer's list without comment. Would the law courts consider this "the acknowledged standard," &c.? "Lockwood" also gives the same list with a heading, "List Prices."

In this trade, as in others, not much light is afforded by such a price as 9*s.* to 12*s.*, and the like; an exact definition, and a price without

alternative, would be better. "Lockwood," in stating the weight of rain-water pipes, makes a step in the right direction. The principle might be extended to other rain-water goods with advantage.

The same book gives for unloading, getting in, hoisting, and fixing rolled iron joists, 3*s.* per cwt., which a builder would only get by great good fortune. In the Plumber, "Spon" and "Lockwood" still adhere to the unmeaning distinction of pipes under the heads "light," "middling," and "strong." On this point, "Laxton" properly says, "the terms 'light,' 'middling,' and 'strong' are but seldom used now, and are practically valueless." The application to pipes of these terms may be useful in a specification, to define their purpose, but only with a table of the weights at the beginning of the trade. The London surveyor usually makes his price for lead pipe, up to 2 in. diameter, include bends, wall-hooks, and fixing, and he includes in his lineal measurement running-joints to all pipes. Joints are all separately stated in these books. Probably the value of a price-book is greater the more closely its descriptions resemble those usually in vogue with measuring surveyors. The distinction as to the amount of labour and consequent precision of measurement of lead-work has increased of late. We see no reference to this either in directions for measurement or prices.

The long lists of apparatus by special makers in "Laxton" and "Lockwood," both for the plumbers' and other trades, indicate great care and pains in their compilation. "Laxton's" price of 3*d.* per superficial foot difference between lead lights in square quarries and lead lights in geometrical patterns is insufficient.

An exhaustive analysis and comparison of prices would obviously be out of place here. The foregoing are a few of the more noticeable features. The prevalent belief that the rates of a price-book, as compared with those of the average estimate, would, taken as a whole, bear a discount of some 15 per cent. or thereabouts, will be modified by an examination of "Lockwood." Many of these are really contract prices. Parallels occur in the other two, but the greater number are to be found in this. All the three books contain some prices at a rate of profit which might be used for current estimating; others with an exorbitant rate of profit; others upon which the profit is inadequate; and a long list of manufactured articles upon which the trade discount varies from 5 per cent. to 50 per cent., without its being clearly indicated to which category a particular item should be referred.

One naturally asks, What are the objects which the author of a price-book has in view? To set forth the rates at which an estimate may be priced with a view to success in competition? To furnish information of first cost? or the value of items with a reasonable profit attached? We rise from the perusal of the three books before us without being able to give a clear answer to these questions.

The attempt to do several things at once is rarely successful. The fable of the old man who tried to please everybody and pleased nobody is a lesson for all time, and may be commended to the makers of price-books. The usefulness of these in many respects valuable books is impaired by the versatility of their intention. They might be more correctly described as handbooks of matters connected with building. The production of the ideal price-book, which shall be orderly in arrangement, consistent in its rates of profit, accurate in the values stated throughout, and easy of reference, requires a combination of qualities rarely found in one person, although one qualified person could do it better than an association of several. Above all, its author should be possessed of long and varied experience of building values, and it is rarely the case that a man so qualified cares to devote time and attention to a pursuit which must of necessity be paid for at a rate far below his possible earnings in other ways. It is, however, too late at the end of this article to enter in detail upon the consideration of

the method at once the most scientific and the most practical of compiling a builders' price-book.

NOTES.

THE Annual Report of the Institute of Architects, which we print in another column, touches on two or three subjects of special interest. The constitution of the Council has become much more cosmopolitan, and for the first time since the establishment of the Institute the presidents of various provincial societies have had, *ex officio*, seats on the Council. The contemplated enlargement of the premises is to include, we are glad to see, the removal of the whole business of the Secretary's department to the ground floor of the building; a much more convenient arrangement for visitors calling on business than the present one. But the report is not satisfactory in regard to one most important department, the Library. In the first place, there seems a most remarkable and uniform falling off in the use of the library, in every branch of its statistics. We place this here in a schedule form:—

	This Year.	Last Year.
Number of readers	3,039	3,906
Tickets for admission to use of loan collection ...	94	103
Volumes issued on loan ...	985	1,255
Attendances of A.A. members as readers ...	296	570

The year means of course the sessional year; now there must be some reason for this remarkable diminution in library attendance. Is the library ill-managed, or what is it? Another point we regret in the report is the statement as to the want of funds to keep the library up to its proper standard. The former by-law requiring every newly-elected member who did not read a paper to make a contribution in money to the library has been abrogated. Its operation brought in a certain fund which nothing else has replaced; nor do we see very well, from the statement of accounts, where a sufficient annual sum is to come from. But this is a serious matter. We regard the library as being really the most valuable concrete fact in connexion with the Institute; as is claimed in the Report, there is no other like it in the United Kingdom; but good as it already is, it is not all it might or should be; there are various important anti-periodicals wanting in it which should be there; and in regard to other works of more permanent value there is a constant necessity for the acquisition of new architectural works of importance which any student ought to count on finding in the Institute Library. There seems to be a half admission in the Report that this is not the case even now, and that the library is not properly up to date; and apparently, unless some decisive action is taken, this state of things is likely to become worse rather than better. This is a very important matter, and ought not to be allowed to drop. If there are not funds to keep the library to the highest standard of a modern architectural library, steps ought to be taken at once to raise a special fund for the purpose. It would be a grievous slur on the Institute that its unique library should be allowed to deteriorate. And the causes of the falling-off in the use of the library recently should also be enquired into.

THE Architectural Association has been considering the question of some further development of its mechanism for Architectural Instruction. A Sub-Committee was appointed on June 21 of last year to consider what alterations, if any, in the methods and working of the Association would improve its usefulness as an educational body, and to report upon the same. The Committee commenced by applying formally to the Institute to enquire if its Council contemplated introducing educational schemes in connexion with their own body, and elicited first a reference to Mr. Waterhouse's recent address, and subsequently a distinct statement that the Institute was not a teaching body. This the Association might

have known; but at the same time they were making a safe course in making the formal inquiry first, and they have some right to complain of the "cold-shoulder" and evasive answer they at first obtained from the Institute, which is constantly putting itself wrong in this kind of way by want of ordinary tact. The main question entered upon then by the Association was whether there should be a salaried staff of teachers engaged, and the report comes to the conclusion that this must be done, and that the "mutual system" cannot be depended on longer. This must have been seen to be inevitable in the long-run; as such societies increase, there always comes a period when the work becomes too great for voluntary effort, and in this respect the Association is only repeating the history of the Institute. Other conclusions embodied in the Subcommittee's report are that the Institute Examination programme should be recognised, but not regarded as the final end or limit of the student's work (though we doubt if many of them will be able to cover more ground than it covers); that a combination of lectures with class teaching was better than either system taken singly; that if possible an architectural studio should be started in connexion with the Association, and that it should be open in the day-time as well as in the evening. The report says on this subject:—

"We have given our attention to the question of the establishment of day classes, recognising that there is, at present, a strong feeling amongst many of especially the leading members of the profession, that architects should allow their pupils additional facilities for study during office hours. We feel that, if such classes were established, attendance at them would soon be accepted by the profession as part of the ordinary work of pupils, and, therefore, strongly recommend that classes of this description should be established as part of the work of the Association."

We hope this programme will be successfully carried out, and especially that architects will recognise the propriety of allowing their pupils to attend day classes, within reasonable limits. For those who wish for the advancement of the standard of professional education in the future there ought to be no foolish hesitation on such a point.

THE "Great Tower" scheme has now reached a further stage. The drawings in competition have been submitted, and we have been exhibited this week at Drapers' Hall, Throgmorton-street. Eighty-six schemes have in all been sent in, out of which eighteen have been disqualified, "sent in as suggestions, but not admissible for competition." Of the remaining sixty-eight designs, it is in many cases hardly possible to speak seriously,—indeed, the competitors themselves seem to have treated the matter as a huge joke, and have submitted to the public gaze as curious a collection of objects as it has been our bad fortune to see for any long day. It was naturally certain that a number would take the idea of the Eiffel Tower as a basis of design, and if in any details of construction they differ from it, they, at least, pretty closely reproduce the general outline. No. 66 is one of these, with pavilions at the base and on the first and second stages. Others, such as 51, are "provided with buildings for residential and other purposes." The base of No. 52 is flanked with a large dome of the "onion" type, to be used as a winter garden; and the author of No. 21, not to be outdone, describes his work as "Light, health, rest, pleasure"; beacon, sanatorium, people's hotel," &c. &c. Full advantage has been also taken in many cases of the "full liberty in the combinations" allowed by the conditions. A steel mast 200 ft. high, with steel ropes as stays; a concrete tower (43); a granite tower on the lines of the Pisa Campanile (29) are some of these. One has submitted a glorified new, 1,900 ft. high; while a second name is a "Vegetarian Tower," for what reason is not apparent, and proposes to make his building, which is in the form of an obelisk, serve

as a vast field for the display of what appears to be transparent advertisements. No. 23 proposes a tower which will stand on a piece of ground of about 64 acres! Of the designs which at all approach architecture in character, little can be said in praise. Two of those before mentioned, Nos. 29 and 43, are the principal ones which have been carried out on anything approaching architectural lines. Several have hotels, pavilions, &c., more or less grotesque in character. What appears to be the best is No. 37, the entrance of which has been designed in the Indian style, and makes a very effective elevation. It was, we suppose, too much to expect that "Gothic" would escape. One or two of the designs are apparently intended to follow the general outline of a church tower and spire of colossal dimensions, and various forms of "tracery" occur, chiefly of geometrical character. If praise cannot be bestowed on the designs, it must be in justice acknowledged that some of the drawings are very fine examples of draughtsmanship and colour—notably Nos. 11, 20, 37, 53, and 54, and it is to be regretted that so much valuable time has been spent in the production of works which are in a large number of cases little short of a farce. The decision of the judges, we are informed, is to be given on Saturday, and we shall be curious to see what opinions are held by the jurors, amongst whom are well-known and honoured names, of a scheme the results of which so far only strengthen the hopes we expressed on a former occasion that the whole would be a failure.

A ROYAL COMMISSION has been issued "to inquire into the present state of the Abbey of Westminster as regards the facilities which it offers for providing for the interment, and otherwise preserving the memory, of the most illustrious of our subjects, in the manner which has been customary for many centuries; and to hear evidence and to consider plans for providing at the Abbey, or elsewhere, an additional place for memorials, should such a provision appear necessary." The Commissioners appointed are:—Mr. D. Plunket, First Commissioner of Works; Sir A. H. Layard, Sir F. Leighton, the Dean of Westminster, Mr. Louis J. Jennings, and Mr. Alfred Waterhouse, R.A. It is with real satisfaction we observe that in this case at all events a Commission to consider an important architectural question has been apparently appointed with some reference to the special knowledge and capabilities of some of the Commissioners for dealing with such a subject. The *Pall Mall Gazette*, with the customary fatuity of our daily papers in regard to all matters of architecture, laments that Mr. Shaw-Lefevre is not on the committee, but accounts for it by the supposition that he preferred to remain as an independent critic. This may be so, but it is just possible also that people are beginning to discover that Mr. Shaw-Lefevre is not the authority on architecture which he has given himself out to be.

SIR WILLIAM HARCOURT is apparently posing as the art-critic of the House. Last week he asked the Chancellor of the Exchequer whether, in view of the prospect of a great issue of new gold coin to replace the present light gold, he would take measures to procure a new design for the future gold coinage. The Chancellor replied that a new design for the head of the Queen was under consideration. As for the reverse side, it appeared to him that nothing could be more handsome than St. George and the Dragon, and he proposed to retain that design. Evidently Mr. Goschen and the honourable members who shouted "hear, hear," are not aware of Mr. Ruskin's keen criticism of that "handsome design," or, being aware of it, do not think it worth consideration; but we are so far with them as to consider the modelling far superior to that of the new effigies of the sovereign on the other side. Sir William next turned from numismatics to architecture, and asked the

Home Secretary "whether the new police buildings on the Thames Embankment represented the æsthetic views of the Secretary of State for the Home Department." When the laughter of the House had subsided, Mr. Matthews made reply: "I will not express any opinion as to the buildings on the Embankment." And again the House laughed, and Sir William gave notice that he would call attention to the subject on the Home Office vote. It may enlighten Sir William Harcourt to learn that a drawing of a portion of this building forms one of the most prominent and central exhibits in the Architectural Room at the Royal Academy at this moment, and our opinion on its architectural merits may be read in our leading article on the Academy Exhibition. The building makes no pretence to being a very picturesque or ornate one, for that would have been unsuitable to its purpose; but it is a thoroughly refined and sensible piece of architectural design, carried out by one of the very first architects of the day, Mr. Norman Shaw, whose merits the Home Secretary appears at all events to have understood. That the architectural design of an artist like Mr. Norman Shaw is to be called in question by such a critic as Sir William Harcourt is very characteristic of the effrontery of English public men in dealing with questions of art; and it is all the more contemptible because the whole thing is palpably only a piece of worry directed against a political opponent, and in which the artistic pretext is a mere stalking-horse.

THE principal point discussed at this week's sittings of the Railway Rates Inquiry has been the demand of the traders to have all hardware goods included under the generic term "hardware." This has evidently long been done in practice, for a railway classification before us, dated several years back, contains a "hardware list," comprising 168 articles; and it is there stated that where special rates exist for "hardware" they apply to all the articles enumerated. The companies object, however, to a hard-and-fast rule being imposed upon them by Act of Parliament, and strongly resist the demand. This point is considered by the Court as being of greater importance than any other yet raised during the inquiry, and Lord Balfour of Burleigh decided that the matter should be fully argued by counsel on each side. The traders' representatives had put on a very bold front, and courageously declared their readiness to argue the point out there and then with the railway representatives present, but they were overruled. A great deal of conflicting evidence is being offered as to the value of different commodities, the variation in the estimates of the railway managers and the traders (given, of course, with differing ends in view) being most remarkable; and unless it should be considered necessary to adduce further evidence to substantiate that already put in, the Court will be compelled to adopt a medium as representing the required figure. But value, after all, is a factor frequently having no weight whatever in the determination of rates,—bulk, liability to damage, and many other considerations being of far greater importance. The evidence on these latter points also, however, is sometimes very contradictory and confusing.

THE case of the Governing Body of Charterhouse School v. Le Marque, Surveyor of Taxes, decided on April 29, raised the question whether Charterhouse School was exempt from payment of inhabited house-duty under 14th & 15th Vict., c. 36, which exempts "any charity-school" from payment of the duty in question. The case is of larger importance than at first sight it would appear to be, because grammar-schools and similar foundations might gradually become large public schools. The Court decided that the duty was payable. This decision is clearly sound, but it certainly raises the question whether the inhabited house-duty is not rather a local than an imperial tax.

AN inquiry has been instituted by the Local Government Board in regard to an outbreak of diphtheria at Berkhamstead, Herts, and the state of sewerage of the town. Dr. Blaxall's Report to the Board (April 1) states that the sewerage of the town is of the most defective character, involving faults in construction, and a method of disposal of sewage fraught with nuisance injurious to health.

"The main sewer which runs along High-street is merely an old brick sewer originally laid down by the highway authorities at a depth of about 2 ft. for the conveyance of surface water, and is utterly unfitted for the purpose of carrying off sewage; it permits leakage, and it favours deposit. I had the sewer opened in two places, when I found some 4 in. of thick black mud at each place. This sewer receives the contents of various branch sewers from the streets on the south, and gives off sewers on the north which pass down certain streets, and ultimately discharge into the stream. The principal of these is the sewer which goes down Castle-street and empties into the stream on the east side of the bridge. Another sewer takes the sewage from the west end of the main sewer, and ultimately enters the stream on the west side of the bridge. This sewer is actually provided with two catchpits for the subsidence of the solids; the larger catchpit being only a few feet removed from cottages, and giving rise to intolerable emanations, especially during the time of removal of the solid contents. I received loud complaints of the nuisance caused by the sewer outlets, which is said to be intensified by the admixture of hot brewery refuse.

The branch sewers are said to be constructed of glazed pipes. But no provision is made for the ventilation or flushing of the sewers. From the foregoing it will be seen that the Berkhamstead Sanitary Authority have failed to fulfil the requirements of the Public Health Act, 1875, sections 15 and 19. That the evidence of this report goes to exculpate the sewerage evils existing in this town from direct concern in the causation and spread of throat illness on this occasion does not constitute the smallest justification for the present state of the sewerage. Not only is its condition a distinct violation of law, and a standing cause of offence and other danger to health, but its condition is such as to ensure the spread of such diseases as cholera and typhoid fever should they by chance be introduced into the town."

MUCH has been written and said of late years, though little has been done, respecting the planting of trees in large towns. Manchester has recently shown a disposition to take up the question seriously, and its "Field Naturalists and Archaeological Society" has prepared a report on the subject. Circulars were sent two or three months ago to a number of gardeners and others, and to these circulars forty replies have been received. It is pleasant to find that the majority of those appealed to consider the successful growth of trees in Manchester a possibility, and as many as sixty kinds of trees and forty kinds of shrubs are recommended for planting in streets. It is also suggested that "when trees are planted in broad thoroughfares they should not be placed near the edge of the pavement, but along the middle at convenient intervals. So placed," the report continues, "they would not impede the traffic, but contribute rather to its assistance. The best methods of planting and subsequent treatment are also stated. It remains to be seen whether this report, like so many others on the same subject, will be without practical results.

AMONG the different works of civil engineering now being carried out on or in close proximity to the coast of the Baltic Sea, those on the German side in the old free town Lübeck may be well worth mentioning. We here find that the harbour lines are being relaid, that the water passage is to have a depth of 6½ metres (about 6 ft. more than formerly), and that this passage will be flanked by embankments of monumental construction, backed by rows of warehouses and sheds. A monster crane will be placed in a convenient position, and a new swing-bridge will form the connecting link for the railway service on either side of the water. Owing to the miserable condition of the ground, the foundation-work of the embankment walls is exceedingly difficult, so that these broad borders of béton (faced with brick) have to rest on piles of some 15 to 16 metres length,

of which 4 or 5 go to the metre. The estimate for the work now in hand shows a figure of 2,000,000 marks, and the authorities hope that this sum will suffice for the present. The design of the harbour plan shows that the engineers expect the approval of the Imperial Ministry of Public Works to the new North German Canal scheme, which latter, when carried out, may in some way recompense the old town for the loss of trade which it will most likely suffer as soon as the new sea-canal connecting North and Baltic waters is completed.

IT is proposed to repair and restore, at an estimated expenditure of 3,000l., the Chapel of King's College, Aberdeen, which was enlarged to a capacity of about 350 persons in 1827. It contains the tomb of the founder of the University, Bishop William Elphinstone, to whom Pope Alexander VI. sent a bull dated February 10, 1494, nearly a year after George Keith, fifth Earl Marischal, had founded Marischal College. Of King's the first principal was Hector Boethius, who came from Paris, at a salary of fifty marks Scots,—about 2l. 8s. 4d. a year. Mr. James C. Watt's prize measured drawings of the interior and exterior of the chapel, showing the stall canopies, door in screen, the lantern, with its crown, and other details, were published in the *Builder* of June 6, 1885. In that same year the home on School-hill of George Jameson, the celebrated portrait painter, was doomed to destruction. We published a cut of it on October 3; it is also illustrated in R. W. Billings' "Baronial and Ecclesiastical Antiquities of Scotland," 1815-52, vol. i., and is therein spoken of as being, traditionally, the manse of St. Nicholas. The adjoining building, shown in our cut, was the school to which Lord Byron used to go. Billings' volume contains an interior view of King's College Library; some of Jameson's paintings were hung in the two college halls, notably the set of female portraits, known as "The Sibyls," at King's College.

THE members of the Manchester Cremation Society met on April 23rd and decided to form a company under the title of "The Manchester Crematorium Limited," for the purpose of acquiring land and erecting thereon a crematorium and chapel. Among the directors of the new company are the Duke of Westminster, Chancellor Christie, Dr. Emrys Jones, and Professor Munro. The capital will be 10,000l., and it is expected that the cost of a crematorium on the smallest scale will be 3,000l. Mr. T. C. Horsfall, a gentleman well-known in Manchester for his advocacy of sanitary reforms, drew attention to the state of Ardwick Cemetery. "For more than half a century hurials had taken place at that cemetery far in excess of the purifying power of the soil, and it was horrible to think of the festering mass of human remains that were lying there virtually in trenches. There was no means of escaping such an evil except the one advocated by that society, and in a few years he believed they would have all the thoughtful men and women in Manchester on their side." Certainly the movement in favour of cremation is spreading, but Mr. Horsfall must not be too sanguine: sentiment dies hard.

IN the last number of the small magazine which circulates among the members of the Architectural Association under the title of "A. A. Notes," a tolerably outspoken opinion is expressed as to the recent appointment to the Professorship of Architecture at King's College.

"Another of our members, Mr. Banister Fletcher, J.P., F.R.I.B.A., D.L., has been appointed Professor of Building Construction and Architecture at King's College, London, in place of Professor Kerr. The appointment has certainly come as a surprise to at least the younger members of the profession. Professor Fletcher has long been known as a successful surveyor, and as the architect of certain buildings; his name, too, appears on the title-page of some well-known hand-books on "Dilapidations," "Quantities," and so on, but these books have nothing to do with architecture,

and not much with building construction. He has never been generally credited with the kind of learning that one looks for in a professor of architecture, and it does not seem as if being a J.P. and past M.P. could be qualifications for the post, so that one may be excused for wondering upon what grounds the appointment was made." We have also "wondered."

THERE seems to have been a little local quarrel about the new Leamington Board schools, concerning the rights of which we know nothing, but a writer signing himself "Parallax" made some deprecatory statements concerning the way the work had been done, in the columns of the *Leamington Courier*. The point that concerns us is that in the next number of that journal the editor published a very well-meant expression of regret at having printed a letter reflecting upon the architect of the schools, which must, be thought, have been an unfair attack, seeing that the architect was a member and a local secretary for the "Society of Architects," so that his professional brethren had confidence in him, and also that the Editor of the *Builder* had "solicited the privilege" of publishing the design. This only shows how things get misrepresented to (and consequently by) well-meaning country journals. We never saw the design, and our solicitation of the "privilege" of publishing it amounted merely to an ordinary routine offer to publish a new building, but which never implied any approval of the design. Occasionally a building gets a factitious celebrity in newspapers which an inspection of the drawings by no means confirms. The more serious point is the absurd and mischievous confusion that is made in country places, and which is promoted we have no doubt as much as possible by those whose interest it is to promote it, between the real representative body of the profession and the recently-constituted sham one. Will country newspapers please take note that the representative body of the profession is the *Institute of Architects*, and they will then be preserved from the unnecessary abasement of doing koodoo to people who have no claim to it.

LETTER FROM PARIS.

THE Municipal Councillors of Paris,—elected for a term of three years, which has just expired,—have separated without having voted the prolongation of the Boulevard Haussmann, leaving it to their successors to settle this matter of considerable interest to the Parisian public. In the same careless fashion, having voted recently for the preservation of the buildings on the Champ de Mars, they have adjourned the question of the Chemin de Fer des Invalides.

It is a year since the Exhibition opened its doors, and the event is to be celebrated by a fête organised by the former Commissioners and the exhibitors who have been "awarded." There was to have been banquet and ball on the first platform of the Eiffel Tower, which, after a closure of some weeks, has again been opened to the public; but the unsettled state of the weather has decided the managers of the fête to take refuge at the Hôtel Continental instead.

The liquidation of accounts in connexion with the Exhibition is proceeding rapidly, and everything will probably be settled by the end of the year. The preparation of commemorative medals is nearly completed, and the Direction des Monnaies has already received more than 3,000 medals for the engraving of the names. The diploma, which was designed by M. Galland and the engraving of which has cost M. Waltner more than seven months' work, is being multiplied in electrotype for quicker printing; and it is hoped that the distribution of medals and diplomas, in the order of classification, will be commenced in August.

While Parliament is putting into legal form the making-over of the Champ de Mars and its buildings to the Municipality of Paris, the arrangement of the Palais des Beaux-Arts for the "Salon Meissonier" is in active preparation. The main public entrance will be opposite the dome and facing the Avenue Bourdonnais. The exterior galleries, formerly occupied by restaurants, will be decorated with plants; and sculpture,—not a great deal, it is said,—will be exhibited in the central hall, which will be

decorated with the tapestries lent by the municipality of Paris. In regard to the paintings, which will occupy the position of the exposition retrospective "of last year, the jury is said to have been very hard to please, and to have admitted only about 250 pictures on outside; the total number of paintings exhibited, including those of Associates and Sociétaires," is expected to be about 1,200. The old Salon, which will have opened by the time this letter is published, will include about 400 pictures (300 less than last year). During the present month, it may be observed, will be placed the sale, for the profit of the Société des Artistes Français, "of the works of Delbuth, which were all left by the artist as a legacy to the Société.

The smaller exhibitions, the delight of amateurs, continue to succeed each other during his lull before the opening of the large ones. The eclectics have succeeded the Water-colourists at the Georges Petit gallery. This is the sixth and certainly the best exhibition of this society; including many works remarkable for purity of colour, perfect taste, and an assemblage of varied and curious talent. We may mention among many others the flower studies of M. Hellen; a remarkable portrait of Madame Adeline Lemaire by M. Bessard; M. Roll's portrait of M. Antonin Proust; five pastels by John Lewis Brown; a whole series of rustic scenes by M. L. Lhermitte; some beautiful sea scenes by M. Duez, a fine portrait of a young girl by Mme. Lemaire, and various works by M. Bissot, Dagnan-Bouveret, Elliot, and Forain. Another interesting exhibition is that of Adelle Abbeville, including portraits, pastels, and decorative panels.

The public has been much interested in an exhibition of the works of M. Chéret, who has received deservedly a nomination as Chevalier of the Legion of Honour, having obtained a gold medal in the Universal Exhibition. This artist has for many years been designing decorative and artistic placards and advertisements which have covered many walls in Paris and in provincial towns, and have done much towards raising advertising pictures to the level of a branch of art. The breadth and simplicity of style natural to him have served him well in his class of work, and he may be regarded as an artist peculiarly representative of the present epoch. Other special exhibitions have been those of M. Nozal, landscape-painter, that of H. Renouard, a clever illustrator of Parisian life, and that of the Russian painter Alvasorski, whose mannered and hard style is a curious contrast to that of contemporary French painting of the "plein air" school.

A few days since there was opened, at the Ecole des Beaux-Arts, an exhibition of Japanese engravings, got up by M. Ph. Burly, the well-known art critic, who has collected some very fine specimens of the work of Japanese artists, ancient and modern, of very curious and unique interest.

We ought not to omit in this list of exhibitions the reopening of the panorama of the battle of Champigny, which had such a success some years ago. For those who participated in the sanguinary actions of November 30 and December 2, 1870, this masterly work by Détaillé and De Neuville has a painfully realistic impression.

The Conseil-Général de la Seine, before separating (the term of office of the present council having expired) has given various commissions to artists. Two of these are for paintings for the Tribunal of Commerce, to replace those of Robert Fleury, now in the museum of Versailles, and which have been removed from their original position from an absurd stretch of political prejudice, because they commemorated scenes of the First and Second Empires. M. Delance is to paint in their place "Les Nauties de Lutèce à l'époque Gallo-Romaine"; and MM. Gilbert and Dupré, working in concert, are to illustrate "Une Gare d'Arrivée de Marchandises à Paris." In addition to these, M. Debon is commissioned to decorate the new Mairie of Charenton-St.-Maurice.

An architectural competition has just been decided at the Hôtel de Ville for the new "Ecole de Meuble," mentioned in our last, to be erected in the Faubourg St. Antoine. From among twenty-six designs sent in, the jury have selected for execution that of M. Léopold Decron, and given premiums to those of MM. Guyon, Blavette, and Durand. A sum of 600,000 fr. has been voted for the work.

The Collège de France, the enlargement of which, often talked about, is not yet taken in

hand, is to receive shortly an important addition in sculptural decoration, on a scheme drawn up by M. Ernest Renan. In the Cour d'Honneur adjoining the Place Cambrai is to be erected a group by M. Guillaume representing Francis I. and his sister Marguerite of Valois founding the Collège de France. In a court adjoining the Rue St. Jacques will be placed two statues by M. Delaplanché, representing "La Science de la Nature" and "La Science de l'Humanité." For the Assembly Hall of the Professors M. Alfred Larion is to execute a work symbolising "Le Génie de la Renaissance;" and on the grand staircase is to be placed a bust of La Boulaye, the learned professor who preceded M. Renan as administrator of the establishment. This last will be executed by M. Chaplain.

At the Madeleine an important piece of decorative work of mosaic on gold ground has been commenced by M. Gilbert Martin, after the cartoons of M. Charles Lameire. This decoration, which will occupy the frieze between the colonnade and the domed ceiling of the apse, will consist of a series of figures, the whole occupying a space 30 mètres long, the figure of Christ triumphant occupying the centre, with figures of Apostles and disciples on either hand. This work will give some encouragement to the school of mosaic founded by M. Gilbert Martin at St. Denis, though it is to be feared it may somewhat disturb the harmony and completeness of effect which at present characterise the interior. It might have been better to take the new Church of Sacré Coeur as a field for this experiment.

The clearing away of the exterior scaffolding from this last-named church has resulted in some disappointment. Considering the admitted and exceptional talent of its designer, the late M. Abadie, and the time and money that have been expended on the work, there is a feeling that the effect of the façade, at all events from a distance, is meagre and deficient in grandeur, suggesting a chapel rather than a great church. The addition of the large flight of steps intended by the architect will do something to give it more breadth of effect, but perhaps even then not all that was expected.

The restoration works at Versailles are still in progress. The "Nymph à la Coquille," by Coysevox, after its restoration by M. Suchetot, is to be transported to a museum, and its place in the park will be taken by a copy to be executed by the same artist.* A statue of Houdon, the sketch-model of which has just been completed by M. Tony Noel, is also to be erected at Versailles.

M. Falguère and M. Mercié have just completed their sketch for the monument to Alfred de Musset for the Place St. Augustin. On a pedestal designed by M. Formigé the poet is represented seated in an attitude of meditation. By him stands a female figure representing Poetry, who holds a lyre.

A new work by M. Ernest Barrias deserves mention; this is a massive silver cup offered by the Jockey Club to the "Société d'Encouragement des Courses des Chevaux," under the title of the "Prix de la Coupe." The cup represents, or rather symbolises, the two principal races of France, Longchamps and Chantilly. On one side the artist has reproduced the ancient abbey of Longchamps in the time of Louis XIV., and on the other the actual chateau of Chantilly. To the right and left are small figures representing the Seine and the Oise; the first leans on her elbow holding a vase from which water issues; the latter bears a shield on which is sculptured the figure of Condé.

At the Ecole des Beaux Arts M. Constant Moyaux, "Grand Prix de Rome" and Inspector-General of "bâtiments civils," has been appointed professor of architecture, in the place of the late M. André.

The final competition for the Prix de Rome has just commenced at the Ecole. There are ten candidates in each of the sections of Architecture, Sculpture, and Painting. The annual examinations have resulted in the conferring of the diploma of "Architecte du Gouvernement" on the following:—M. Malgras, pupil of M. Ginain; M. Guénot, pupil of MM. Vaudremer and Raulin; M. Cousin, pupil of MM. Coquery and Gerhardt; M. Garnier, pupil of MM. Douillard and Thierry; and MM. Destor and Febvre, pupils of M. André. The Duc competition, which has for its object "To determine as far as possible, and under the patronage of the Académie, the style and form of the element of our modern architecture," has only attracted

* Most English readers will consider this a very doubtful mode of carrying out restoration.

four candidates. The prize has been awarded to M. Yasson, for a design for a Salle de Concert at Nancy.

A landscape painter who received last year a commission for a large decorative panel for the Hôtel de Ville, has died before having executed his task. This is Mr. Hector Hanoteau, who has died at the age of sixty-seven, after a long and painful illness. A pupil of M. Jean Gigoux, he received medals in the Salons of 1861, 1868, and 1869. He devoted himself especially to pictures of scenes in the neighbourhood of Nivernais, in the midst of which he lived. The Luxembourg possesses two of his principal works, "Les Némuphars" and "Mare du Village." The death of M. Émile de Lansac is also announced, who gained a repute as a portrait-painter. Among his best works are his portraits of Olivier de Clisson and Marché de la Palisse, both now in the Museum of Versailles. He was a pupil of Ary Scheffer, and obtained medals in the Salons of 1836 and 1838. He was eighty-six years old at the time of his death.

Engène Ciceri, the painter, who also died during the past month, was the son of the decorator Charles Ciceri, who was well known for his designs for scenery and decorations for "Guillaume Tell" and "Robert le Diable." Engène Ciceri was pupil of his father, and designed the decoration for the Salle de Spectacle at Mans, but he devoted himself mainly to landscape painting in water colour. He obtained a troisième médaille at the Salon of 1852.

We have also to record the death, at the age of eighty, of M. Brisset, an old pupil of Picot, who assisted his master in the execution of the frescoes in the Church of St. Vincent de Paul, and subsequently executed decorative paintings in a good many churches in Paris, a class of work for which he gained a certain reputation, though his work cannot be said to have risen higher than mediocrity.

In the premature death of the young sculptor, M. Sul-Abadie, pupil of Jouffroy, we have lost one who would probably have attained a high position in his art.

Although collecting is not art, the collector has an important influence in bringing together and preserving art treasures which might otherwise be lost or remain unnoticed, and on this ground we should include in our obituary notes some mention of M. Spitzer, the well-known collector, who, in his splendid house in the Rue Villejust, had accumulated an immense quantity of artistic objects of various kinds, among them a reliquary of the Renaissance period which was valued at 500,000 francs. He was the contributor of the most remarkable objects in the loan exhibition of ancient French art collected in the Trocadéro Gallery last year, of which a detailed account was given in the *Builder* at the time.

The annual congress of French architects will be held this year, to meet the wishes and convenience of some of the departmental societies, in the third week in June, from the 16th to the 21st.

The Académie des Beaux Arts has classed in the following order the candidates for succession to the place vacated by the death of M. André: "première ligne," M. Ancelet; deuxième, M. Pascal; troisième, MM. Guadet, Guillaume, and Harly. But to these five candidates nominated by the Section of Architecture the Académie has added the names of MM. Dutert, Sédille, and Corroyer. The election of the new Academicians will take place shortly.

THE NEW GALLERY EXHIBITION.

The Exhibitions at the New Gallery are less mixed than those of the Academy, where there are levels of commonplace which we do not find at the New Gallery, at which latter, however, it must be remembered the number of works is much smaller: 436 this year, as against 2,119 at the Academy. Consequently the first impression on entering the New Gallery is that of being in a rather select and specially high-class exhibition; an impression which on closer inspection is rather weakened. There is a choice of poetic subjects prevalent, but not always a poetic treatment of them; and a good deal which looks at first sight original seems on further acquaintance rather more correctly classed as eccentric.

There are two very ambitious paintings in the exhibition which peculiarly illustrate the shortcomings of the artists of this following in regard to poetic subjects. Mr. Richmond's large paint-

ing illustrating a quotation from Shelley's "Eppisychion" (72) is merely a reduction of the wild fancy of Shelley to a decorative picture, with a hardly painted and uninteresting damsel walking through a landscape where flowers sprout in a decorative manner, with equal spaces between them. The picture is an absolute failure as far as it professes to be an illustration of Shelley's poem. Equally a failure is Mr. Kennedy's "Persons" (162); worse than a failure, a vulgarising of the legend. The Andromeda is odious; a smirking young woman making vulgar love to Persus. The treatment of the sea-monster is good; but as a whole the thing is nothing but a bad stage scene.

Mr. Watts's "Ariadne" (31) is another sort of thing. A fine picture at all events, though she is too placid for Ariadne, this large and rosy nymph in her ample drapery; there is a richness of colour, in the drapery, in the face, and in the bands of heavy foliage and dark clouds which cross the background. There is at all events nothing commonplace here in the conception; and there is that harmony and unity in the whole, rather to be felt than described, which goes to make what can really be termed in the full sense a picture.

Mr. Alma Tadema's "Eloquent Silence" (51) is another masterpiece of colour. A Greek man and woman are seated on a marble bench, with a mass of purple clematis on the wall behind them, whose colour is repeated in the purple jar which forms a background to the woman's head. There is a little more of interest and expression in the figures, in the man at all events, than this painter generally gives us; but the interest of the painting does not lie in that, we care nothing for them; it is an incident of composition and colour presented with consummate skill. The small and exquisitely-painted portrait of "Miss McWhirter" (52) by the same hand, is very interesting, for it shows Mr. Tadema for once dealing with a different type of female face from that which he had been for so long continually repeating; there is a great deal of character about it; and as a painting, in the matter of execution, it is a perfect gem. Below these, and lower than it should be hung, is placed a beautiful little nude study by Mr. Poyner, "High Noon" (55), a young girl seated on rocks by the sea and shading her face from the sun with a palmetto fan. This is a curious contrast to Mr. Tadema's method in flesh painting; less realistic, warmer and richer in colour, and broader in execution, and as far as the figures taken alone are concerned it is a finer work. Mr. Tadema's strength lies in his brilliant combinations of figures and accessories.

It may be doubted whether Sir John Millais has achieved what he intended in his remarkable attempt to represent "Dew-drenched furze" (119) under the light of the morning sun. The scene is in a wood facing the full glare of the morning sun, and the furze-brake is glistening with myriads of dewdrops. The dazzling effect of the sun is conveyed by the loss of form and detail among the trees, which vanish in the light in the centre of the picture. The attempt to represent in painting an effect which depends on an infinite number of scintillations or reflections of light seems almost hopeless; we can see what is intended, but the effect is not realised, though the experiment is a most interesting one.

Landscape takes for the most part, at the New Gallery, the form of studies of special effect or special sentiment expressed in a more or less impressionist treatment. Thus we find as a typical example immediately on entering, Mr. Padgett's "As the red moon rose o'er a Sussex down" (2), a ghostly effect of moon over an expanse of down, the whole worked up into a kind of dreamy effect of demi-tint. This is not Nature; it is very pretty art, but an art of which one is apt to tire, and of a kind which it is not very difficult to manufacture. There are some fine landscapes to be seen however. Mr. Alfred Hunt sends a large painting of "Windsor Castle, Twilight" (92), which is the larger edition of that which is seen on a small scale in the gallery of the Water-Colour Society; an effect of atmosphere expressed with even more delicacy and beauty in the oil painting than in the water-colour. Mr. Adrian Stokes's "Breaking Wave" (97) is a fine painting in regard to the form and movement of the water, but there is a want of light and "glisten" on the inner surface of the turn of the wave which gives it a dead and un-waterly look; the dark bulk of the following wave, behind the foam of the first one, is finely given;

but the whole picture is not one of Mr. Stokes's great successes.

Mr. Parsons even has become sentimental in the atmosphere of the New Gallery; his "When Daylight Dies" (149) has the usual arrangement of trees but with a sunset sky and a figure—actually a figure, of a melancholy lady leaning against a tree trunk to gaze on the sunset, but we cannot say the figure adds to the sentiment of the scene. Mr. East's "Pershire Pastoral" (133) is a fine work, the method of Corot with a different and warmer scale of colour. Mr. R. W. Allan has made a fine landscape under the title "Homewards" (96); we say "made" advisedly, for it is a contrived picture with a kind of "old master" style about it, and not a transcript from nature; but it is a powerful and poetic work. Mr. Wetherbee's "O Lovely Spring" (105) is a joyous effect of sunlight. Mr. Lemon's fine and poetic work, "The Horse Pond" (125), is made out of the same materials as his picture in last year's Academy; well-studied but dimly-discerned horses in the foreground and successive stretches of dull moorland in the background; it is an admirable picture, but we hope the author is not going to fall into the mere repetition of a receipt: he is worth something better than that.

Among the figure pictures that are prominent is Mr. La Thanguc's "Leaving Home" (132), a painting which pretends to be pathetic while the real and evident object is to display the artist's cleverness in painting a horse and cart "end on." This is a false cleverness which always defeats itself in regard to any effect of the picture on the sentiment of the spectator.

Mrs. Alma Tadema's "Battledore and Shuttlecock" (138) is one of the best works we have ever seen of hers; it is a study in light tones, a girl in a white dress in the middle of a mostly white room; her figure is very pretty and her action as she prepares to hit the shuttlecock very well conveyed; the lookers on fill up the incident of the picture well. Mr. Nettleship sends one of his large and interesting animal paintings, "The Adversary" (8), a huge serpent (which we think we know at Regent's Park) stalked by two tigers: the colour of the serpent seems rather heightened beyond that of Nature. Mr. Edgar Barclay's "Shelter" (34) is a pretty combination of figures and landscape, a group of girls in the foreground sheltering under a tree. Mr. Watts sends one of the little jokes which he has taken to lately, "Little Red Riding Hood" (47), charming in colour but rather stiff and artificial as a child picture.

Among the portraits are some really fine ones, of which we prefer Mr. Shannon's portrait of "Sir Alfred Lyall" (64) to all the rest; it is a full-length portrait in which the artist has contrived to give both ease and dignity of attitude; a combination not often achieved in portrait painting. His "Mrs. Whitelaw" (98) is not happy in colour; but a half-length portrait in the South Room, "Miss Cooper" (227), is beautiful. Mr. Herkomer's portraits of Mr. Cawkwell, Mr. Grierson, and Sir James Pender, (28, 33, 43) are masterpieces of straightforward realistic portraiture. Among smaller portraits Mr. Julian Story's "Mrs. Humphrey Ward" (123), and Mrs. Swynnerton's portrait of two little boys (192) should be looked at; as also Mr. Clifford's large and fine portrait group of the Earl and Countess of Radnor and Viscount Folkestone (237). Mr. Sargent has out-Sargented himself in his portrait of poor Mrs. Comyns Carr (82), nor is his rather bald picture of "Ightham Moat" (188) a compensation, though topographically interesting.

Among various pictures we noted but have not space to comment on further are Mr. Waterlow's "Night before Shearing" (6), an effect of light well conveyed; Mr. Buxton Knight's "All on a Summer Day" (19), noticeable because it is out of the painter's usual style and looks like a leaf taken out of Mr. Mark Fisher's book; Mr. Alfred Parsons's "Beafield" (46); Mr. Wylie's "Fallow" (61); Mr. Leslie Thomson's "Summer" (78), a clever example of the artificial landscape effect, "with bathers," a new tune on an old instrument; Miss Tennant's "Street Arabs at Play" (170), a more ambitious work than she has generally attempted; Mr. Thorne Waite's "The Shepherds Meet" (232), a beautiful chalk coast landscape; and Mr. Harper's "The Singers; Byzantine Interior" (217), in which the figures are perfectly stiff and uninteresting, but which may appropriately be recognised in an architectural journal as a remarkably finished study of mosaic and glass decorative effect in an interior.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS: THE ANNUAL REPORT.

The annual general meeting of this Institute will be held on Monday next, May 5. The Annual Report of the Council, to be formally submitted for consideration, has been already issued to the members. As usual, we make some extracts from it:—

"The thirty-four members of the present Council are the first who have been elected by voting-papers issued to every subscribing member of the Royal Institute in the United Kingdom; and they include representatives from Bristol, Cambridge, Glasgow, Leeds, Leicester, Liverpool, Manchester, Newcastle, Nottingham, and Sheffield, with a representative of the Architectural Association (London). For the first time since the foundation of the Institute, the Presidents of allied societies at Bristol, Leicester, Liverpool, Manchester, Newcastle, Nottingham, and Sheffield have been elected to seats on the Council; as also two Associates, in accordance with the provision of the by-law. The Council, since their election on June 3, 1889, have held twenty-five meetings, and, since the issue of the last annual report, Committees of Council have held in all fifteen meetings, for the consideration respectively of questions relating to Professional Practice, the Certificate of Membership and the new sea alliance of non-metropolitan Societies, the acquisition of additional premises, the qualifications of technical officers appointed under Acts of Parliament, and the Architects' Registration Bill.

The Birmingham Architectural Association, whose rules had been previously approved by the Council, and whose list of members had been duly submitted, were admitted to alliance with the Institute by a resolution passed at a special general meeting held on March 1, 1890.

During the official year now terminating forty-two Fellows (of whom twenty-four were previously Associates) and seventy-eight Associates have been elected. The number of Fellows is now 519 as against 497, and the number of Associates 768 as against 727, at the corresponding period last year. The number of Hon. Associates is now eighty.

In accordance with the provisions of By-law 13, three Fellows have been transferred to the new non-subscribing class of Retired Fellows—viz., Messrs. H. Clutton and James Murray of London, and Mr. Milford Teulon of Leamington. Professor E. A. Freeman, D.C.L., and the Right Hon. Sir Henry Layard, G.C.B., who have been members for many years, have been elected Hon. Fellows. One Hon. Cor. Member has been elected—viz., M. J. Van Ysenyck, architect, of Brussels.

The losses by death since the last annual meeting have been eight Fellows,—viz., E. C. Aytton-Lee, Joseph Jennings, Charles Lockhart-Lock, W. Millican (Leicester), Samuel Musgrave, H. R. Newton, Sir J. A. Pictou, F.S.A. (Liverpool), and E. W. Stephens (Maidstone) (three Associates,—viz., J. Mechelen Bogers, Ralph Nicholson, and E. P. Willis (Norwich)) and three Hon. Associates,—viz., J. F. Latrobe Bateman, F.R.S., Gerard Ford, and George J. J. Mair, F.S.A. Among the non-subscribing members the Institute has lost by death John Turtle Wood, F.S.A., Hon. Fellow, Firminger Epellet, Hon. Cor. Member (Arras, France), and Louis Jules André, architect-academician in the Institut de France, Hon. Cor. Member.

The need of further accommodation for the purposes of the Library and the Office of the Institute, and the opportunity offered by the removal of Messrs. Hutchings and Romer, the music-sellers, who have long occupied the shop on the ground-floor of No. 9, Conduit-street, led the Council to consider the possibility of taking the vacant premises. They have consequently arranged with the Architectural Union Company for a lease of the shop and the basement under it, at a rental of 220*l.* per annum; and as the seven years' lease held by the Institute of the Arbitration-room would expire at Christmas, it was thought desirable to enter into a lease of both the shop and the Arbitration-room for the same period, and on the same lines as that of the other portions of the building rented by the Institute, viz., until the year 1958. The Council, therefore, having made a recommendation to this effect, have been empowered, by a resolution passed at a special general meeting held on March 31, to execute a lease of the premises in

question at a combined rental of 350l. per annum. Possession of the shop, it is understood, can be obtained at Midsummer Day, when it will be necessary to make certain alterations therein, in order to fit it for future use as a Council-room and Secretary's room. The proposal is to remove the whole of the secretarial work to the ground-floor, the present Arbitration-room to be fitted as a general office, and the basement divided into a strong-room, store-room, lavatory, &c., thus leaving the whole of the first-floor free for the library and reading-room, and for committee purposes. The probable cost of the necessary alterations and fittings will be about 1,000l.

An enlarged edition of the 'Kalendar,' issued to members in September, 1889, contained, besides most of the matter in former editions, lists of the names and addresses of professional members of nine allied societies, particulars of the Progressive Examinations, a list of the principal contributions to the original series of the 'Transactions,' with the new By-laws and revised appendices incidental thereto.

The Certificates of Membership, authorised under the provisions of the Charter of 1887, are being issued to Fellows and Associates, at home and abroad; and, in accordance with its requirements, a new seal has been prepared, from drawings made by Mr. J. H. Metcalf, the gift of the President.

A Preliminary Examination of candidates for registration as Probationers of the Institute,—the first under the newly-established system of Progressive Examinations,—was held in November last, and the Council desire to acknowledge the cordial assistance they received in its inauguration from the nine allied societies. Of the 107 candidates admitted, 41 were declared exempt; and of the remainder, 36 were examined in London, 3 in Dublin, 8 in Bristol, and 16 in Manchester. Forty-three passed. At a second Preliminary Examination held in March, 1890, in London, Bristol, and Manchester, 18 out of the 70 candidates admitted were declared exempt; and of the remainder, 34 passed. The names of 139 gentlemen have consequently been entered on the Register of Probationers. The Council have decided to hold the first Intermediate Examination next November, on condition that a minimum of six Probationers offer such testimonies of study, and have so advanced in their studies, that by special exemption they can be admitted to it in less time than the prescribed two years.

At the Qualifying Examination for candidature as Associate, held last November, 28 out of 40 gentlemen who presented themselves passed; and at the Examination held in March, 26, out of 53 who presented themselves, passed. Thus, during the official year 1889-90 (from May, 1889, to May, 1890), 54 gentlemen have qualified for candidature as Associate. During the Kalendar year 1889 the number who passed at the three Examinations held in London and Liverpool amounted to 79. Of these, Mr. Herbert Baker was declared by the Board of Examiners to have most highly distinguished himself, and the Council awarded him the Aspietial Examination Prize.

At the Statutory Examinations held in October, 1889, when six candidates presented themselves, a certificate of competency to act as District Surveyor in London was granted to Mr. George Lay Crickmay, Fellow; and certificates of competency to act as Building Surveyor under Local Authorities were granted to Mr. Henry Heugh Tasker and Mr. Robert Williams, Associate. The second half-yearly Examinations are to be held on the 24th and 25th inst.

The Royal Gold Medal for the promotion of architecture was presented in June, 1889, to Sir Charles T. Newton, K.C.B., Antiquary to the Royal Academy of Arts, and late Keeper of Greek and Roman Antiquities in the British Museum, for his works as a man of science and letters. That for the current year has been awarded to Mr. John Gibson, for his works as an architect; and, the royal sanction having been received, the medal will be presented at the closing meeting of the present Session.

The public presentation of the Studentships and Prizes for 1889-90, the award of which, in accordance with the provisions of By-law 66, was made by the Council in writing under the common seal, and announced at the business general meeting held Monday, January 13 last, took place on the subsequent Monday, when the President delivered an interesting address to students. The exhibition of drawings consequently remained open until after the presenta-

tion of the prizes, an advantage to all concerned.

The Council regret to be obliged to record that no Essays were submitted for the Silver Medal and twenty-five guineas offered last year, the subject of which was 'Fenestration: its treatment in secular buildings of various styles.' A similar subject has been set for the current year, under the title of 'The treatment and disposition of windows in Civil and Domestic Buildings in the United Kingdom.' The Silver Medal and ten guineas for Measured Drawings were presented to Mr. Alex. Mackintosh for illustrations of Pluscardyn Priory. In the same competition, Mr. J. E. Mowlem, of Swanage, obtained a Medal of Merit for illustrations of Cranborne Manor House.

None of the designs submitted for the Soane Medallion appeared of sufficient merit to justify the award of the Medallion or of a sum of money for foreign travel; but Medals of Merit were presented to Mr. Francis W. Bedford, who sent in the best plan, and to Mr. Charles S. Spooner and Mr. Ernest W. Gimson, who sent in the best architectural designs for the exterior.

Mr. John Begg, of Edinburgh, was elected the Pugin Student; and Mr. Detmar J. Blow received a Medal of Merit for the drawings he submitted for the Studentship.

The Godwin Bursary was awarded to Mr. A. Arthur Cox, who has undertaken to make a tour in the United States.

The Lite Prize for Design in the Italian Style was presented to Mr. James C. Watt, of Aberdeen; and the Grissell Medal for Construction to Mr. Walter Percival, of Longton, Staffordshire. In the latter competition Medals of Merit were presented to Mr. J. A. Pywell and Mr. Thomas F. Pennington, Associate.

In the Scientific Masonry Competition, the first prize of ten guineas was gained by Mr. Harold A. Woodington, and the second prize of five guineas by Mr. A. Whitford Anderson, Associate. These prizes were the gift of three members of the Council. Three similar prizes, offered during the current year from a sum of twenty guineas subscribed by members of the Institute, are open to all British architects and students of architecture.

During the twelve months elapsed from April 1, 1889, to March 31 of the present year, the additions to the library amounted to 208 volumes and 222 pamphlets, and to the Loan Collection six volumes and five pamphlets, exclusive of Parliamentary Papers, periodicals, reports and transactions of societies, parts of works issued in a serial form not yet completed, and trade-lists.

The number of volumes presented to the Library was 190, and to the Loan Collection three. Of pamphlets, 164 were presented to the Library, and five to the Loan Collection. The foregoing enumeration includes 123 volumes and 58 pamphlets forming the Pink Bequest.

Of drawings, engravings, and photographs, 103 sheets were presented, and seven volumes of drawings and sketches of Indian scenery and antiquities by T. and W. Daniell were presented by Mr. J. D. Crace, Hon. Associate.

The works purchased comprise eighteen volumes and fifty-nine pamphlets for the Library, and three volumes for the Loan Collection, together with several Parliamentary Papers.

The want of shelf-accommodation, a subject that has frequently been mentioned in the annual reports, has again begun to make itself felt; but the Committee trust this may be met by increased accommodation when the changes in the Institute premises, now under consideration, are carried out.

The Report then gives statistics as to the attendances of readers in the Library, which during the year numbered 3,039, as against 3,906 last year. The number of tickets (exclusive of renewals) issued for admission to the use of the library and loan collection was 94 (last year 108). The number of volumes issued on loan was 985 (last year 1,255). The attendance of members of the Architectural Association as readers in the library were 296 (last year 570), and the number of issues on loan (both these items being included in the gross returns above given) was 91 (last year 185).

The bookcases opened last year for general access to certain books of reference have

* See some remarks on this subject, and the state of the Library generally, in a "Note" on page 316.—Ed.

fairly answered their intended purpose, and many of the books are in frequent use.

"The Committee have called special attention to the fact that, since the abrogation of the by-law referring to the special donation" which every newly-elected metropolitan member was expected to make to the library, the amount of money the committee have at their disposal for the purchase of books is extremely small. In the absence of adequate funds it is quite impossible to maintain the Institute Library (the most valuable architectural reference library in the United Kingdom) at the standard of usefulness desired for it. There is every year a very large number of books published which ought to be at once purchased: delay in waiting until they can be bought second-hand, or by chance be presented, tends to foster in the minds of members a belief that the Institute library is of value only for the consulting of books long since published.

The *Literature Standing Committee* report that at the first meeting, held on July 9, 1889, the following officers were elected under By-law 48:—As Chairman, Professor T. Hayter Lewis, F.S.A., Past Vice-President; as Vice-Chairman, Mr. Alex. Graham, F.S.A., Member of Council; and as Hon. Secretary, Mr. Paul Waterhouse, M.A., Associate. The committee have held eight meetings, and the average of attendance of members therat has been between eleven and twelve.

The *Standing Committee for Art* have held seven meetings, and have had under consideration and inquiry subjects that have been referred to them by the Council, or have been brought to their notice.

Their attention having been drawn to the proposed demolition of well-known old houses in the Butter Market at Dartmouth, a resolution was passed expressing their sense of the interest and value of the buildings, and their wish that the efforts of the Mayor of Dartmouth for their preservation might be successful. Upon this resolution the Council forwarded a letter to the Mayor of Dartmouth, and it is understood that the threatened demolition has been averted.

In view of the public discussion upon the preservation of the existing buildings of Emanuel Hospital, Westminster, a resolution was adopted expressing the interest felt by the committee in the ancient hospital, and their hope that any scheme for reconstructing the charity would not involve the destruction of the building. This resolution was communicated to the Governors by the Council.

A communication on the subject of the sculptured panels at St. George's Hall was considered, and the committee stated that, while not prepared to express an opinion on the details, they would welcome the completion of the sculpture of the building.

London street improvements have been constantly under consideration by the committee, and they observe with satisfaction that the plan proposed by the London County Council in their scheme for the Strand improvement provides for the preservation of the Church of St. Mary-le-Strand. The improvement of Piccadilly-circus and the erection of a memorial fountain there have been considered, and Mr. Gilbert, A.R.A., the sculptor of the fountain, has been consulted in order that the committee may be in a position to make recommendations to the Council at an opportune time. The advisability of removing houses at the corner of Tottenham-court-road and Oxford-street has been considered, and a plan submitted and discussed for the improvement proposed. The committee drew attention to the fact that, at the junction of Shaftesbury-avenue with Oxford-street, a frontage designed for a permanent advertising station had been erected, as they considered that a protest should be made against such a use of a commanding site by public bodies.

The *Practising Standing Committee* have held eleven meetings, and the following is a summary of work done by them:—

Revised Conditions of Building Contracts have been completed, and, with the authority of the Council, have been submitted to the Institute of Builders, and are now under consideration by that body.

The committee have approved a modification

* The old by-law was thus worded:—"All metropolitan Fellows and Associates are expected within twelve months after their election to deliver an original paper to the Council, on some subject connected with architecture or kindred subjects, or to make a donation to the library or collection."

of the forms of Articles of Clerkship which they had prepared.

The committee have considered and reported to the Council upon the following Bills dealing with building and sanitation in London:—London County Council (General Powers) Bill; and Public Health (London) Consolidation Bill.

The committee have given great attention to a question raised as to a clause inserted in some advertisements for tenders throwing the onus of checking upon the contractors. They have obtained much information upon the subject from all parts of the kingdom, but have not yet been able to report.

There are numerous other subjects, some having been referred to the committee by the Council, which have engaged their attention, among which may be mentioned the amendment of the Acts relating to buildings in the metropolis, the question of ownership of drawings, &c. The committee are making a careful study of the various points suggested for consideration in regard to amending the Metropolitan Building Acts.

The Science Committee have held six meetings, and the principal subjects discussed have been the amendment of the law with regard to light and air, and the draft Bill proposed to be introduced by the Government for the consolidation of existing enactments affecting Public Health in London. The subject of light and air has been the occasion of much consideration and discussion, and the committee are now engaged upon the consideration of certain proposals dealing with the question of existing prescriptive rights.

Before the present Council came into office, arrangements had been made, with the assistance of the Art Standing Committee, to obtain a select number of architectural drawings and of photographs of executed buildings for the International Exhibition held in Paris last year; and the Institute was accredited by the Fine Arts Department of the British Section as the channel through which such drawings and photographs were to be selected. The exhibition of drawings and photographs was duly held, and Mr. E. J. Tarver, F.S.A., then hon. secretary of the Art Standing Committee, went to Paris for the purpose of superintending their hanging. The President of the Institute, Mr. Waterhouse, R.A., and the Secretary, Mr. William H. White, were appointed to represent the United Kingdom on the International Jury for Architecture, and were received in Paris with great cordiality by M. Bailly, Hon. Corr. Member, and the other members of the jury.

An International Congress of Architects was also held in Paris last June, which was attended by the President and other members of the Institute, and to which the Secretary was accredited by the Council as the representative of the Institute.

Early in the official year, the Council agreed to the appointment of a joint committee, composed of members of the Institute and of gentlemen nominated by the College of Organists, to consider the subject of musical requirements in church planning—a subject brought before the Institute by Mr. John Belcher last session. The following gentlemen consented to serve thereon,—viz., Messrs. Belcher, Carpenter, Sedding, Stannus, and Statham, on the part of the Institute; and on the part of the College of Organists, Dr. Martin, of St. Paul's Cathedral; Mr. Walter Parrott, of St. George's Chapel, Windsor; Mr. James Higg, of the Royal College of Music; and Mr. Turpin, Hon. Sec. of the College. The committee have held meetings, and have the whole matter now under discussion.

The Council have also had under consideration the qualifications necessary and adequate to technical officers intrusted with duties under the provisions of the Public Health Act, and of Acts bearing on the same; and, an opportunity having presented itself, they addressed a letter on the subject to the President of the Local Government Board. In this communication the Council strongly advocated the desirability of further legislation by the Government to improve the qualifications of such officers and afford a real test of their efficiency; to which end the Secretaries were directed to inform the Local Government Board that the Council would gladly assist in any way that might be deemed necessary or desirable.

At a special general meeting held on January 13, 1890, a Form and an alternative Form of Articles of Pupilage were approved,

and a copy of each will in due course be issued to every member.

On the same evening a discussion was opened by Mr. William Woodward, Associate, on the 'Sundry Powers and Provisions' portions of the London County Council (General Powers) Bill. A full report of the discussion was placed before the Practice Standing Committee, then engaged at the request of the Council in considering the subject. This Bill is entitled: 'A Bill to provide for the improvement and alteration of a Bridge over Bow Creek at Barking, and the acquisition and management of Brockswell Park, and to confer various further powers on the London County Council'; and the Council, in their letter to the County Council, expressed regret that important amendments of Building Regulations should have been introduced into a 'General Powers' Bill. They urged that such a system could be only of temporary expediency, and that in their opinion the time was approaching when the County Council might advantageously introduce a new Bill for consolidating and amending the laws relating to building within the county of London. The Council then submitted for the consideration of the London County Council some suggestions relating to certain sections of the Bill, and printed copies of their letter were forwarded to the members of the County Council, the metropolitan members of Parliament, the City Corporation and the twelve principal Companies, and other owners of landed property in London. The letter was published in 'The Journal of Proceedings' of March 20, 1890.

Prior to this, a communication was received from the Building Act Committee of the London County Council, asking for an opinion on questions relating to the appointment of District Surveyors, to which the Council gave full consideration, and their reply was forwarded in November last.

The President of the Local Government Board having been good enough to furnish the Council with two copies of a draft Bill to consolidate the Acts relating to Public Health in the Administrative County of London, the same was referred for consideration and report to the Practice and Science Standing Committees; and the Council, having received from the two committees their respective reports, ordered a communication to be made on the subject to the President of the Local Government Board, and submitted suggestions in regard to certain sections of the Bill, expressing at the same time satisfaction that the consolidation of the laws affecting public health in London had engaged Mr. Ritchie's attention, and adding a hope that the Bill would soon be brought before the Legislature.

A Bill for the registration of architects was read a first time in the House of Commons on February 13, 1890, and now stands for a second reading on May 14, 1890. The Bill is precisely the same, with the exception of its heading, as that introduced into Parliament last year. A Statement of Objections to it, prepared by the Council, was extensively circulated, and a petition under the common seal of the Institute, affixed by the authority of the Council, was presented to the House of Commons by Mr. Dixon-Hartland, M.P., praying that the Bill might not pass into a law, and that if it were read a second time the same might be referred to a Select Committee of the House, and the Institute heard by counsel against the Bill. The action of the Council in this matter was strengthened by the support of most of the allied societies and of the Architectural Association, petitions to the House of Commons having been presented against the Registration Bill from the Royal Institute of the Architects of Ireland, the Bristol Society, the Glasgow Institute, the Leicester and Leicestershire Society, the Manchester Society, and the Nottingham Society.

A requisition* made in accordance with the provisions of By-law 60 having been received from fifteen Fellows and six Associates for a special general meeting to consider the subject of a compulsory Examination (by statute) of all architects hereafter seeking to practise, whether members of the Institute or not [see the R.I.B.A. Journal, p. 232], the Council convened the meeting on March 31, 1890. At this meeting† the following resolution was carried:—

'That, while not opposed to the principle of compulsory examination as applied to those about to practise architecture, the Royal Institute of British Architects

* See Builder, p. 208, ante.

† See the R.I.B.A. Journal, pp. 261-274; and the Builder, p. 244, ante.

is of opinion that the difficulty of restricting by statutory powers the practice of architecture to those who have passed an examination is at present so insuperable that it is undesirable to make an immediate application for such powers.'

On the demand, however, of six Fellows, made at the meeting in accordance with the provisions of By-law 62, the resolution was suspended in order that a poll might be taken thereon by voting-papers. Scrutineers were appointed, and 1,182 voting-papers were sent out to the professional members resident in the United Kingdom. The report of the scrutineers was presented on April 21, 1890,* when it was found that 702 votes had been received within the prescribed limit of time, and that the result was 520 For, and 164 Against the resolution, which was therefore carried by a majority of 356 votes. In the scrutiny 18 votes were rejected as informal.

The revenue accounts and balance-sheets of ordinary and trust funds for the year ended December 31, 1889, are submitted, with the Report, duly audited and signed by Mr. Henry S. Legg, Fellow, and Mr. Bernard Dicksee, Associate, the auditors appointed at the general meeting held June 3, 1889.

An estimate of receipts and disbursements of ordinary funds for the year ending December 31, 1890, to which are attached statements of the amounts actually received and spent in 1889, is also submitted with the Report. The subscriptions for the current year are estimated at £4,150L, as against 3,837L last year, and the total receipts at 5,250L, as against 5,061L. The estimated disbursements for the current year are 4,790L, against 4,534L last year. The Council have invested the balance of 506L 11s. 3d., which remained at the close of 1889, and a sum of 276L 5s. 9d. taken from the current year's ordinary revenue, making altogether 783L. This amount has been devoted to the purchase of fifty-eight shares, at the rate of 13L 10s. per share, in the Architectural Union Company (Limited).

Illustrations.

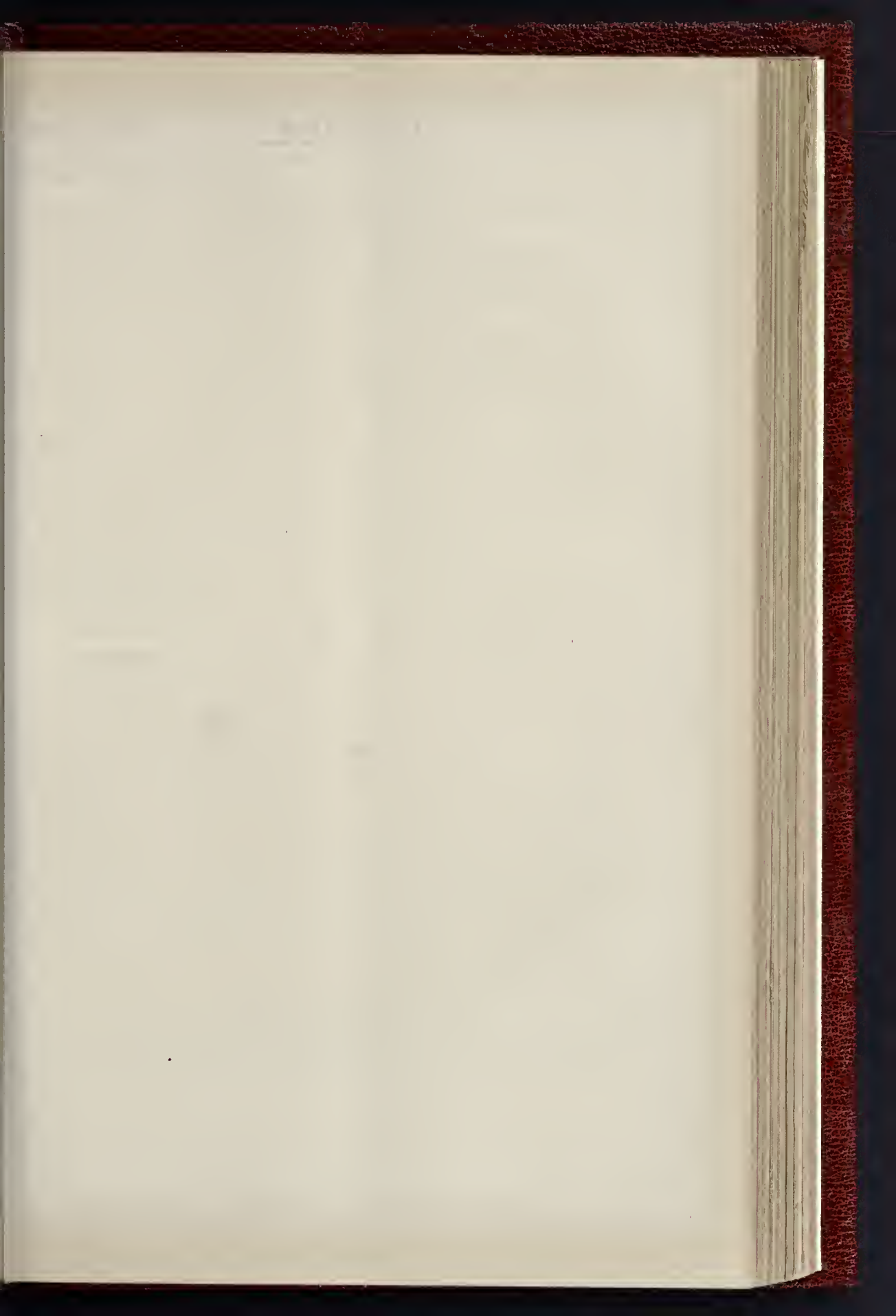
SOME CHURCHES UPON THE LOWER RHINE.—III.

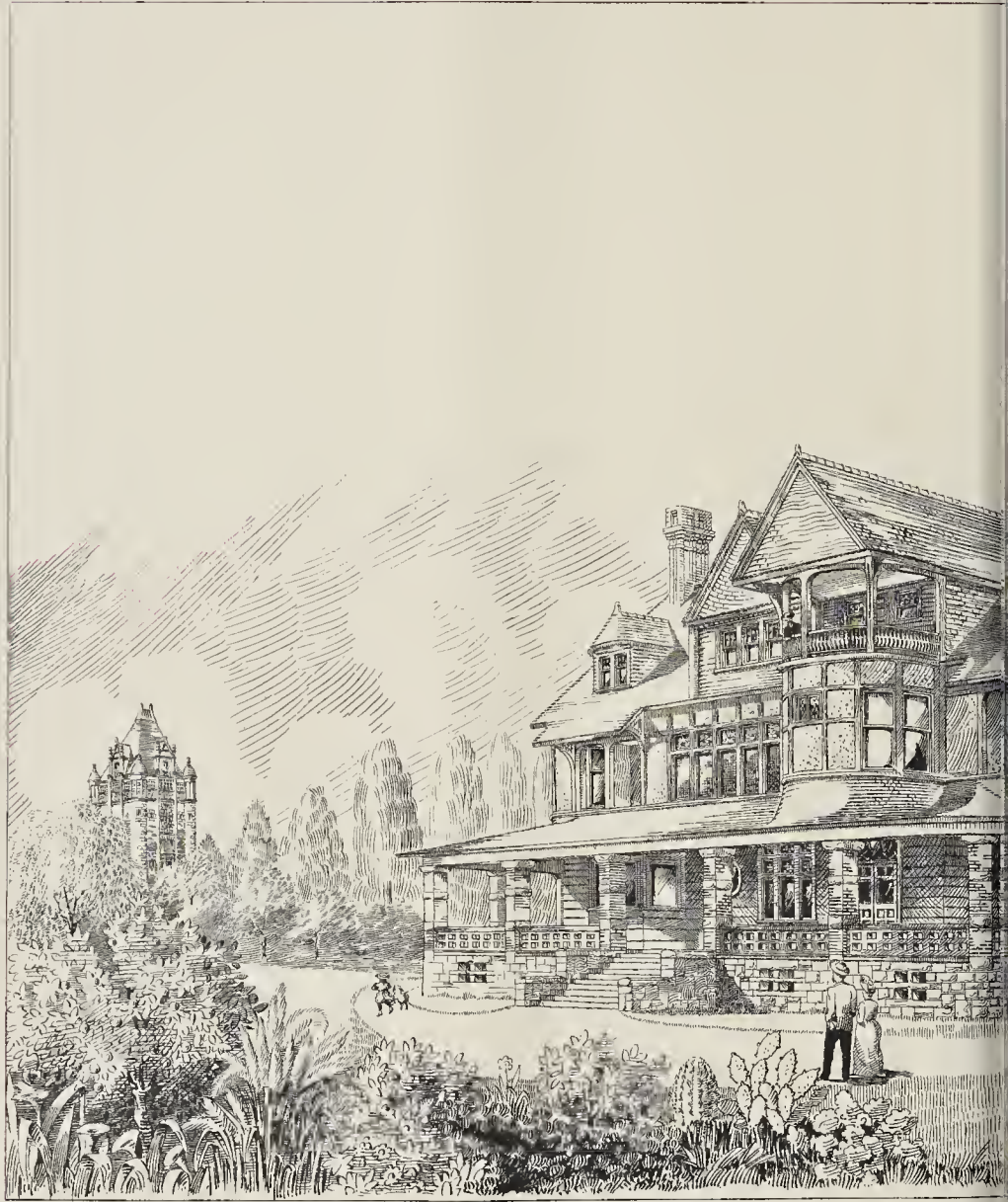
WE have previously illustrated and described the exterior of the magnificent minster church of St. Victor, at Xanten.† The general effect of the interior is even more striking than that of the exterior. It consists of a nave with four aisles, ending in five apses to the east, arranged in a singularly picturesque manner. To the west of the nave is a kind of transept which formed a portion of an earlier church, and is made up of the lower parts of the towers and a square bay of the old Romanesque nave between them. The arches which separate the nave from its aisles are supported upon very richly-clustered columns, which have deep foliated capitals and elaborate tabernacle niches attached to them. These niches contain one of the finest series of Mediaeval statues in all Germany. There is no triforium, but a pierced parapet, supported upon an elaborately-foliated cornice, runs round the whole church. The clearstory is very lofty, and the vaulting very elegant. There is no architectural division between the nave and the choir, except the stone roof-screen, an interesting work of the latter part of the fourteenth century. Two doorways in this screen give access to the choir, which, by the way, occupies half the length of the church. The effect upon entering this choir is surprisingly beautiful. Not only is the architecture of this portion of the building singularly graceful, but it retains the whole of its very sumptuous Mediaeval furniture.

The high altar is surmounted by a vast triptych reredos, with double doors or valves. When the inner series of these is thrown open it displays a number of elaborately carved niches filled with Mediaeval reliquaries, that in the centre being the splendid thirteenth century shrine containing the body of St. Victor; below these niches are three panels,—the centre, painted by Jean Mabuse, and the sides by Bart de Bruyn. The wings, or valves, are also works of the same painter. Above the whole is a large semicircular lunette, adorned with a beautiful painting of the Crucifixion, possibly by John of Calcar. The architectural portion of this

* See Builder, p. 297, ante.

† See Builder for April 5 last.



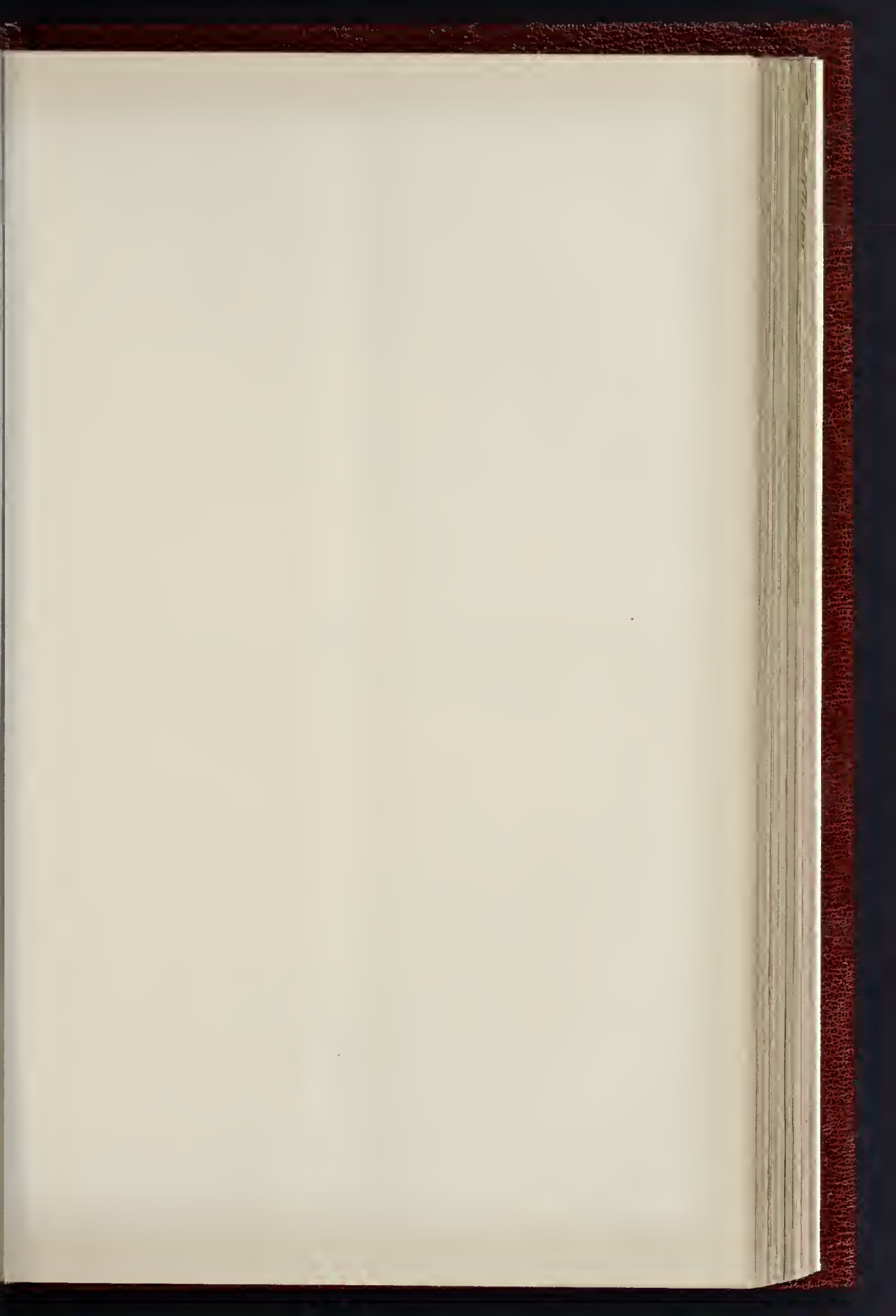


RESIDENCE, INGLEWOOD, CALIFORNIA



PHOTO-LITHO SPRAGUE & CO 32 MARTIN LANE CANNON ST LONDON, E.C.

ATT, EISEN AND CUTBERTSON, ARCHITECTS.

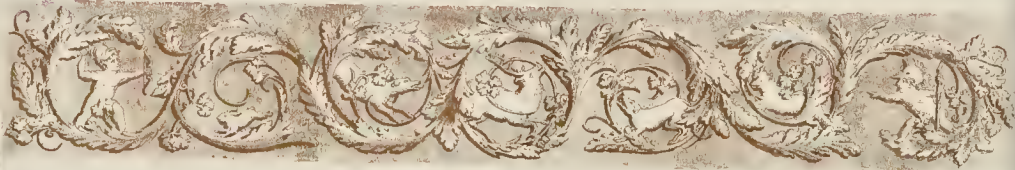




BRICK PANEL. WEST FRONT.



BRICK PANEL: WEST FRONT.



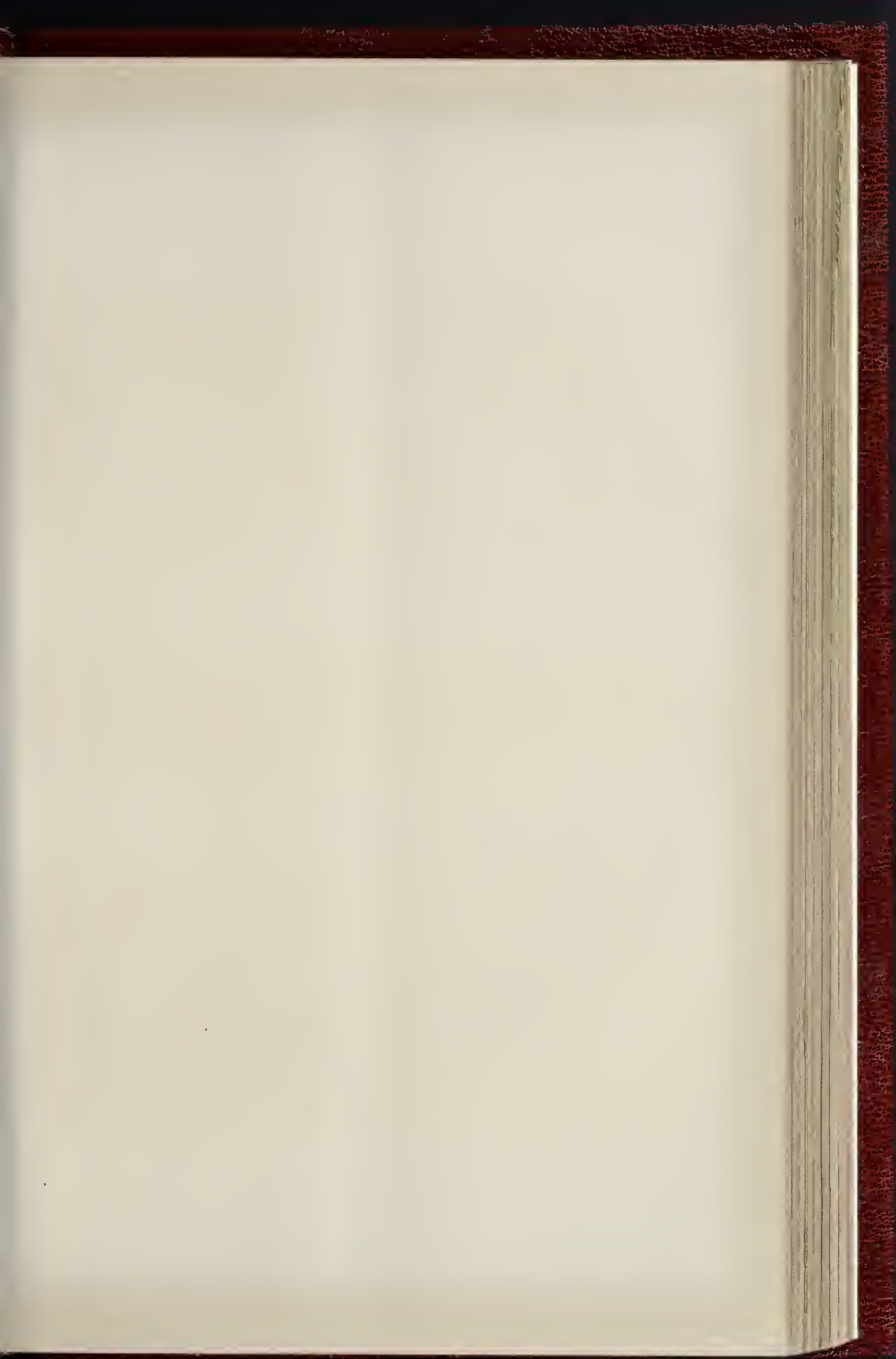
STONE FRIEZE FROM DINING ROOM MANTEL-PIECE.



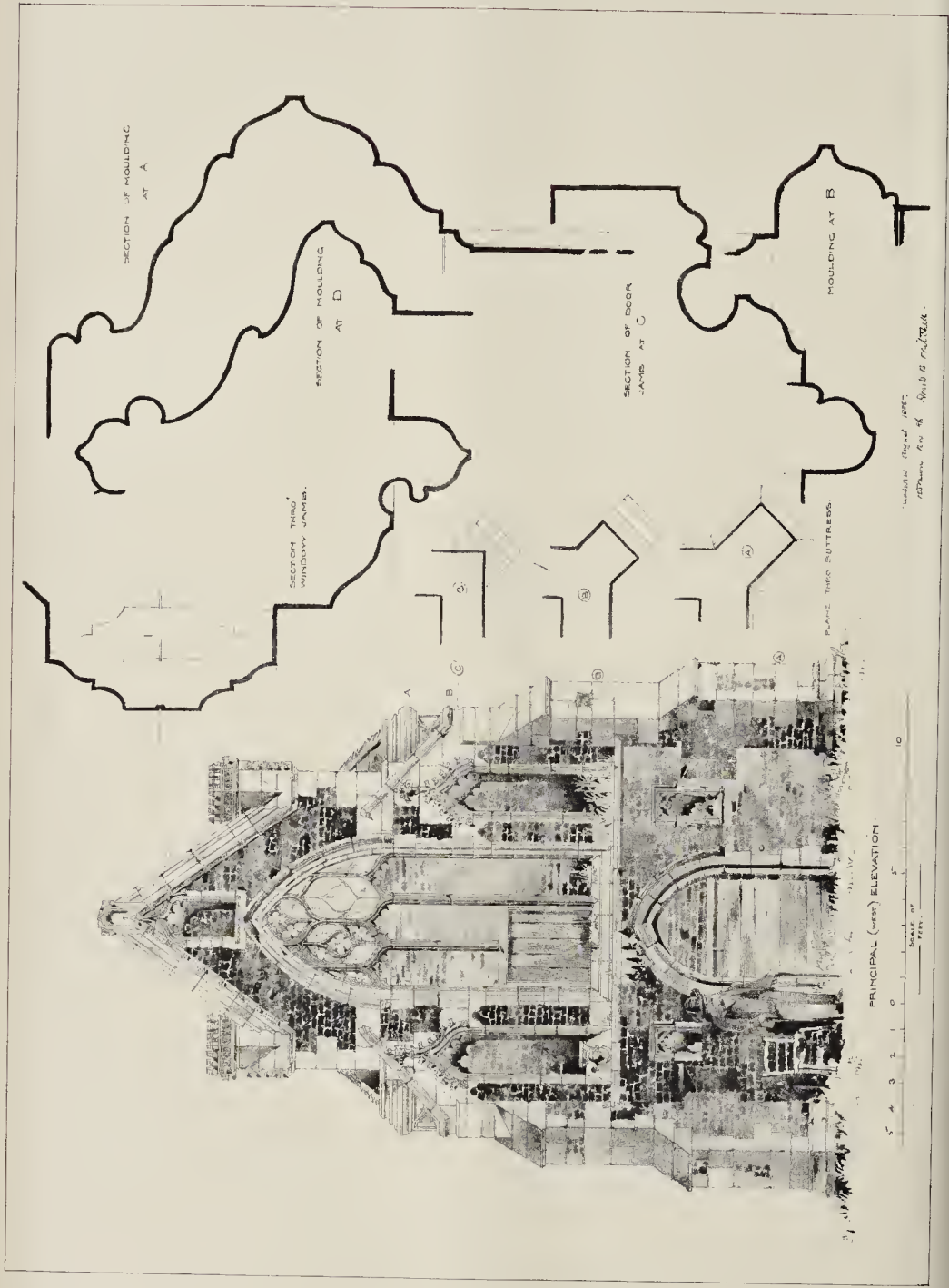
BRICK PANEL: WEST FRONT.

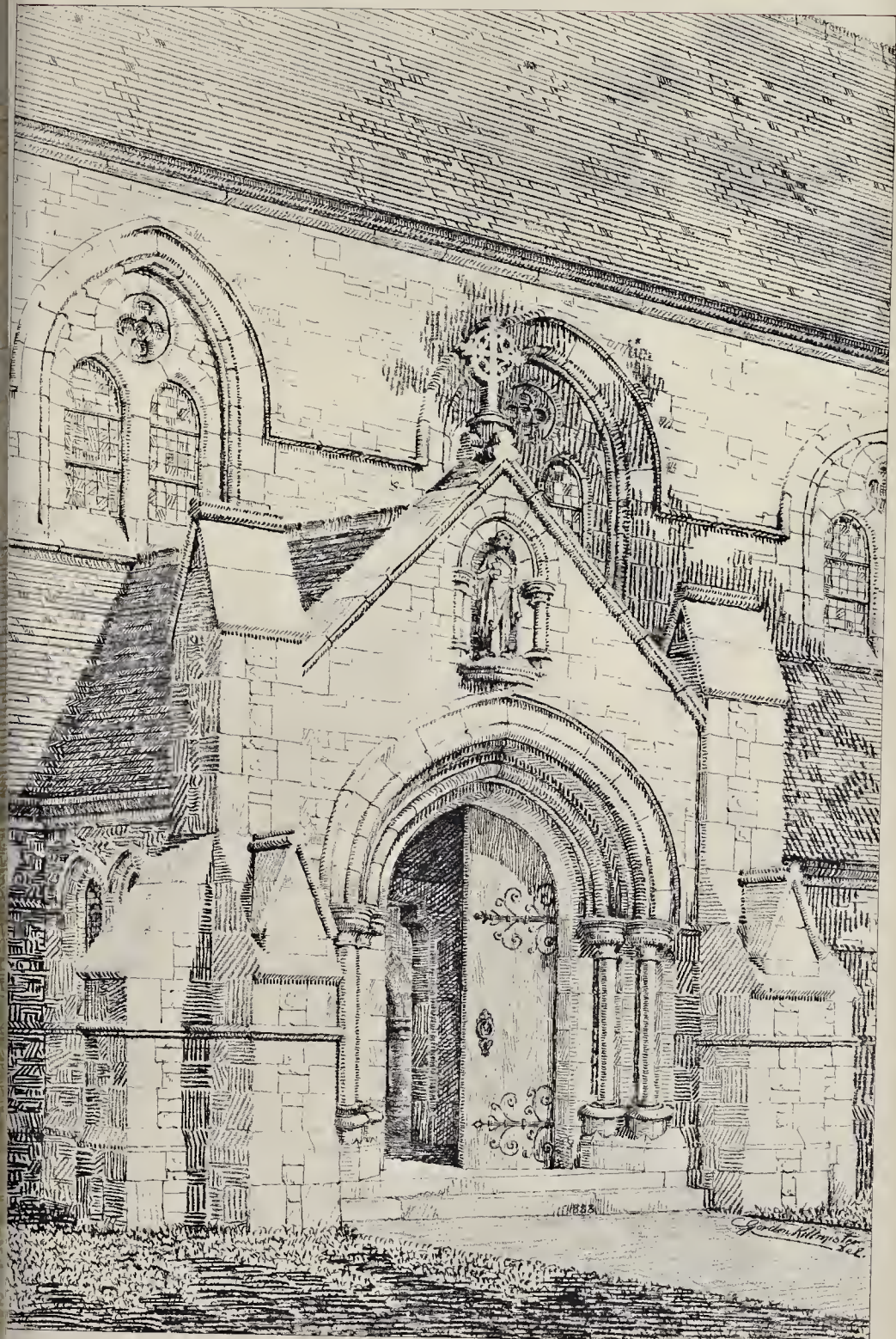


BRICK PANEL: WEST FRONT.



THE BUILDER, MAY 3, 1890.





"INK PHOTO, SPRAGUE & CO., 25, MARTIN LANE, CANNON ST., LONDON, E.C.

ST. JOHN'S CHURCH, MACCLESFIELD.—MR. C. GORDON KILLMISTER AND MR. R. A. BRIGGS, A.R.I.B.A., JOINT ARCHITECTS.

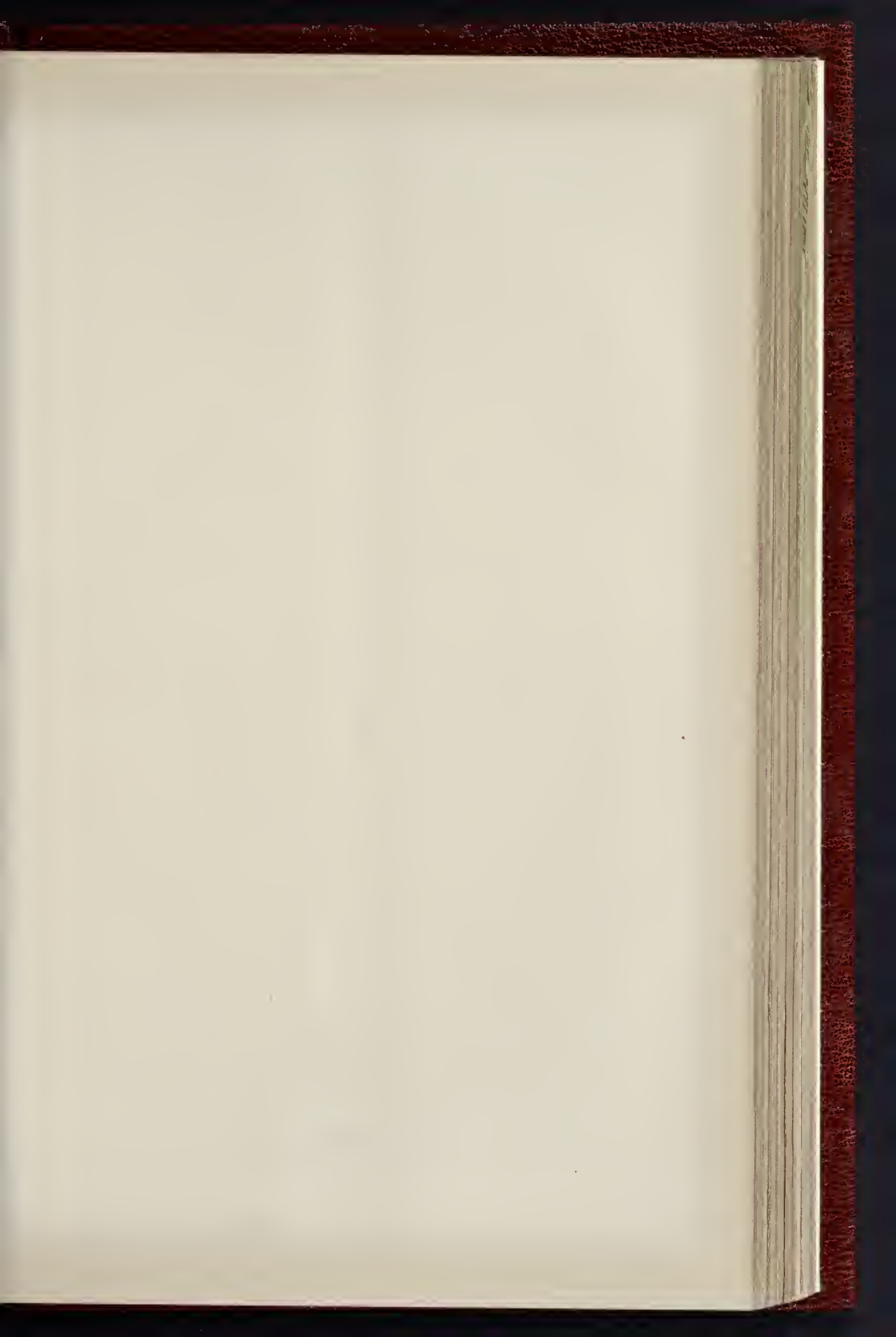
GREY FRIARS, DUNWICH.

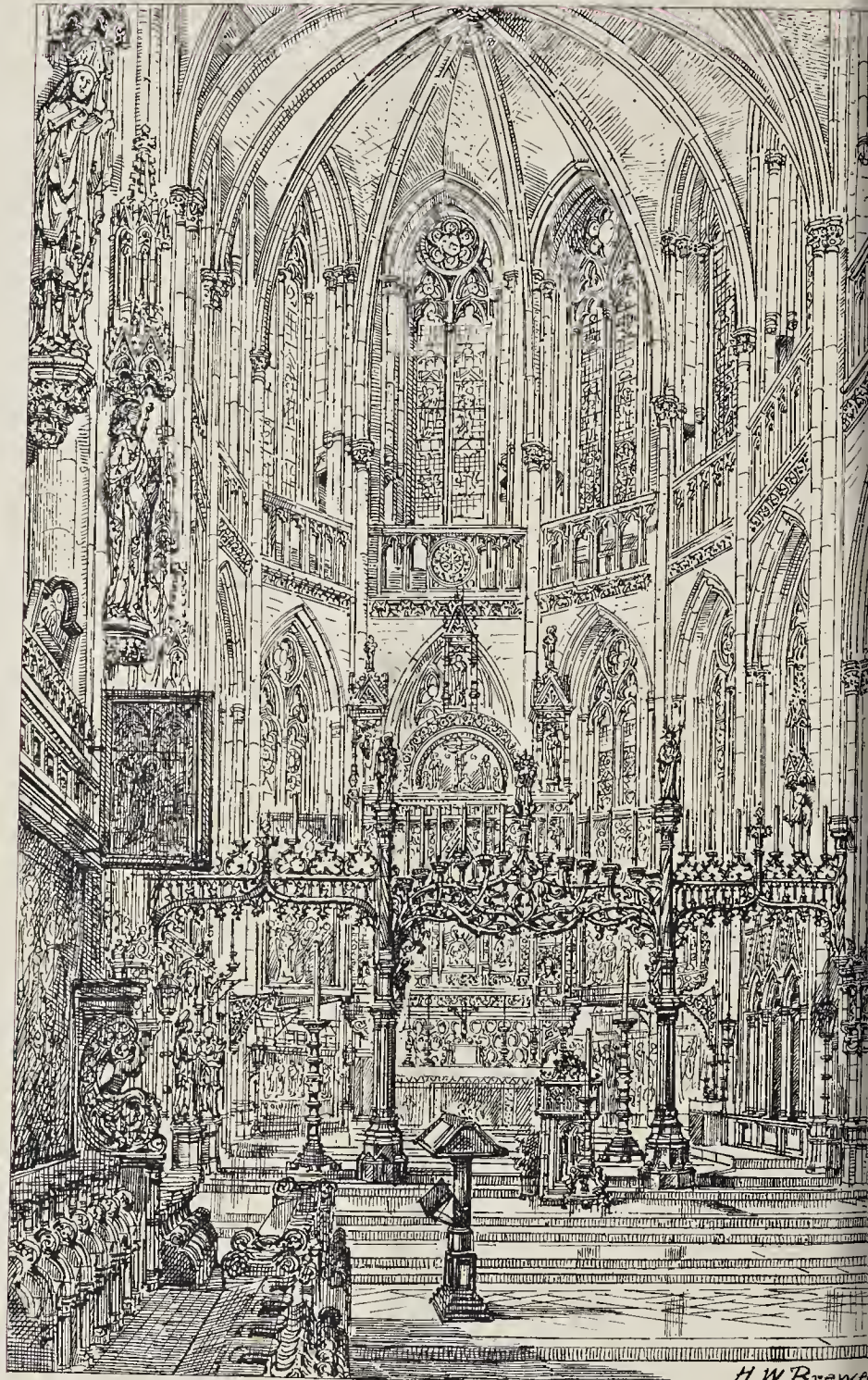
VIEW FROM SOUTH EAST.

M^r E. F. BISSHOFF, Architect



THE PHOTO-ENGRAVER, 47, ST. MARTIN'S LANE, LONDON, W. LINCOLN, F.





H. W. Brent

INTERIOR OF THE CHOIR

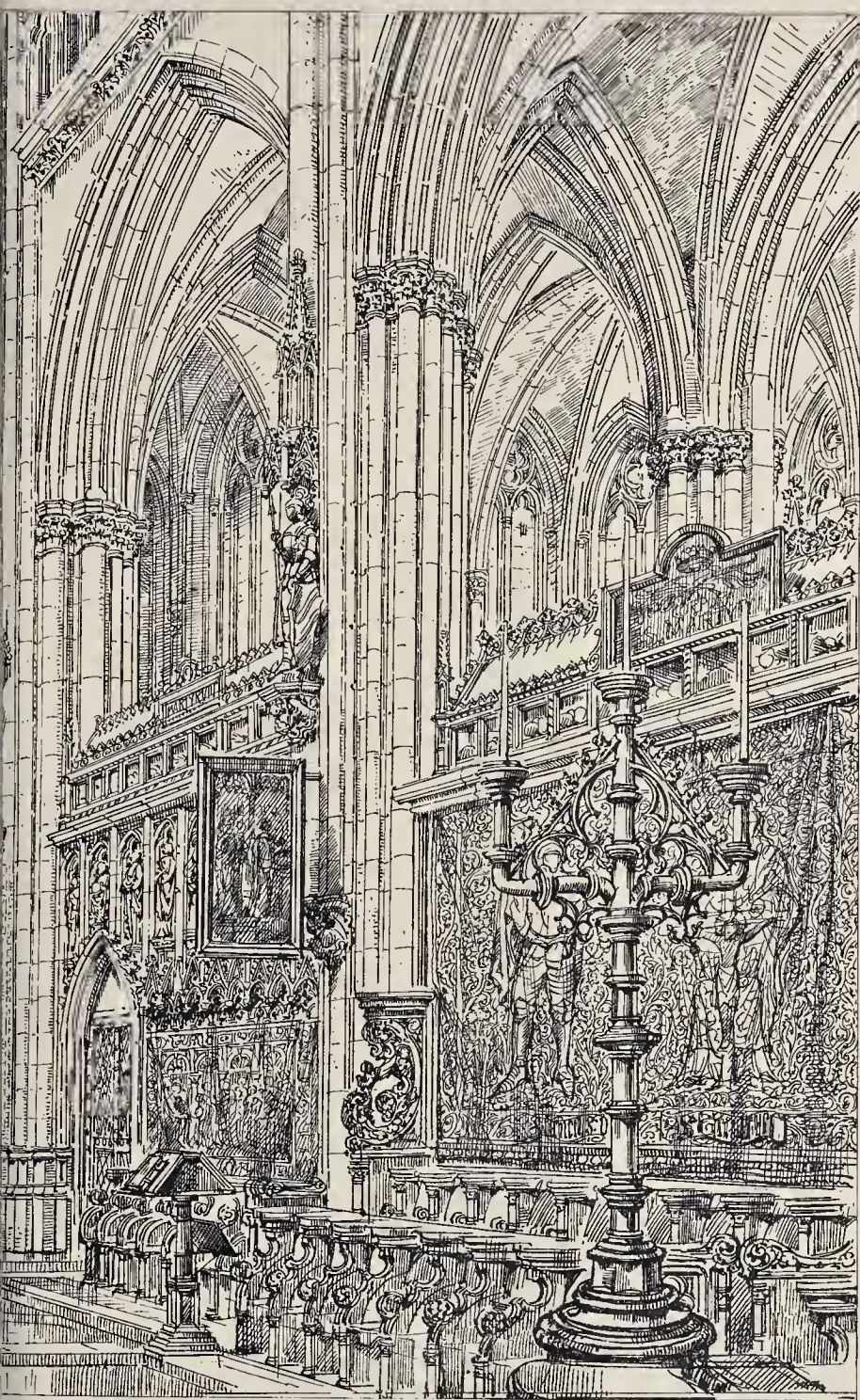
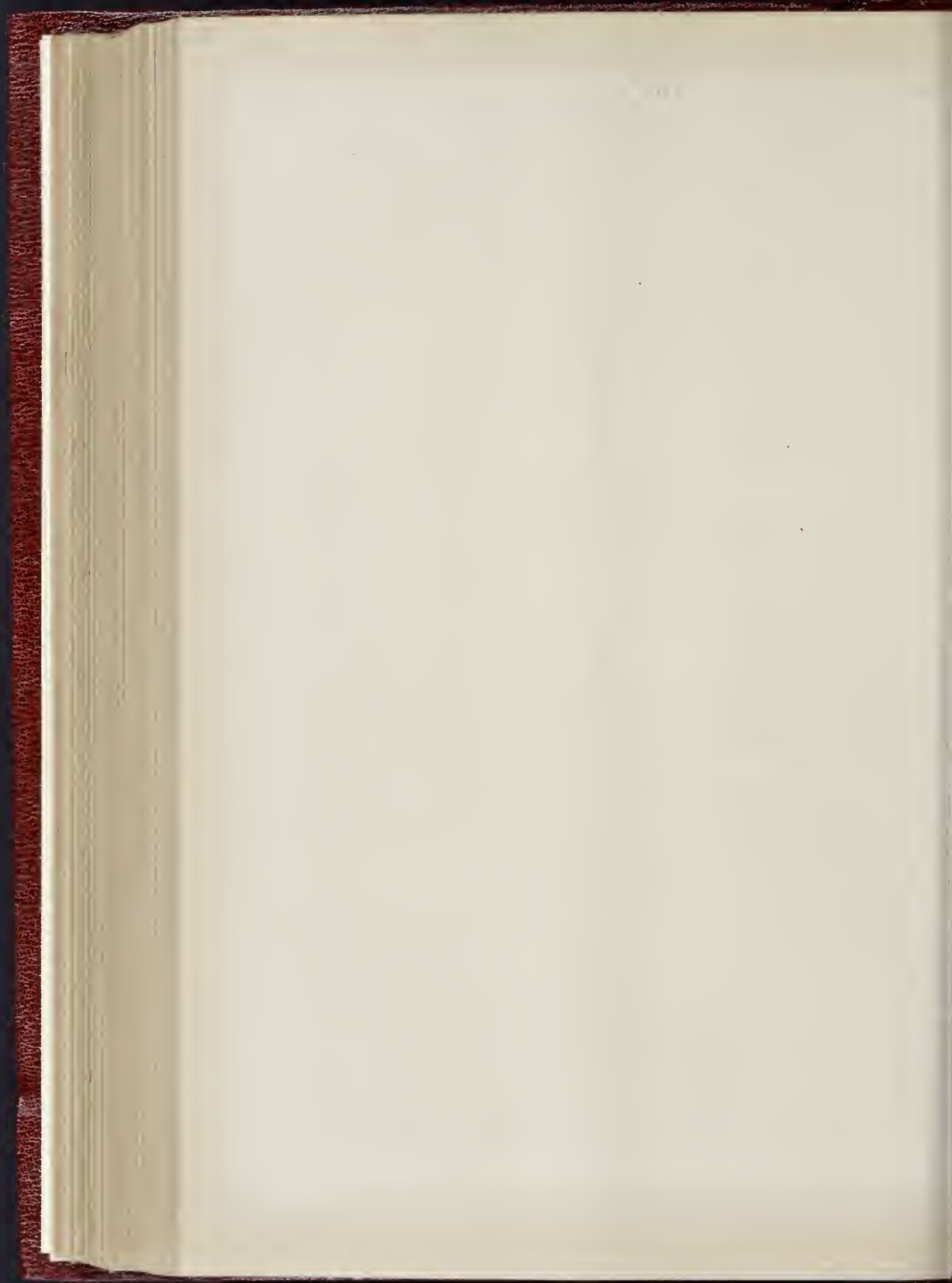


PHOTO LITHO SIMARBE & CO. 22, MARTIN LANE, CANON'S ST. LONDON, E.C.

, XANTEN, GERMANY.



nautilus' record is in the Earliest Renaissance style, and dates from about the year 1520. Immediately in front of the high altar is a magnificent brass screen supported upon two columns bearing statues, and sockets for thirty-six great candles. It appears to be Flemish work, rather than German, and is, we believe, a perfectly unique feature; though quite Gothic in character, it is probably of the same date as the altar itself. Of course it will be seen at once that this elegant candle-screen is neither a roof-screen nor a sanctuary-screen, and is executed in a totally different manner to such structures; perhaps it must be considered as an adjunct to the altar, rather than as a separate work. The sedilia are of stone, richly canopied, the *sakramentshuischen* or tabernacle is Renaissance, of a somewhat later date than the altar, the side-screens of the sanctuary are of stone, lorned with canopy work and statues, and over them are curious wooden reliquaries, an arrangement, by the way, which we see at Winchester Cathedral. The stalls are early fourteenth century work, and at their back are some interesting tapestries dated 1520. Near the west end of the choir is a great triple indelstick of brass. The windows of the choir contain a great deal of ancient stained glass, though very much mixed up and disarranged, that in two of the lower windows of the apse must certainly have belonged to an earlier church, as it is thirteenth-century work; most of the glass, however, is not earlier than the sixteenth century.

H. W. B.

ESIDENCE, INGLEWOOD, CALIFORNIA.

This residence, situate a few miles from Los Angeles, Southern California, is a prominent feature in the extensive and rapidly-growing township of Inglewood, founded and developed by Colonel Freeman, who has the reputation of being one of the wealthiest and most public-spirited citizens of the State. The residence is built in the form of a hollow-ware, the front being occupied by an immense alcove hall, the right by reception-rooms *a suite*, the left by culinary offices, &c., and the rear by a verandah and octagonal tea-room, the whole surrounding a large arcaded courtyard.

The premises have a brick and rock-faced one basement, and brick and stone piers supporting the external verandahs, and the whole of the superstructure is built of Oregon pine and California red wood, the ground-floor walls being covered with rusticated boarding, and the first-floor and gables partly half-timbered and plastered, and partly covered with ornamental tiles; and the roof is also covered with tiles.

The interior is most elaborately fitted up, principally in red wood of various finishings. The principal stairs are of oak, very massive, with richly and quaintly-designed screens, swells, and balustrades, &c. The ceilings of the hall and reception-rooms are panelled with moulded-wood ribs, the floors are of parquetry, and the fire-places have specially-designed chimney-pieces, with over-mantels and tile-panels, &c. A considerable amount of stained glass has been inserted in the windows.

The extensive stables in the rear of the residence have a deep well and water tower in connexion, with windmill for pumping the water to the tank in the upper part of tower, from which is obtained a fine view reaching to Los Angeles on the one hand, and to the Pacific Ocean on the other.

The building has been designed and carried out for the owner by Messrs. Curlett, Eisen, & Hetherington, architects, of Los Angeles and San Francisco.

HOUGHTON-LE-DALE CHAPEL, NORFOLK.

The Pilgrims' Chapel of Houghton-le-Dale is the way-side of the main road from Fakenham to Walsingham, in Norfolk, about a mile and a-half from the latter town. The building is seen better days, for it is now used as a barn or general farm-house store. The work is late Decorated, and very rich in appearance, the material for the general walling being squared at; the date is about the year 1350.

ARNOLD MITCHELL.

ST. JOHN'S FREE AND OPEN CHURCH, MACCLESFIELD.

This church, the ground for which was given to the late Sir Edmund Buckley, was completed and opened in October, 1887. The

building is thirteenth century in style, and consists of an apsidal chancel, 31 ft. by 20 ft., with organ chambers on the north and clergy and choir vestries on south sides. The nave consists of four bays and a half, and measures from chancel arch over 70 ft. The north and south aisles extend the same length as the nave, and the entire width across the two aisles and nave is some 50 ft.

The building seats 600. The chief entrance is by the south porch, the view of which is shown in the illustration. There is also a large entrance at the west end. The roof is covered with reddish-brown tiles, and internally is panelled and moulded in pitch pine. The internal lining of the walls is of dark-red brick, relieved by Hollington stone around windows and in arches. The external walls are faced with local teggsone parapoint stone, which is of a delicate mauve colour relieved with Hollington stone around the windows and in the string-courses, pilthns, &c. The entire cost has been about 5,600. There is still the tower to be finished, the cost of which will be some 700l. more. Mr. Moores, of Macclesfield, was the contractor for the first portion, and Mr. B. Haywood, of Alderley Edge, has carried out the last contract. Mr. C. Gordon Killmister and Mr. R. A. Briggs, of London, are the joint architects.

CARVED ORNAMENT, BLACKHEATH, FRISTON.

The brick panels shown in the illustrations are taken from the west front of the mansion.* They are illustrative of the heronry, the river, and the birds found thereon, such as wild geese and swans, and those which are to be found in the surrounding woods and heaths, such as hawks and owls. Wild boars were originally, no doubt, to be found in the neighbourhood.

The stone frieze from the dining-room chimney-piece illustrates "Sport," the house having been erected for shooting purposes.

The whole of the above are from my designs, and have been admirably executed by Messrs. John Groom & Son, of Ipswich, from my full-size details.

E. F. BISHOPP.

ADDITIONS TO GREYFRIARS, DUNWICH.

The accompanying illustration shows the exterior of the additions now being made to Greyfriars, Dunwich, the seat of Colonel St. John and Lady Constance Barne.

To the south is the drawing-room (an interior illustration of which appeared in the *Builder* for April 19), to the east the boudoir and smoking-room, whilst the north is occupied by the gun-room, sportsman's entrance, and offices. Suites of bedrooms occupy the first and second floors.

The works are being executed in red brick, made on Colonel Barne's estate, with the moulded and ornamental work from Messrs. Gunton's yards. The roofs are covered with dark Broseley tiles. The plastering in best rooms is in *Parian*.

The heating is by hot-water pipes and open fire-places, and the house will be lighted throughout by the electric light, whilst a ram is the chief power used for the water-supply.

Mr. Alfred Brown, of Baintree, is the contractor, and the whole of the works are being executed from my designs and under my supervision.

E. F. BISHOPP, Diocesan Surveyor.

THE SURVEYORS' INSTITUTION:

EXAMINATION FOR THE FELLOWSHIP.

The following Professional Associates have passed the Examination for the Fellowship:—

Adkin, Beniah Whitley, 33, Walbrook, E.C.
Darch, John, 74, Sarsfield-road, Balham, S.W.
Denny, William Cooper, 49, Fordwych-road, Bronesbury, N.W.

Ellis, Herbert Moates, 29, Fleet-street, E.C.
Ellis, Ralph Staples, 69, Palace-gardens-terrace, Kensington, W.

Eves, William Lionel, Milton House, Uxbridge.
Foster, Frank, 37, Gower-street, W.C.
Hardy, Temple, "Glenhurst," Trinity-road, Tulse-hill, S.W.

Haslam, Dryland, jun., Warren House, Caversham, Reading.
Jones, Frederick Herbert, 35, The Broadway, Ealing, W.

Melrose, Frank, 4, Whitehall, S.W.
Mixer, Edward, 80, Cheapside, E.C.
Parry, Richard, 22, Dagmar-road, Camberwell, S.E.

* We gave an interior view of the hall and staircase of the building in our number for October 5 last.—ED.

THE ARCHITECTURAL ASSOCIATION VISITS:

THE ALBERT MANSIONS, KNIGHTSBRIDGE.

THESE mansions, which are being erected by Messrs. J. W. Hobbs & Co., Limited, from the designs of Messrs. Archer & Green, were visited on Saturday afternoon by a party of members of the Architectural Association. Messrs. Archer & Hooper, under whose superintendence the work is now being completed, met the party, and gave an interesting description of this novel pile of buildings.

The buildings comprise a collection of flats for families on the lower floors, with bachelor suites on the upper floors.

The right-hand portion of the lower floors forms a separate building, and has been designed to accommodate a separate club, having a private entrance at the east end of the Knightsbridge frontage.

The portion of the ground-floor on the left of the central entrance contains dining, reading, and other club rooms for the exclusive use of the tenants.

The site is an exceptional one, with frontages to both Knightsbridge and the Park.

The plan of the building is H-shaped, one block facing the Park, the other fronting Knightsbridge. The two blocks are centrally joined by a block, containing the staircases and passenger and service lifts. This latter divides the area for light and air between the blocks.

The principal entrance to the building is in the centre of the Knightsbridge front, and opposite it, in the centre of the Park-front, an open loggia is provided on each floor, so that the tenants may enjoy a view which is hardly surpassed anywhere in the metropolis. A circular iron staircase in the centre of the loggia, from the top to the bottom of the building, makes escape in the event of fire an easy matter.

The space between the front entrance and the loggia, as already mentioned, contains the principal staircase and lifts, as well as chambers for pipes of all kinds. From this central position on each floor access to all parts of each block is readily obtained.

The usual combination of concrete and rolled iron renders the construction of all floors fire-proof.

The great height of the buildings, upon which so much comment was recently made, has rendered it necessary to provide machinery in the basement for pumping water to the large storage tanks in the roof of the central tower.

The state of the works at present hardly allows the formation of an opinion as to its ultimate decoration and finishings, and the elevations are more or less obscured by scaffolding; but as regards the plan, every care appears to have been taken to utilise the exceptional advantages and peculiarities of the site, and there is little doubt that these latest additions to the residential accommodation of the West-end will be much sought after.

BAYNARD'S CASTLE.

BAYNARD'S CASTLE, says Peter Cunningham, stood on the banks of the Thames, immediately below St. Paul's, and was so called by Baynard, a nobleman that came in with William the Conqueror. This fortress was fortified by him, or one of his descendants, in the year 1111, and granted to Robert Fitzgerald, son of Gilbert, Earl of Clare, in whose family it remained for three centuries. The Castle, however, is of Roman foundation, as can now be proved from two large stone corbels and other Roman relics recently discovered there in the erection of Messrs. Pilkington's new warehouse now in course of completion.

These relics were exhibited and described by Mr. J. H. Macmichael at the recent meeting of the British Archaeological Association. Mr. Macmichael said that in the course of the late excavations of this warehouse for Messrs. Pilkington, glass-factors, of St. Helen's, Lancashire (Messrs. Chambers, architects), many interesting relics had been unearthed, which, one may trust, will never be dispersed, but may eventually find their way to the Guildhall Museum. "If you thrive well, bring them to Baynard's Castle," says Gloucester to Buckingham, in allusion to that wily nobleman's efforts to engage the sympathy of the citizens. Other monarchs were entertained here down to Charles II., who is described by Pepps in his

"Diary" as going, accompanied by "my Lord Sandwich to supper at Baynard's Castle," June 19, 1660. The Earls of Shrewsbury resided here till the Great Fire, which six years afterwards (1666) left only the blackened walls, never to be rebuilt. It had been twice burnt and twice rebuilt. In 1128 it was almost entirely destroyed by fire, and rebuilt by the good Duke Humphrey of Gloucester. Henry VII. again repaired or rebuilt it, and changed its form, says Pennant, "into that of a palace for quiet times." It is to the structure as rebuilt by Henry VII. that the few architectural remains, such as the transom of a double or two-light window, and the two stone corbels, to be shortly hereafter referred to, appertain. The Roman wall along the whole south side of London proper terminated in Roman times, both east and west, with a fortress, which was called *Arx Palatina*, or the *Imperial (Palatine) fortress*: upon the site of these fortresses the Tower and Baynards Castle were built, the limits of the City having been in 1274 extended to Blackfriars. In the course of erecting the new warehouses for Messrs. Pilkington, some oaken piles were encountered by pick and shovel. These are probably identical in age with the "strong oaken piles" which Mr. Roach Smith tells us were used for the foundations of the Roman wall. Besides the transom of a window and the two stone corbels, one of the objects which have been lately dug up is an old steel-yard. There is only one perfect example of the Anglo-Roman steel-yard in the British Museum, and that is but 6 in. in length. Mr. Sutton, the Clerk of the Works, who is himself a Devonshire man, and to whom is owing the preservation of this and the other relics, at the happy instigation of Messrs. Pilkington, says there is a steel-yard of similar construction in use at the present day in his county. He does not, however, remember having seen anything like the incised ornamentation. The stone transom contradicts all the old engravings in which the windows are represented as single lights, this transom being that of a double or two-light window, as described by Pennant. But the two carved stone corbels are probably the most important discoveries yet made. They are both in low relief: one represents a pair of wrestlers, and the other a ram. The ram is not heraldic; it can, therefore, only represent the prize which the *Medieval* or Roman wrestler received—either a *ram* or a *cock*—as a reward for his dexterity when victor. But the circumstance of the conjunction of two corbels measuring 1 ft. 6 in. in height, each, both carved in low relief, one representing two nude wrestlers and the other a ram, and both found built into a wall 16 ft. below Upper Thames-street, is surely worthy of adequate attention. Not the least interesting feature of the excavations was the meeting with a black, manure-like stratum of substance about 2 ft. in thickness, and 17 ft. below the surface. What could this have been but the green rushes which were strewn upon the floor in the Middle Ages? Hence our straw from sterno, stratum, to stretch out, word being used in winter, as well as rushes in summer, to spread upon the floor—when they were said to have engendered a delightful sensation of coolness, as well as presenting a very pleasing appearance, recalling as it did the "simple manners of other times." There has been no necessity to strew the church-floors, said Mr. Macmichael, with rushes in summer or straw in winter, since they were paved or flagged, as was generally the case after the Tudor period, and unusually so since the Reformation. "Is there a village church," he asked, "in the United Kingdom and Ireland where the bare floor still exists?" Grassmere Church is said to have had a bare floor in 1828. One at least of the numerous tiles or fragments which have been preserved dates from the original building of the Castle by "one Baynard,"—that with two birds back to back. There is a similar one in the Geological Museum. Two fragments of skulls were also found 6 ft. below the foundations, and 24 ft. beneath the level of Thames-street, and *mirabile dictu!* beneath an oak tree which was found *in situ!* A marbled tile (like scagliola of to-day), an ornamental metal hoop, and boat-hook were all found together, also four spurs, a Roman nail, bone stilus, a primitive pegtop, a fragment of a short pendant, ear-pick, and a shoe, Norman or Plantagenet, with pointed toe; the peak was stuffed with tow or hay. Mr. Macmichael also exhibited some other objects of interest which had been found elsewhere, and which he described.

THE LONDON COUNTY COUNCIL.

The London County Council held its second meeting in the enlarged Council Chamber at Spring-gardens on Tuesday afternoon. Lord Rosebery presided, and after a few preliminary items of business, resumed his review of the work of the various Committees of the Council. He said that at the previous meeting he had reviewed the work of seven Committees. That left thirteen or fourteen Committees still to be reviewed. We give extracts from Lord Rosebery's speech:—

"The Sanitary Committee, from the multiplicity of its functions and their domestic character, might almost be called the nurse of London. If he read out to them the heads of the report of the Sanitary Committee he thought they would feel that that name was justified:—Public Health (London) Consolidation Bill, By-laws, Medical Officers of Health, public baths and laundries, chalet accommodation, fogs, water supply, Railway and Canal Traffic Act, coroners, notification of infectious diseases, ambulances, gas supply, testing of gas meters, weights and measures, licensing cow-houses and slaughter-houses, supervision of offensive trades, Explosive Acts, Petroleum Acts, Infant Life Protection, and Prevention of Cruelty to Children. He was sure they would feel that it was not possible for him to go through these heads in detail, but a cursory review was necessary on one or two of them. In the first place, the Committee thought that its powers were very inadequate; it had found them to be very inadequate; they said that the sanitary administration of the metropolis was in a completely and entirely unsatisfactory state, and they wished strongly to emphasise their opinion that the London County Council should be empowered to frame By-laws for the proper sanitary government of London; that the new District Councils or the existing local bodies should put them in force, and that the County Council should be the supervisory body to see that they were properly carried out. He believed that to be a sound recommendation. They had in view also the dealing with a subject which occupied much of their time at the last meeting, which was called chalet accommodation. They had endeavoured to urge on Vestries and District Boards their duties in that respect, and they had received from no less than twenty of these authorities their promise to take action. As regarded fogs, which was a subject on which they had built some hopes, they found that it was impossible to make any practical suggestion. As a matter of fact, the only existing legislation on the subject was in the Smoke Abatement Acts, which provided that engines and furnaces and buildings used for trade should consume their own smoke, but there was no enactment in regard to the smoke of private houses, and in any case the police were entrusted with the enforcement of these Acts, and they had no control over the police for that or for any other purpose. As regarded the gas supply, which was one of their most important functions, they had the whole gas-testing for London, except at the City stations, and they had endeavoured to make considerable improvements in this examination. To make it more real and more thorough, they had endeavoured to persuade the Board of Trade to introduce a Bill to legalise portable photometers, so that gas might be tested at other places than the regular testing-places. He had no doubt whatever that no testing of gas could be efficient unless it was extended much beyond its present scope. The duties of the Committee in regard to licensed cow-houses and slaughter-houses were very considerable. There were 728 licensed slaughter-houses on April 1, 1889, when they came into office, and they renewed the licences in 691. The number of licensed cow-houses in London was 745, and they renewed the licences in 673 cases. They had, further, a large control of the explosives and inflammable materials of London. As regarded inflammable materials, their duties were not very considerable, because they had only the power to sample petroleum on dealers' premises so as to ascertain whether it was petroleum of the flashing point to which the Act applied. But when they considered that the import of petroleum into London annually was not less than 2,000,000 barrels of 40 gallons each, and that the number of fires proceeding from mineral oil lamps was very considerable, there being no less than 259 last year, he thought they must see that the committee had some reason for urging that they

should be given extended powers in the respect.

The Highways Committee was mainly concerned with business under three heads,—main roads, electric lighting, and tramways. With regard to main roads, they received from the Government the duty of contributing to the maintenance of certain disturnpiked roads, there were eleven miles of them, he thought. That was one of the new duties and new expenses which had been imposed upon the ratepayers by the new Act, and which contribute in some degree to what was supposed to be the increase of the rates. The Committee, however, wisely, as he thought, decided to contribute the same sum to these disturnpiked roads that had been previously contributed by the Government—that was 3,558*l.* From the district authorities who were charged with these roads there was much grumbling that the Committee did not recommend a larger contribution, but he confessed that he thought the Committee were perfectly right in taking the action they did, knowing of no reason whatever why they should give more than Parliament or the Government did for these roads, and he thought the Committee was right in leaving an authorities that were aggrieved to take the own action in the matter. They had a large and more complex business in connexion with roads. The 41st section of the Local Government Act extended to London the provisions of the Highways and Locomotives Acts Amendment Act of 1875 relative to main roads. If the Common Council or any Vestry or District Board might apply for an order asking that a road might be made a main road, and it kept up by the Council. Every district authority in London, except the Common Council on the Strand, had made this application, and the total amount of that application was 412 miles of main road. The Committee had come to the conclusion that it could not have been the intention of Government to east on the central authority the charge of these 412 miles of road, over the maintenance of which they could not possibly exercise any supervision. They had decided that the enactment was practically unworkable, having regard to the peculiar conditions under which the roads were managed and the number of authorities concerned in their management. He confessed he thought that that was one of the cases where in order to make the Local Government Act uniform, the legs of London had been cut to fit into a Procrustean bed which was meant to adapt itself to every small community in the country. Another great power of theirs was in regard to electric lighting. The favourable terms of the Act of 1888, as regarded length of tenure and conditions of purchase at the termination of tenure, as well as the advance of science, had led to a great development last year which also coincided with the coming into existence of the Council. The Council had been entrusted with great powers of supervision and control, and they had, he thought, last year fifty-five notices to apply for these powers from different companies, and in every case he thought the affixed special conditions, which had been applied with. This year they had had twenty-three provisional orders and three Bills, all of which they had considered and which they brought into line, as far as they could, with those that they gave last year. They had other work with regard to tramways. There were five schemes in 1889. In all those that they had passed, clauses had been inserted to satisfy the requirements of the Council. There were seven in 1890, of which two had been withdrawn, and he had no doubt that the Committee would be equally successful in dealing with the balance of five. With regard to the Overhead Wire Bill for the regulation and control of overhead wires, which was a matter of so much importance, they had withdrawn their clauses with regard to subways, at any rate for the present. Then there was the question of bars and gates which came before this Committee. If he were asked to take an intelligent foreigner or Londoner and to show him the most remarkable thing in London he should not take him to Westminster Abbey, or St. Paul's, or the House of Parliament, or even the County Council, he should take him to the mysterious region of London which was shut up from the contagion of the outer world at eleven or twelve o'clock at night by these bars and gates. There was no such thing in any other city of the world. He did not believe they could persuade a foreigner who had not seen these bars and gates that they were in actual existence in London.

the last decade of the nineteenth century. He believed there was an arrangement analogous to it in the time of the Pharaohs in Egypt, when the children of Israel were relegated to a part of that country which was shut off, he had no doubt, by bars and gates at a fixed hour of the night from any communication with the outer world; but that was really the only precedent that he knew for it, except the precedent of walled and fortified cities. [Captain James: "The Ghetto."] Well, the Ghetto; but the Ghetto had long ceased to exist in its secluded form. The committee had endeavoured to deal with this through the medium of the Parliamentary Committee, and they thought that for a condition of things like this compensation was hardly required. But they had endeavoured to compromise on the question of compensation, he believed, by offering to provide a silent pavement in that neighbourhood at the expense of the Council to some extent, which would soften to some degree the rude change from the sacred slumbers which at present prevailed in that quarter of London to the sleep enjoyed by other less privileged inhabitants of the metropolis. In addition to this, they had had the charge of their embankments and the closing of streets. Last year they had closed, wholly or partially, 166 streets, and they had had 59 applications for closing. They had the control of railway bridges over streets, and all the plans for such bridges had to be submitted to them for approval. They had had four bridging schemes and two for widening bridges, with all of which they had dealt. He thought everybody would feel that this was a very creditable record of work.

The *Corporate Property Committee*, as they knew, managed their property and their ground rents. The value of the property was very considerable. The capital value was not less than £2,300,000. He could not notice the work of the Committee in detail, because it was a work of detail, and it could not more be described in a hasty review of this kind than they could describe a land agent's work on a large estate in this country. But it had been, as he believed, very efficiently managed, and the result of the first auction that had been carried on under their Valuer, last week, he thought was a most decided success.

The *Building Act Committee* was also a committee very much of detail, and they would forgive him if he could not enter into their yearly report any more than the Council entered into the details of its weekly report. The greatest compliment to that Committee, and it was a deserved compliment, was that their recommendations or reports were swallowed whole. He would only give one or two figures to point out what manner of work it was they had to do. For instance, they had sanctioned the opening of no less than eight miles of new streets in the past year. They had considered and reported upon 2,979 cases of dangerous structures, taken out 853 summonses against recalcitrant house-owners, abolished 316 subsidiary and other names of streets, and re-arranged the numbers of 7,896 houses, approved 65 names of new streets, and ordered the re-naming and re-numbering of 241 streets. He could continue these statistics *ad infinitum* to show the enormous amount of detailed work which was thrown on this Committee. In each of those cases that he had mentioned they went carefully into the matter; very often, he believed, the Chairman of the Committee went into the whole of the report before it came before the Committee, and therefore they might form some idea of the work which was occupying that Committee in dealing with the management of London. They had also had one great question of principle to settle—the question of District Surveyors. They had not yet fully reported to the Council what their recommendations were in that respect, but they seemed to favour the idea of District Surveyors being paid by salary instead of by fees, and being divorced from private practice. He did not know what view the Council might take of that, but it was very clearly a point of very great importance in their administration, and they left it with great confidence to the Building Acts Committee. They also stated that it was extremely unsatisfactory that so many separate Acts of Parliament were enforced in the metropolis with reference to building matters. Yet no opposition to a really useful and comprehensive Bill introduced into Parliament by the Board, which to an extent would have

obviated the difficulty, was so determined as to defeat the Bill. Hon. members might know that it was not only the Council that found opposition to its measures in Parliament. The Committee was of opinion that the building law, both constructional and sanitary, should be strengthened and then consolidated.

The *Special Committee on Water-Supply* had submitted a report which was a very interesting record of the history of the question drawn up by their colleague, Mr. Beal, but, as a matter of fact, when they came to inquire into their subject they found that they had no power to incur expenses in connexion with the inquiry as to the matter referred to them, and they had to put a special clause into the County Council Bill for obtaining money for that purpose. That clause was not favourably received by Parliament, and they were only able to renew it this year. That matter was a very urgent one. It was not so much that they should obtain control of the water companies that the question was so urgent, but it was in view of the quinquennial valuation that took place next year. Now, the annual increase in rateable value of property in London, as the Committee pointed out, averaged about 1½ million at each quinquennial valuation. Taking the average authorised charge of the several companies for domestic supply to be five per cent. on rateable value, the increase of income to the companies at each quinquennial valuation would amount to 75,000*l.* a year, solely in respect of the increased rateable value of existing property, and without reference to any increase of supply. The consequent increase in value of the water companies' stock would probably exceed two millions, and that at each quinquennial valuation would probably be the very lowest increase which could be added to the value of these water companies. They would see from that that it would become after ten or fifteen years impossible for London to face the enormous expense of controlling its own water supply. He thought that the Committee were right to urge that a Bill be brought into Parliament to deal with this question in the interest of the ratepayers and in the interest of the metropolis at large.

Suggested amendments in the Laws relating to the Government of London.—The only point to which he should call their attention further was this—the number of committees that found their powers inadequate under present Acts of Parliament. Of course, it might be said to that that bad workmen quarrelled with their tools, and that it was the fault of the workmen, and not of the tools, that this discovery should be made. But he did not think that that view of the case would hold water for a moment. Why was the Local Government Bill made to apply to London at all? Simply to remedy the chaotic condition of things which existed in the metropolis, which consisted of a city and fragments of three counties. Well, it was quite clear that when they tried to reduce that chaos under a system, more especially by a Bill of universal application, both to rural and urban counties, they could not help finding that a great deal of their machinery required renovation. That was the case on this occasion, and they were also well aware of the fact that their predecessors in part of their functions, the Metropolitan Board of Works, repeatedly had to seek the assistance of Parliament, and very often in vain, to enable them to perfect their machinery. He thought that on a calm survey of the whole situation they would find that, with the machinery at their disposal, these committees had done the best that could be done, and that Parliament would not long consider it unreasonable if the Council should apply for some assistance in re-modelling and re-sharpening the machinery with which they had to work.

The greater part of the remainder of the sitting was devoted to the consideration of the report of the Housing of the Working Classes Committee. As this debate was adjourned, we will revert to the subject next week. The Council adjourned shortly after 7 o'clock.

Appointment.—We are informed that the Lord Lieutenant has, in accordance with the wish of the Grand Jury at the recent Spring Assizes, appointed Mr. P. O. Cowan, B.Sc., A.M.I.C.E., County Surveyor for South Down, to be County Surveyor for the entire county, in which the annual expenditure on Grand Jury works is about 45,000*l.*, and there are eleven Assistant Surveyors.

COMPETITIONS.

Baths, Salford.—[The Baths Committee] of the Salford Town Council met on the 23rd ult. and selected the plans submitted by Messrs. Mangnall & Littlewood for the new baths, Regent-road, Salford, which were submitted in competition under the *nom de plume*, "The Regent."

Breslau.—In the competition for a design of an equestrian statue of the deceased Emperor William, the first prize has been obtained by Messrs. Behrens & Licht, the former a sculptor of Breslau, the latter the well-known City Architect of Leipzig.

WORKS OF THE LATE J. T. WOOD.

SIR,—Professor Aitchison is in error in assigning to Mr. J. T. Wood, of Ephesian fame, the office at the north-east corner of King-street, Cheapside (with one front in Gresham-street), as it was designed and carried out by the late Mr. Sancton Wood, and he was well known in connexion with other works.

T. BOS. CHATFIELD CLARKE.

GOLDEN CHANCES FOR SURVEYORS.

SIR,—I notice by the list you publish [p. 302, ante] that fifty-seven young men have passed the Surveyors' Institution Examination, some of whom may be now shortly seeking a start in life. Perhaps you will allow me space to point out a few splendid openings in Local Board Surveyorships now offered, so that those gentlemen may be on the *qui vivit*. Who shall say the profession is overcrowded, and that when you have spent hundreds upon education and pupillage and become "P. A. S. I.," the difficulty of earning bread and cheese then begins?

There is Google Surveyorship, "salary 100*l.*, which is to include travelling expenses." To the careful man (who cycles) here is a prospect of saving up for old age! Then Rugeley, salary 50*l.*, travelling not mentioned.

Then South Molton, salary 100*l.*, which includes rate-collecting. But the greatest prize is at Worksop, 120*l.*, and *nothing much to do*, although the

"Surveyor must give the whole of his time to the duties, no extras nor private practice allowed. He will have to make surveys, prepare and approve plans, estimates, and tenders, schedules of prices, supervise and carry out the construction of works, keep accounts, pay wages and bills, superintend and manage the sewage-pumping station and drainage systems, fire-bridges, engines and hydrants, lighting of the public lamps and streets, and forty-eight miles of highways."

Now, in a sincere like this any active young fellow believing in the dignity of labour could very well fill up his leisure by sweeping up the roads, putting in an odd house-draught or two until tea-time; and then run round to the lamps, and after a bit of supper clean up the fire-engine, and in case of a call run it out and extinguish the fire, by which time he would be ready for bed.

This is so good a chance that I expect it will not go out of the town; or at least only be given to some clever M. I. C. E.

April 30.

VENTILATION BY SASH-WINDOWS.

SIR,—In your issue of April 25, among the "Recent Patents," I notice one, No. 8,019, "Ventilation by Sash-Windows." If I understand it rightly, I have used this method of ventilation for years, with a piece of wood alone. My method is to remove the sash-band, and nail a piece of wood on the window-sill about 1½ in. deep, cut in tight between the inside lining, shorten the sash-bands 1½ in., and replace the sash-band, which will simply be the depth of the new piece higher than it was before. It can be applied to any sash-window at a very trifling cost, and answers admirably.

Of course the piece could be more than 1½ in. if desired, but I find that size the most convenient to allow of the sash-lifts being fixed on bottom rail of sash.

HULL, April 26.

. This method of obtaining ventilation from sash-windows without draught,—the fresh air entering at the meeting-rail and passing upwards some distance and gradually becoming diffused with the air of a room, has been in use for many years by many people who are aware of its advantages. We ourselves have used it for many years. As far as we know, this simple method was first suggested by Dr. Hinecks Bird, who thirty or forty years ago described and illustrated it in the *Builder*. Dr. Hinecks Bird did not patent the idea, but published it for the benefit of the public. As indicated by us in our foot-note last week, we were rather surprised to see that a patent has now been granted for what appears to be practically the same idea.

Glaucus Club.—The *Sportsmen* announces that Mr. Arthur Green, architect, will be engaged to make designs for this new club-house. The premises will comprise a large theatre.

CHURCH BUILDING NEWS.

Glyn Farrell.—A correspondent says:—"A new Mission Church is about to be erected at Glyn Farrell, in the parish of Llanyddid, Breconshire. The old parish church is well known for its unusually large churchyard, its exceeding picturesque position, its grand yew trees, the retention of so many of its interesting old features, such as the fine old font, the sounding board over the pulpit, which was doubtless made out of part of the rood screen, and the old doorway; the remains of the fine old oak porch, and some old windows and a number of monuments. It was carefully repaired and re-fitted with seats about fifteen years ago by Mr. Kempson, then of Hereford, and now Diocesan Surveyor for Llandaff. The new Mission Church, which will be commenced at once, will accommodate about 120 adults. It will be situated about two miles from the mother church, close to a good road, and in a part of the parish where its want has been long felt. It will be built of fine hard native stone, with local and other hard stone dressings, the walls will be thick, the roofs very strong, the seats of substantial character. The font will be of stone, the pulpit of oak, the chancel floor of tiles. There will be a reredos of quiet design, a western bell-cote, and the roofs will be covered with green slates. The designs, which are of simple thirteenth century character, with details full of careful treatment of true old Welsh type, are by Messrs. Kempson & Fowler, of Llandaff."

Kington (Herefordshire).—A new mission chapel is about to be erected in this interesting little town. The new chapel will accommodate 165 adults. It will be built of local stone, with bard stone dressings of fine colour; the roof-timbers are all of large size, and the covering will be the best North of England heavy green slates; the floors of the nave will be of wood blocks, those in the chancel of tiles. The screen will be of oak, as will also the chancel fittings. The contract has been entrusted to Mr. Wislade, builder, Kington. The designs are by Messrs. Kempson & Fowler.

Linkinhorne.—The restoration of St. Mellor Church, at Linkinhorne, near to Liskeard, Cornwall, has been taken in hand. The church consists of a nave with five bays, aisles, chancel, and transept; the embattled tower has turrets with pinnacles. The parish is renowned for its granite quarries, the property of the Duchy, and for its monolithic remains, including the Cheesewring on Stoves-common, the two stone-circles known as the "Hurlers," the "Lingstone," and the elevated sharp Point Tor. Here, in a habitation which he had made for himself in the rocks, lived the eccentric philosopher and mathematician, Daniel Gwyn.

Stockland (near Honiton).—A new pulpit has lately been fixed in the old fifteenth-century parish church here, designed by Mr. B. Edmund Ferrey, F.S.A., to harmonise with the surroundings. It is octagonal in plan, the superstructure being of English oak with three pierced traceried panels to each side, trefoil-headed, and with a cornice having carved roses conventionally treated. The pedestal is of Bishop's Lydeard stone, with Keinton steps. The work was executed by Mr. W. T. Berry, builder, Honiton.

DISSENTING CHURCH BUILDING NEWS.

Birkenhead.—A few days since the new Congregational Church, Prenton-road West, was opened. The church is the first section of a comprehensive scheme, which will include a church to accommodate about 600 people, having tower and spire, and schoolroom for 250 children, having five class-rooms for senior scholars. The present building is so arranged that it may be used for Sunday-school in addition to congregational purposes. The contract has been carried out by Mr. John Shaw, of Birkenhead, from the designs and under the supervision of the architect, Mr. Thomas W. Cubbon, of Birkenhead, whose plans were selected in competition.

Leek (Staffordshire).—Brunswick Chapel is at present closed for alterations and decoration, the congregation meeting meanwhile in the Balbhay-street schools. The improvements are somewhat extensive, and are being carried out by Messrs. Matthews, builders, to the designs and under the superintendence of Messrs. W. Sugden & Son, architects. The whole of the galleries are being considerably

lowered, so as to group the audience more closely together, and improve sight and hearing from the gallery. Moreover, they are being lowered bodily, and without being taken to pieces.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—XVIII.

ALTERNATING-CURRENT DYNAMO-MACHINE.

A SKELETON alternating-current dynamo-machine was shown in fig. 28, representing a single turn of a coil, on a drum armature, revolving between the poles of a magnet. Very small machines are, indeed, sometimes constructed on this principle, but the type most commonly adopted for machines

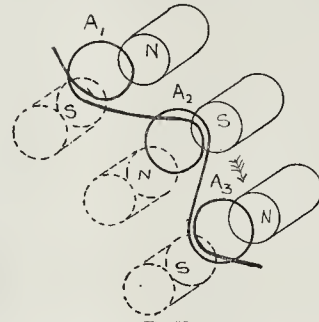


Fig. 50.

of larger size is that shown in fig. 50. The armature coils A_1, A_2, A_3 are fixed in the plane and around the circumference of a disc, being made to revolve between an equal number of pairs of faces of field magnets, which are separately excited by a little continuous-current machine; the alternating current produced is then connected with the external circuit through collector rings. The coils may be connected in series, as in the figure, or when a large current and low electromotive force is required they may be put abreast.

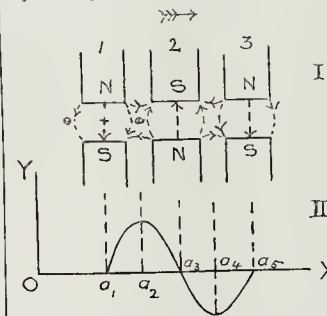


Fig. 51.

Fig. 51 is a plan of a section of the part of the machine shown in fig. 50, the field being represented by a few dotted lines of force. The centre of the bobbin A is exactly on the axis of the first pair of the field magnets, the full circles being the sections of the wire on the bobbin. In this position no E.M.F. is being set up, as the bobbin is cutting practically no lines of force, or whatever E.M.F. is set up in one side of the bobbin, by the few lines it may cut, an exactly equal and opposite E.M.F., round the coil, is set up (see fig. 26) on the other side, so that, as a net result, the bobbin contributes no E.M.F. to the circuit. As the coil moves onward an increasing E.M.F. is produced, until its centre is half-way between pairs 1 and 2 of the field magnets, when both sides of the coil are in the strongest parts of their respective fields, and both contributing E.M.F. in the same direction; hence, in this position, the available E.M.F. in the coil has risen to its maximum value. It falls to zero when A has reached the axis of the second pair of field-magnets, after passing which, E.M.F. is again

set up, but in the opposite direction. In the lower part, II., of the figure the positions of the centre of the bobbin are marked off along $O X$, and the E.M.F., in any position, measured parallel to $O Y$. The direction of the E.M.F. is indicated by setting off electromotive forces in opposite directions on opposite sides of $O X$. The curve drawn is a simple curve of sines.* The curve which shows the current flowing from the machine will have the same form, though modified by the conditions of the circuit.

TRANSFORMER.

In a dynamo-machine the coils of the armature revolve and cut the lines of force produced by the stationary field-magnets; in some cases the armature is stationary while the field-magnets revolve, carrying their lines of force with them so as to cut the armature coils. A transformer may be regarded as a dynamo-machine in which both armature and field-magnets are stationary, but in which the lines of force, proceeding from the field-magnets, are made to move by varying the current in the field-magnet coils, thus cutting the conductors in the armature. Faraday, in 1831, described certain types of transformers for the "Evolution of Electricity from Magnetism," but the name "transformer" is of later date, and modern transformers differ considerably in detail from those used by Faraday.

In fig. 53 two coils, P and S , are shown wound round an iron ring, which must be divided, like the core of the armature of a dynamo-machine, at right angles to the direction of winding of the coils, so as to prevent, as far as possible, the induction of currents in the core itself. Such an arrangement represents, in principle, the most common type of transformer, though in practice the magnetic circuit is made as short as possible, and its shape, therefore, differs considerably from that shown in the figure; we are not, however, concerned with the design of transformers, but with their action. If a varying current is sent through P , E.M.F. is set up in S . Owing to the similarity between a transformer and an ordinary induction coil, P and S are usually called respectively the primary and secondary coils; though, regarding the transformer as a peculiar form of dynamo-machine, P and S might be respectively called the field magnet and armature coils.

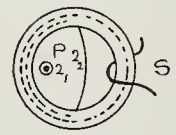


Fig. 52.

The reason for the production of E. M. F. in S , when a varying current flows in P , can be seen from fig. 52. Let P represent the section of one inside turn of the primary wire, carrying a current, and let l_1 be one of the circular lines of force surrounding it in air. If the current in a wire is rising, the closed lines of force surrounding it at any point are being propagated outwards, very much in the way that rings spread over the surface of water from a point at which a stone has been dropped into it. Suppose, then, the current in P to be increasing, the line l_1 will expand until part of it enters the iron and assumes a shape somewhat like l_2 , finally expanding so as to lie wholly within the ring like l_3 ; in expanding this line has cut through the single turn drawn of the secondary coil, and hence produced an E. M. F. in it.

If the line extends still further so as to cut S on the outside of the ring as it quits the iron the effect of such cutting would be to neutralise the E.M.F. set up by the line following it which happened at the same instant to be cutting S on the inside of the core, for clearly the two electromotive forces set up in the two portions of S would act in opposite directions round it. The net effect then of any lines of force which pass out of the core again is nil, but until the core shows signs of saturation they may be neglected, as practically all the lines remain within the iron ring.

If the current in P could go on increasing indefinitely, E.M.F. in one direction would be

* Any periodic curve has, for its components, a greater or less number of simple curves of sines, the true curves, obtained experimentally from machines actually in use, differ but slightly from that drawn above, the simple curve will always be used.

produced in S, and a transformer might then replace a continuous current dynamo-machine; as, however, this is impossible, the current in P is varied by connecting it with an alternating current dynamo-machine, an alternating E.M.F. is then set up in S, the E.M.F. reversing when the number of lines included in S begins to diminish. The considerations which apply to single turns of wire in fig. 52 will obviously apply to the number of turns in fig. 53.



Fig. 53.

Let N = number of turns of wire in P (Fig. 53); C = maximum value of current; a = area of cross section of iron core; μ = permeability of the iron; l = average length of line of force in core; F = maximum flux. Then,

$$F = \frac{4\pi N C + 10}{\mu a}$$

Again, if n = number of times the current has its maximum value in the same direction per second; n = number of turns in S; then F n is the number of lines which cut into and out of S per second; if E = average E. M. F. set up in S.

$$E = 4\pi F n \times 10^{-8}$$

4π F n being the number of cuttings by lines of force per second which S experiences.

The advantage of the transformer lies in the fact that the magnitude of E can be made any thing we please by giving the proper value to n, so that if a certain amount of power is being wanted, obtain as high an E.M.F. in S, by sacrificing current, or as large a current as we please by sacrificing electro-motive force. Transformers are usually employed for producing a larger current than that in the primary circuit at a reduced E.M.F.

If the current in P is one ampere the number of lines of force enclosed by S is 4π N a (100)⁻¹, and these lines in getting into the coil cut out the wire 4π N n μ a (100)⁻¹ times (1); similarly if an ampere flows in S the number of lines enclosed by P will be 4π N a (100)⁻¹ and these lines have cut out the wire of P 4π N n μ a (100)⁻¹ times ... (11), but these expressions (1) and (11) are identical, and this identity is called The Co-efficient of Mutual Induction of the two coils, a quantity that clearly varies with the relative positions of the coils and the medium between them. It must also be noticed that when P embraces 4π N n μ a (100)⁻¹ lines produced by its current of one ampere, each line has cut through each turn, and the number of cuttings is 4π N n μ a (100)⁻¹; this quantity is called The Co-efficient of Self Induction of the coil, varying both with the shape of the coil and the medium surrounding it.

Self induction, therefore, causes a varying local E.M.F. in the coil itself, opposing the current as it rises, assisting it as it falls in value.

In a system consisting of (1) an alternating current dynamo-machine delivering current to the primary coils of a transformer; (2) the secondary coils of a transformer delivering current to an external circuit; we have to consider (1) the E.M.F. produced by the machine; (2) the local E.M.F. in the primary coils; (3) the current in the primary circuit; (4) the E.M.F. produced in the secondary coils; (5) the local E.M.F. in the external circuit, due to self induction; (6) the current in the secondary circuit.

St. Peter's (R.C.) College, Glasgow.—Bishop Eyre on the 22nd ult. laid the corner stone of St. Peter's College, at Bardsen, a few miles from Glasgow. It is a large building, designed by Messrs. Pugin & Pugin, London. It gave an illustration of the College in the Builder for September 21st last.

The Swan United Electric Light Company (Limited).—We are informed that the directors have decided to pay an *ad interim* dividend at the rate of 6 per cent. per annum for the six months ending March 31, 1890.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

5,775, Bricks, Tiles, Building Blocks, &c. J. D. Denny.

This invention principally relates to improvements in the method of manufacture of bricks, &c., by machinery, and consists in arranging a plate on which a device is carved in the mould, and in dressing the plastic surface with ground dust.

6,949, Flushing Apparatus for Water-closets. J. Middlehurst.

According to this invention, a movable flushing-tank is used, and this is pivoted on a water-inlet pipe and suitably balanced. By its form it allows the water to come in through the inlet passage, and then directly after discharge it returns to a normal position, closing the supply-valve. The balancing power of the water is the chief feature, as this influences the discharge and supply, opening or cutting-off the inlets or outlets as required.

7,089, Gully-Trap, Cover, &c., for Drains. C. W. Miller.

This invention consists of an air-tight man-hole cover provided with a central opening protected by a grating, under which is a gully-trap of ordinary construction, but having on one side a fresh-air inlet with valve formed of mica, or some such substance. This valve is acted upon by the pressure of the fresh air being drawn through the grating by the friction of the ventilating shaft of the drain, but immediately the current ceases the valve falls. The presence of foul air or gases causes the valve to close and remain closed, preventing the escape of noxious smells or dangerous odours.

8,051, Paperhangings. W. Scott.

It is claimed that by this invention improved and cheaper materials are used. Sponge, fluely-out or ground, is applied to plain paper by means of adhesive substance. This gives a rich, velvety appearance, which may be increased by successive printings or embossing if desired, and is cheaper than "flock" papers.

19,634, Ventilators. W. and W. Gray.

The improvement which is the subject of this patent consists mainly in the uptake pipe or shaft of the ventilating head being fitted with a double casing lined with hair, felt, or woollen fabric or non-conducting material, sufficient to keep the external air from cooling down the internal air, and so reducing the induced up-draught.

NEW APPLICATIONS FOR PATENTS.

April 14.—5,666, H. Marsden, Nails.—5,627, J. Rome, Metallic Trough Flooring for Bridges, &c.

April 15.—6,980, G. Weber and K. Mayer, Wood Screw Machines.—5,719, W. Taylor, Manufacture of Cement.

April 16.—5,745, C. Ure, Water-closets.—5,746, C. Watts, Ventilating Gear for opening continuous lengths of Lights, Windows, or Ventilators.—5,753, W. Leegott, Operating Skylights, Fanlights, &c.—5,757, R. Lee, Fencing and Railing.—5,796, E. Jeays, Gully-trap for Waste Water.

April 17.—5,807, W. Omlin, Combined Square, Bevel, and Set Mitre.—5,818, R. Rowson, Staircases.—5,822, A. Ripley, Concrete Blocks.—5,837, D. Batcliff, Metallic Framing for the Doors of Strong-rooms, &c.—5,852, J. Reid, Door-check and Closing Apparatus.—5,865, W. Hutchens, Mitreing and Cutting-machine.

April 18.—5,899, T. Robinson, Wood Planing and Moulding Machines.—5,905, H. Marples, Squares for Joiners, &c.—5,912, J. Smith, Window-sashes at G Frames.

April 19.—5,974, F. Goodall, Grates.—5,977, D. Wright and J. Mackinlay, Stove-grates, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

1,248, W. Horn, Building Block.—2,346, T. Kemp, Testing Drains.—2,258, E. Marples and F. Lamburn, Tool Cabinets.—3,788, E. Garside, Sub-faster.—3,598, C. Mills, Walls and other Structures.—4,348, T. Moss-Flower, Spirit Level.—4,593, W. Baker, Fire-grates.—4,878, J. White, Door-springs.—4,882, J. Mason, Door-springs.—4,988, J. Lewis, Fire-grates.—4,990, A. Booth, Sawing-machine.—5,012, J. Tinlin and S. Holt, Wood planing Machine.—5,070, J. Morris, Extending Fret-saw Frame.—5,349, C. Weber and G. Freeman, Artificial Stone, &c.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

8,961, E. Hanf, Window-fastenings.—9,305, E. Johns, Water-closet Basins, &c.—9,666, E. Nunan, Base for Plastering, &c.—9,760, A. Katz, Ceilings, &c.—10,003, The Broseley Tiles Co. and J. Crump, Earthenware Quarries or Tiles.—10,120, S. Wormald, Hinges for Doors.—11,128, G. Batchelor, Drying Slurry by the Waste Heat from Cement Kilns.

Removal.—Mr. G. Shrewsbury notifies his removal from 122, Newgate-street, to larger premises at 36, Gray's Inn-road, W.C.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

Table listing recent sales of property, including estate exchange reports. Columns include location, date, and price. Examples include: April 22.—By R. A. NOTLEY, Upper Tooting—1, Grosford-villa, u.t. 75 yrs., g.r. 56, £360; Kentish Town—9 and 10, Leighton-crescent, u.t. 51 yrs., g.r. 61, £700; Deptford—73, Watlington-lane, u.t. 73 yrs., no g.r., r. 240, £400; Highgate—29, Woodsome-rd., u.t. 72 yrs., no g.r., r. 240, £400.

By WORFORD & HAYWARD (at Folkestone).	
Folkestone—11, Gullhall-st., l., r. £70	4530
Chertton, near Folkestone—7 and 8, Embrose buildings, l.	375
April 25.—By BAKER & SONS.	
Hartlesden—"Kingston House," u.t. 93 yrs., g.t. 26 6s.	850
The residence—"Beechurst," u.t. 63 yrs., g.t. 25 6s., r. £40	375
Willesden-green—F. residence and 1a. 1r. 31p.	2,900
Grange-rd.—Two f. houses and shops, r. £71 p.a.	980
Hampstead, Finchley-rd.—Three plots of f. land	1,470
By J. C. PLATT.	
Fulham—25, 26, and 27, New Crown-ter., and 1, 2, and 3, Crown Mews, l., r. £126 10s.	1,100
Hammersmith—42 and 44, Westville-rd., l., r. £57. 4s.	350
By ELIAS & SON.	
Holborn—6 to 9, Goldsmith-street, u.t. 553 yrs., no g.r., r. £150	2,210
Lambeth—33 and 41, Upper Marsh, c. r. £94 p.a.	780
Islington—6 and 8, Bride-st., u.t. 32 yrs., g.t. £5 8s.	260
Commercial-rd., E.—60, Siddle-st., u.t. 54 yrs., g.t. £11, r. £24	15

(Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; f.g.r. for ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for piece; terr. for terrace; yd. for yard, &c.)

MEETINGS.

SATURDAY, MAY 3.

Royal Institution.—Captain W. de W. Abney, F.R.S., on "Colour and its Chemical Action." II. 3 p.m.
Association of Public Sanitary Inspectors.—Mr. T. Lowther on "The Drainage of Buildings, Public and Private, and its Relation to Health." 6 p.m.
Edinburgh Architectural Association.—Visit to Edinburgh Castle, Parliament Hall, Argyle Tower, and St. Margaret's Chapel.

MONDAY, MAY 5.

Royal Institute of British Architects.—Annual General Meeting of Members only. 8 p.m.
Society of Engineers.—Mr. F. H. Cheeswright on "Breakwater Construction." 7.30 p.m.
Guild and School of Handicraft.—Mr. C. R. Ashbee on "The Architectural Story of England." 8 p.m.
Liverpool Architectural Society.—Annual General Meeting. Closing Address by the President, Mr. T. Mellard Reade. 7 p.m.

TUESDAY, MAY 6.

Royal Institution.—Mr. Louis Pagan on "The Art of Engraving." I. 3 p.m.
Institution of Civil Engineers.—Mr. S. W. Barnaby on "The Screw-Propeller." 8 p.m.
Society of Biblical Archaeology.—Two papers will be read. 8 p.m.
Glasgow Architectural Association.—Paper by Mr. A. N. Prentice.

WEDNESDAY, MAY 7.

Institution of Civil Engineers of Ireland.—Society of Arts.—Dr. P. K. Franklin on "The Aim and Scope of Higher Technical Teaching." 8 p.m.
Liverpool Engineering Society.—(1) Election of Council and Officers for ensuing Session. (2) Adjourned Discussion upon Mr. T. L. Miller's paper on "The Efficiency of Gas-Engines." 8 p.m.

THURSDAY, MAY 8.

Society of Arts.—Mr. Lewis F. Day on "Design Applied to Wood-carving." II. 8 p.m.
Royal Institution.—Professor Dewar, M.A., F.R.S., on "Flame and Explosives." I. 3 p.m.

FRIDAY, MAY 9.

Royal Institution.—Mr. E. Brudenell Carter, F.R.C.S., on "Colour-Vision and Colour Blindness." 8 p.m.

SATURDAY, MAY 10.

Royal Institution.—Dr. Charles Waldstein on "Recent Excavations in Greece." I. 3 p.m.

Miscellaneous.

Liverpool Engineering Society.—The thirtieth ordinary meeting of the present session was held in the Royal Institution, Colquitt-street, on Wednesday evening, the 23rd ult., Mr. Henry H. West, M.Inst.C.E., President, in the chair. After the election of new members, the nomination of council and officers for the ensuing session took place. The adjourned discussion upon Mr. Thomas L. Miller's paper, entitled, "The Efficiency of Gas Engines," which was read before the Society at the meeting on March 26 last, was then opened by Mr. Joseph Price, jun., who was followed by Messrs. J. Hargreaves, C. G. Beechey, Ernest R. Royston, and others. The discussion, which was well sustained, was further adjourned to the meeting to be held on the 7th inst.

The Salvation Army in Brussels.—We are informed that a large block of buildings recently burnt out, and having a fine frontage to one of the main boulevards in Brussels, has just been purchased by the Salvation Army. Plans have been prepared by Mr. J. Williams Dunford, architect, of Queen Victoria-street, E.C., for adapting them to army uses. Arrangements have been made with a Brussels architect to carry the plans into effect.

National Registration of Plumbers.

A public meeting in connexion with the District Council for Bristol, Gloucester, Somerset, and Wilts was held at the Guildhall, Small-street, Bristol, on the 22nd ult. The High Sheriff of Bristol (Mr. Lockley), who is Chairman of the Bristol Sanitary Authority, presided, and there was a large attendance.—The Chairman said no one could estimate the value of that institution, and to it the Medical Officer owed a great deal. The mortality of a city was raised or lowered according to the efficiency of the plumbers engaged upon plumbing work in their residences. Jerry plumbing was an offspring of jerry building, and the object of the society was to get rid of the evil, and thus to reduce the rate of mortality.—The High Sheriff then distributed the certificates of registration, and Mr. W. H. Perry explained the conditions under which they were granted. The applications had been carefully inquired into, so that none but those who had had experience in the trade should be placed on the list.—The Chairman remarked that with such a body of master plumbers and of journeymen, they had a right to look forward to a better state of things in plumbing work than in the past.—Mr. G. H. Pope congratulated those associated with it on the success of the movement which was so recently started. They were to be congratulated also, though he ought not to say so, in having ready to hand technical instruction in plumbing at the Merchant Venturers' School. He had to move the following resolution:—"That after October 31 next the candidates for registration will be required to prove their qualifications by examination in the theory and practice of plumbing." In a new movement like that it was manifestly impossible to require all who had been in the trade for years to prove their fitness by examination, but it was thought there should be a limit to this, and those who did not apply before October 31 should be required to pass an examination.—Mr. Thos. Dyke seconded the resolution, and remarked that there was a certain amount of opinion about plumbers not altogether complimentary, and that opinion was partly founded on ignorance and prejudice. The work of that organisation would do a good deal to remove the idea of which he had referred. The resolution was carried, as was also the following one, moved by Mr. W. Brock and seconded by Mr. Tuckey:—"That in view of the public importance of a recognised qualification of plumbers we desire respectfully to call upon all public bodies, local authorities, architects, and the public generally in Bristol and throughout the counties of Gloucester, Somerset, and Wilts, to support the movement by giving preference to registered plumbers."

A Pavilion for the Finsbury-square Inclosure.—We understand that the committee of the inhabitants of Finsbury-square have accepted a design by Messrs. Crompton & Fawkes, horticultural builders, of Chesham, for a pavilion for the centre of the square. The building will be 24 ft. by 18 ft., and about 40 ft. high, cruciform in plan, with ornamental gables facing four ways, surmounted by an octagonal lantern, in which a four-dial clock will probably be placed at a future time. The base will be of red rubbed brickwork, and the sides will be glazed for the remainder of the height. The roof will be covered by red tiles. It is contemplated that the building will be opened the first week in June. All the details have been designed by Mr. Fawkes.

Potsdam.—Great alterations have been made in the interior of the so-called "New Palace" at Potsdam, owing to the Emperor having made known his intention of making this beautifully-situated home of Frederick the Great his regular summer residence. Not only have the halls and rooms been re-decorated and the valuable old furniture put into a state of repair, but also the arrangements in the kitchen and offices of the household have seen a great change. In accordance to the special wish of his Majesty the heating of the building has undergone a thorough reformation, a system of hot-water coils being substituted for the former ordinary fireplaces.

Messrs. Pontifex & Wood (Limited).—The business premises of this long-established firm of brassfounders, copper-smiths, and engineers will be put up for sale at auction on May 30. The property, which covers a total area of nearly 24,000 feet superficial, whereof the greater portion is freehold, is situated at the northern end of Farringdon Market, and has frontages to Shoe-lane and Plumtree-court.

Edinburgh and Leith Master Builders' Association and the Caledonian Railway Edinburgh Extension Bill.

At a general meeting of the Edinburgh and Leith Master Builders' Association, held at 5, St. Andrew's-square, on the 25th ult., it was unanimously resolved:—

I. As it is the interest of the public to promote intercommunication, the proposed extension of the Caledonian Railway to Leith, in competition with the North British Railway system, is regarded by the master builders, as a portion of the community, with favour, and as eminently desirable, being calculated to greatly increase and develop trade, and the means of transit from the west to the east of the City of Edinburgh.

II. As the future prosperity and extension of the city largely depends upon its amenity, it is incumbent upon the master builders to carefully criticise and, if need be, to strenuously oppose any scheme calculated to injure or destroy said amenity. Having, as practised men, considered the proposals of the Caledonian Railway Company, the master builders are of opinion that the construction of the proposed line of railway will not injuriously affect the amenity of the city; that a thoroughly practical scheme for the construction of the line has been submitted; and that it can be safely carried out without special risk to either property or life.

III. That the master builders and those of the public interested in the extension of the city in the Easter-road and neighbouring districts have a special interest in desiring and promoting an extension of the Caledonian Railway to the east, as the conveyance of building materials without undue cartage will materially lessen the cost of erection of new property in the districts referred to.

IV. That a copy hereof be forwarded to the Edinburgh Town Council, with the expression of the opinion of the master builders that in their determined and uncompromising opposition to the Bill they do not have the public interest in the construction of a railway whose interests would be better served,—1, by securing as large a sum as possible for wayleave through or under the property of the City; 2, by endeavouring to arrange for the public interest in the construction of a subway between the platform of the North British Waverley Station and the platform of the adjoining station on the proposed line; 3, by seeing that the proposed railway should be elevated and viaducts or viaducts of an architectural character as to enhance in place of injuring the amenity of the city; 4, by securing access wherever necessary to the property on both sides of the proposed line, so as not to repeat the objectionable by which the City has allowed both the Caledonian and the North British Railway to prevent all direct communication between the Fountainbridge and Dalry with the Roschire or Gorbals district; 5, by arranging economic through-rates both for passenger and mineral traffic in the public interest.

V. That a copy hereof be also forwarded to the secretary of the Caledonian Railway Company, with the assurance of the hearty co-operation of the master builders, and their best wishes for the success of their Edinburgh Extension Bill.—Scottman.

The Keepership of the Monument.

Mr. Thomas Peto Ward, of 10, Campsbourne-villas, Pembroke-road, Hornsey, well known to many of our readers as the founder of the Builders' Clerks' Benevolent Institution, is a candidate for this appointment, and has our best wishes. In his address to the Lord Mayor and Corporation, he says:—"As a nephew of the late William Ward, who died in 1881, of the Ward Bequests to the Poor of London, and of James Ward, of the Court of Common Council for Aldersgate, also related to the Wards, several contractors for upwards of 100 years, within your City, and who carried out several of the important contracts, permit me, in consequence of a severe reverse of circumstances, to solicit at your hands such employment as you are enabled to bestow. My family were supporters of many of the charitable institutions of London and suburbs, members of the Tylers' and Bricklayers' and Lorryes' Companies, of which last, by patrimony, servitude, and purchase, I am a freeman, and I have the great gratification of seeing much good resulting from my foundation in 1866 of one successful benevolent trade institution, the Builders' Clerks' Benevolent, the success of which was assured by the support rendered me then for the benefit of others by Sir William Lawrence, one of your respected Aldermen and former Lord Mayor, and the late George Godwin, Esq. For fourteen years I held important positions in the offices of four leading London contractors, Messrs. George Mansfield & Son, James Macey, Newnan & Mann, and Browne & Robinson, the latter building your Markets, the interior of Newgate Prison, and Sessions House alterations. For fourteen years I was a master builder; such position was ruined by the results of a five years' litigation (Ward v. Pillely). I have since held two appointments as Clerk of Works, receiving sealed testimonials, thanks, and testimonials from Engineer and Architect."

Royal Victoria Hall, Waterloo Bridge-road.—The following are the arrangements for the Science Lectures to be held here during May.—May 6, "Birth and Death of Mountains," by W. W. Watts. May 13, "London Water Supply," by Prof. Bonney. May 20, "How a Photograph is taken," Dr. J. A. Fleming.

The Central London Railway Bill.—During last week and this week evidence has been given before the Select Committee of the House of Commons for and against the proposals made by the promoters of this Bill. It proposes to make an underground railway (on the plan adopted in the Southwark City Subway) from Bayswater, along Bedford-street, Holborn, and Cheapside to the Bank. Last week evidence was given to the effect that the project was likely to endanger the safety of such buildings as St. Mary's Cathedral and the Church of St. Mary Bow, Cheapside, but on the 25th ult. Sir Benjamin Baker was called, and said he quite agreed with Mr. Hutton Greathead, the responsible engineer, that iron stations would prevent any such damage to property as may have occurred on the Southwark Subway route, where the stations were built with bricks. The underground Railway went within a short distance of Westminster Abbey, and no damage was done to that structure, and he did not anticipate any to the buildings on the route of the proposed line. Near St. Paul's Station the Metropolitan Railway passed under a very heavy bridge belonging to the Chatham and Dover Railway Company without injury to the structure. The witness produced some photographs showing the manner in which a similar railway on the proposed line was constructed, and explained the system to the Committee. While the line was in course of construction there would, said Sir Benjamin, be no obstruction whatever. Anything that would take traffic off the road, or prevent further traffic, was for the benefit of the public. Their system of generating the electricity would cause no annoyance whatever. They did not intend to alter the level of a single sewer on the Metropolitan line. In the construction of the Metropolitan Railways sewers had to be altered every yard, which was accomplished without any difficulty. The present scheme was mere child's play compared with what had to be done in the construction of the Metropolitan Railway. He had very carefully considered the question of the possibility of injury to the Holborn Viaduct, and he was content that none would be done. St. Paul's Cathedral was so far away that it need not be taken into consideration at all. Sir John Fowler gave evidence in support of the Bill. He stated that electricity had passed the experimental stage, and he expressed the opinion that the Metropolitan Railway would be worked by electricity in a few years. This closed the promoters' case, and the inquiry was adjourned till Friday last, when the proceedings were resumed on behalf of the opponents of the scheme.

The A.A. Lyric Club.—The seventh and smoking concert of the season in connexion with the A.A. Lyric Club took place on Thursday, the 24th ult., at the "Mona" Hotel, Piccadilly Garden, Mr. G. Richards Julian, President, in the chair. A very good programme was got through very creditably to all the artists and performers, including Messrs. C. D. of, C. W. Davies, Thomas Roberts, F. T. Stanley, F. J. Dyer, E. W. Arthur Thomas, F. H. Collins, and H. Weeks. Special mention must be made of the services rendered by four sopranos, Messrs. S. Wright, A. E. Williams, A. Cr., and M. Holdsworth, whose performances as a string quartette were deservedly applauded. Mr. Richards Julian distinguished his abilities as a reciter, and Mr. Arthur Julian his versatility as a vocalist. During the evening Mr. W. Burrell was elected President of the Club for next session, and Messrs. Henry White and Theo. Moore, secretaries, are asked to mention that on Monday, the 22nd (not the 15th, as previously announced), there will be "a ladies' night," when a concert exhibition of drawings will be held at 9, St. James-street.

Berlin.—Looking through the official estimates of the expenses of the City of Berlin for the financial year 1890-1891, we find that the Public Works Division of the Board of Public Works requests a grant of some 70,000, for a new lunatic asylum, 30,000, for a new obstetric hospital, some 49,000, for new high schools, and 79,000, for the erection of new schools. The Civil Engineering Division of the same Board request a grant of about 600,000, for the cutting through and laying out of new streets, and nearly 68,000, for the construction of new bridges. The total of the estimates of the two divisions shows a figure nearly 1,000,000.

PRICES CURRENT OF MATERIALS.

TIMBER.	£. s. d.	£. s. d.
Greenheart, B.G. ton	6 15 0	7 5 0
Teak, E.I. load	11 0 0	14 0 0
Sentola, U.S. foot cube	0 2 3	0 3 0
Asi, Java, &c. load	3 0 0	4 5 0
Birch " " " " " " " "	3 0 0	5 0 0
Elm " " " " " " " "	3 10 0	4 15 0
Mr. Dautic, &c. load	2 0 0	3 10 0
Oak " " " " " " " "	2 10 0	4 10 0
Canada " " " " " " " "	5 10 0	6 10 0
Pine, Canada red " " " " " " " "	2 10 0	3 10 0
Road Works " yellow " " " " " " " "	2 0 0	3 5 0
Lath, Dautic, " " " " " " " "	5 0 0	6 5 0
St. Petersburg, " " " " " " " "	5 0 0	7 10 0
Walruscot, B.G. log	0 0 0	0 0 0
Deals, Finland, 2nd and 1st. std. 100 " " " " " " " "	8 0 0	11 0 0
" " " " " " " " " " " "	7 0 0	7 10 0
Riga " " " " " " " " " " " "	7 0 0	8 10 0
St. Petersburg, 1st yellow " " " " " " " "	10 0 0	14 0 0
" " " " " " " " " " " "	8 0 0	10 0 0
" " " " " " " " " " " "	6 10 0	10 0 0
Swedish " " " " " " " " " " " "	7 10 0	15 10 0
White " " " " " " " " " " " "	0 0 0	17 0 0
Canada, Pine, 1st " " " " " " " "	15 0 0	26 0 0
" " " " " " " " " " " "	10 10 0	17 0 0
" " " " " " " " " " " "	7 0 0	10 0 0
" " Spruce, 1st " " " " " " " "	8 15 0	11 0 0
" " " " " " " " " " " "	6 15 0	8 10 0
New Brunswick, &c. " " " " " " " "	6 0 0	8 10 0
Rattens, all kinds " " " " " " " "	6 0 0	16 0 0
Flooring Boards, 8 1/2, 1 1/2, prepared, First " " " " " " " "	0 11 0	0 14 0
Second " " " " " " " " " " " "	0 8 0	0 10 6
Other qualities " " " " " " " " " " " "	0 6 0	0 7 9
Cedar, Cuba " " " " " " " " " " " "	0 0 4	0 0 4 1/2
Honduras, &c. " " " " " " " " " " " "	0 0 4	0 0 4 1/2
Mahogany, Cuba " " " " " " " " " " " "	0 0 4 1/2	0 0 6 1/2
St. Domingo, cargo average " " " " " " " "	0 0 4 1/2	0 0 6 1/2

TIMBER (continued).

	£. s. d.	£. s. d.
Mahogany—Mexican, cargo avg. 0 0 4 1/2	0 0 4 1/2	0 0 5 1/2
Tobasco " " " " " " " "	0 0 5 1/2	0 0 6 1/2
Honduras " " " " " " " "	0 0 5 1/2	0 0 6 1/2
Box, Turkey " " " " " " " "	4 0 0	13 0 0
Rose, Rio " " " " " " " "	15 0 0	20 0 0
Bahia " " " " " " " "	14 0 0	18 0 0
Satin, St. Domingo, " " " " " " " "	0 0 5 1/2	0 1 3
Porto Rico " " " " " " " "	0 0 10 0	0 1 3
Walnut, Italian " " " " " " " "	0 0 4 1/2	0 0 7

METALS.

	£. s. d.	£. s. d.
IRON—Bar, Welsh, in London ton	8 2 6	8 10 0
" " " " " " " " " " " "	7 15 0	8 0 0
" " " " " " " " " " " "	8 10 0	9 10 0
COPPER—British, cake and ingot 54 0 0	54 0 0	54 10 0
Best selected " " " " " " " "	56 0 0	57 0 0
Sheets, strong " " " " " " " "	62 0 0	0 0 0
Chili, bars " " " " " " " "	49 5 0	0 0 0
YELLOW METAL " " " " " " " "	0 0 5 1/2	0 0 6
LEAD—Pig, Spanish " " " " " " " "	12 15 0	0 0 0
English, com. brands " " " " " " " "	12 17 6	13 0 0
Sheet, English, 3 lbs. per square foot and upwards. 14 15 0	14 15 0	0 0 0
Pipe " " " " " " " " " " " "	15 5 0	0 0 0
TIN—Strait, " " " " " " " " " " " "	92 15 0	0 0 0
Australian " " " " " " " " " " " "	93 0 0	0 0 0
English Ingots " " " " " " " " " " " "	96 10 0	0 0 0

OILS.

	£. s. d.	£. s. d.
Linseed " " " " " " " " " " " "	23 7 6	23 15 0
Cocanut, Ceylon " " " " " " " "	23 10 0	0 0 0
Cocanut, Ceylon " " " " " " " "	25 5 0	25 10 0
Palm, Lagos " " " " " " " "	24 10 0	24 15 0
Rapeseed, English pale " " " " " " " "	31 15 0	0 0 0
" " " " " " " " " " " "	30 10 0	0 0 0
Cottonseed, refined " " " " " " " "	22 0 0	0 0 0
Tallow and Oleine " " " " " " " "	21 0 0	40 0 0
Lubricating, U.S. " " " " " " " "	6 10 0	6 0 0
" " " " " " " " " " " "	7 0 0	12 0 0
TAR—Stockholm " " " " " " " "	1 5 6	0 0 0
Archangel " " " " " " " " " " " "	0 18 0	0 0 0

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.
Oak Fencing	Watford Cricket Club		May 6th	ii.
Road Works	Lewisham Bd. of Works	Official	do.	ii.
Sewerage Works, &c., at Infirmary	Harry & Cadoston L.B.	C. R. Walker	May 8th	ii.
Painting, Repairs, &c., at Infirmary	St. Marylebone Guar.	Official	May 12th	xii.
Road Repairs	Croydon Corporation	do.	May 13th	xii.
Paving Works, &c., at Infirmary	East Ham Local Board	W. H. Savage	do.	xii.
Roadmaking and Paving Works	Enham Vestry	W. Sykes	May 14th	xii.
Painting and General Repairs, &c. at Asylum	Kent County Lunatic Asylum	Stenning & Jennings	May 15th	xii.
Alterations, Cheltenham Post-Office	Com. of H.M. Wks. &c.	Official	May 16th	ii.
Engine House, &c.	Bristol Waterworks Co.	J. Taylor & Sons	do.	ii.
Formation of Paths, &c., on Peckham Rye	London County Council	Official	May 19th	xii.
Alterations, &c., to Schools	Brighton Guardians	J. G. Gibbins	May 20th	ii.
Ironwork and steel Girders	Manchester Works Com.	O. H. Hill	do.	ii.
Roadmaking and Paving Works	Tottenham Local Board	do.	do.	ii.
Poor Asylum, Isle of Man	do.	J. E. Worth	May 24th	ii.
Works and Materials, Liverpool Sub-District	War Department	Official	May 26th	xii.
Painting, &c., Works, York Sub-District	do.	do.	Not stated	ii.
Painting Works, Liverpool Sub-District	do.	do.	do.	ii.
Small Factory, Little Claunder-street	A. & E. Humphreys	do.	do.	xii.
New Schools, St. Mary Cray	The Committee	Bonella & Panll	do.	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Borough Surveyor	Banbury Town Council	£150	May 16th	xvi.
Expeditor	Lords, Ballif, & Jurats			
Surveyor and Inspector of Nuisances	Fareham Local Board	£250, &c.	May 15th	xvi.
		£130	May 21st	xvi.

TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

	£. s. d.	£. s. d.
BURGESS-HILL (Sussex).—For the construction of roads and sewers on the Burgess-hill estate, for Mr. J. Letman Johnson. Mr. W. Theobalds, architect, 26, Fudge-row, E.C. Works, York sub-District.		
Oram, Burgess-hill	£2,795 0 0	
Bryant, Burgess-hill	2,750 0 0	
Peters, Petersham	2,540 0 0	
Downer, Burgess-hill	2,379 0 0	
Harrison, Brighton	2,360 0 0	
Canfield, Dorking	2,325 0 0	
Atley, Woodking	2,314 0 0	
HANWELL.—For erecting boys' and girls' school-rooms and swimming bath, for the Central London School District at Hanwell. Messrs. Henry Jarvis & Son, architects. Quantities by Mr. W. Barnett.		
Scrimpp & Co., Brompton-road	£18,490 0 0	
Hobbs & Co., Cecil-street, Strand	17,096 0 0	
E. Bunton, Colchester	17,535 0 0	
Longley & Co., Crawley	17,432 0 0	
H. W. Pattinson, Charing-cross	17,237 0 0	
J. E. Colhinson, Teddington	17,060 0 0	
G. Gibson, Southall	16,790 0 0	
W. Buckeridge, Kingston	16,850 0 0	
Kirk & Randall, Woolwich	16,419 0 0	
Allee & Sons, Kilburn	14,625 0 0	

LONDON.—For pulling down and rebuilding the "Noah's Ark" public-house, Oxford-street, W. Mr. John T. Alexander, architect. Quantities by Mr. Frederick Thomson:

J. W. Hobbs & Co.	£4,500 0 0
Mattock Bros.	4,333 0 0
Puzey & Lamley	4,325 0 0
W. Titmas & Sons	4,283 0 0
T. L. Green	4,275 0 0
J. Beate	4,238 0 0
E. Toms	4,219 0 0
H. Burman & Sons	4,004 0 0
John Anley (accepted)	3,990 0 0

LONDON.—For the erection of the New Peckham Rye Tabernacle, for the Building Committee, Mr. W. H. Woodroffe, architect, 214, Great Dover-street, S.E.:

Higg & Hill	£4,284 0 0
Dove Bros.	4,275 0 0
Hart Bros.	4,257 0 0
R. & E. Evans	4,020 0 0
W. Downs	3,927 0 0
Smith & Son	3,887 0 0
Marland	3,815 0 0
Bately	3,697 0 0
Holloway	3,543 0 0
G. Parker	3,325 0 0

LONDON.—For alterations and conversion into shop premises of 49, Ludbrooke Grove-road, Notting-hill. Mr. Arthur Vernon, architect, 26, Great George-street, Westminster:

Colley	£629 0 0
Watts	575 18 0
Aldin Bros. & Davies (accepted)	522 0 0

LONDON.—For alterations at the "Pitt's Head" public-house, 29, Paddington-street, W., for Mr. Rider, architect, 29, Robert-street, N.W.:

Mr. H. W. Smith, architect, 29, Robert-street, N.W.	£1,128 0 0
Marls	1,033 0 0
Drew & Cadman	971 0 0
Colls	924 10 0
De Grey	849 0 0
Goold & Brand (accepted)	849 0 0

LONDON.—For rebuilding the "Daniel Lambert" tavern, Ludgate-hill and Ave Marie-lane, E.C., for Mr. R. H. Barnes, Mr. H. I. Newton, architect, 49, Victoria-street, Westminster, S.W. Quantities by Mr. F. Thomson, 5, Great James-street, Bedford-row, W.C. :—

Holland & Hannen, Bloomsbury	£13,337 0 0
Harris & Wardrop, Lincoln	12,268 0 0
W. Shurmer, Clapton	11,250 0 0
Dove Bros., Islington	10,991 0 0
S. Godden, Bryanston-square	10,893 0 0
Mark, Edgware-road	10,829 0 0
Kirk & Randall, Woolwich	10,820 0 0
S. R. Lambie, Kentish-town	10,789 0 0
Barnman & Sons, Kennington Park	10,700 0 0
Perry & Co., Bow	10,665 0 0
Fatman & Fotheringham, Holborn	10,453 0 0

* Accepted.

LONDON.—For the erection of a factory, Harrow, for the Eastman Photographic Company. Mr. Charles Bell, architect. Quantities by Mr. Henry Lovegrove :—

Brass & Sons	£10,096 0 0
Nightingale	9,983 0 0
Kilby & Co.	9,930 0 0
J. Anley	9,786 0 0
Wall	9,775 0 0
Smith & Sons	9,127 0 0
F. & H. F. Higgs	8,970 0 0
Allen & Sons (accepted)	7,560 0 0

LONDON.—For erecting headquarters for the 17th North Middlesex Volunteers, at High-street, Camden Town. Messrs. Spalding & Cross, architects, 15, Queen-street, Cheapside :—

Scudrah	£4,028 12 0
Morier	3,430 0 0
Johnson & Manners	3,432 0 0
Bywaters	3,423 0 0
Low & Son	3,390 0 0
Schreyer & Co.	3,313 0 0
Toms	3,291 0 0
Allen & Son	3,265 16 0
Lawrence	3,265 0 0
Chappell	3,236 0 0
Gould & Brand (accepted)	3,121 10 0

LONDON.—For proposed residences, Putney Park Estate, for Mr. Evan Hare. Mr. A. Pope, architect, 5, John-street, Adelphi, W.C. :—

	Residence inclusive	Hardwood fittings
Lathey Bros.	£2,157 0 0	£107 0 0
Davis	2,150 0 0	105 0 0
Smith	2,129 0 0	114 10 0
Oldridge & Son	2,048 0 0	113 0 0
Aries	2,033 0 0	125 0 0
Daw	2,030 0 0	95 0 0
Ellis	2,022 19 1	97 8 0
Gregory & Co.	1,996 0 0	83 0 0
Marjetta	1,928 0 0	128 10 0
Heywood	1,793 0 0	105 0 0
Gaze	1,605 0 0	100 0 0

LONDON.—For building chapel and lodge, for the Putney Burial Board, at their new cemetery in Putney Vale. Mr. J. C. Radford, surveyor to the Board :—

	Faced with Kentish flag	Faced with Bargate Stone.
Williams	£4,000 0 0	£4,000 0 0
Wallis	3,930 0 0	3,980 0 0
Grant	3,875 0 0	3,900 0 0
Jarvis	3,798 0 0	3,773 0 0
Hammond	3,796 0 0	3,780 0 0
Davis	3,748 0 0	3,731 0 0
Landsdown & Co.	3,697 0 0	3,725 0 0
H. G. Heywood	3,692 0 0	3,746 0 0
Gregory & Co.	3,645 0 0	3,645 0 0
Buckridge	3,590 0 0	3,590 0 0
Goddard & Son	3,565 0 0	3,550 0 0
Patison	3,252 0 0	3,252 0 0

LONDON.—For erecting business premises at High-road, Kilburn, Mr. Chester Foulsham, architect. Quantities by Mr. C. H. Goode :—

Avis & Co.	£3,400 0 0
Yerbury	3,237 0 0
Tennant	3,218 0 0
Oldrey	3,115 0 0
Pearse	3,110 0 0
Salt	2,987 0 0
Allen & Sons	2,955 0 0
Fryer	2,940 0 0

LONDON.—For additional repairs, alterations, and decorations at No. 10, Saville-row, W. :—

McCormick & Sons (accepted)	£275 0 0
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LONDON.—For alterations and repairs to be done at Nos. 150 and 152, Seymour-street, Euston-square, for Mr. J. Polzins. Mr. W. F. Polzner, architect :—

J. Kingdon, St. Pancras	£250 0 0
T. G. Hawkins, Holborn	240 0 0
R. Bassano, St. Pancras	234 16 0
C. E. Norris, London	210 0 0
W. Wythe, Dalston	200 0 0
J. T. Peppiatt, Hoxton (accepted)	195 0 0

LONDON.—For carved oak chimney-pieces, panelled ceiling, and interior joinery work, at 8, Wimpole-street, for Mr. G. L. Watson. Mr. J. Armstrong Stenhouse, architect :—

C. Hindley & Sons (accepted)	£250 0 0
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LONDON.—For additions to Nos. 157 and 159, Jamaica-road, Bermondsey, for Mr. J. W. Carter. Mr. Lawton R. Ford, architect, St. Thomas's-chambers, 24, Railway-approach, London Bridge, S.E. :—

J. Bullers (accepted)	£262 0 0
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TWICKENHAM.—For general repairs, decorations, new drains, and sanitary works, at Crossdeep Lodge :—

McCormick & Sons (accepted)	£230 0 0
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WATFORD.—For interior joinery work and parquet flooring, for Mr. G. Wallis. Mr. J. Armstrong Stenhouse, architect :—

C. Hindley & Sons (accepted)	£160 0 0
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The Builder.

Vol. LVIII. No. 2466.

SATURDAY, MAY 10, 1890.

ILLUSTRATIONS.

St. Saviour's Church, Southwark; The Nave Restored.—Sir Arthur Blomfield, Architect.....	Double-Page Ink-Photo.
Sheffield Municipal Buildings Competition: Elevation of Designs submitted by Mr. J. Slater and Mr. H. H. Statham.....	Double-Page Photo-Litho.
Decoration for Bed-room in a Country-house.—Professor Atchison, A.R.A., Architect.....	Double-Page Ink-Photo.
Church of the Sacred Heart, Wimbledon; Interior.—Mr. F. A. Walters, A.R.I.B.A., Architect.....	Double-Page Photo-Litho.

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Architecture at the Paris Salon.



Go from the architectural room at the Royal Academy to those of the Salon furnishes a striking contrast. At the Academy room everything is on a small scale, and perspective views, architectural pictures, are in the majority. At the Salon they are so rare as to be a subject of remark when one encounters them. Large geometrical drawings, often of the most highly-finished character, and got up with a power of effect to which we are almost strangers in England, are the rule here. Gilt frames are not demanded, and the most important drawings are merely mounted on strainers laid with toned paper on the margins, as competition drawings are usually mounted in England. The principal architectural drawings occupy two large rooms, each much larger than the one Royal Academy room, and extend along the end and well up the two side walls of the gallery surrounding the great central court of the Palais d'Industrie. Another feature in the collection, which we do not approve of so much, is that nearly all the drawings which are not illustrative of ancient monuments are ideal designs, which have not been and probably never will be executed. Many of these are of much interest and evince remarkable talent and acquirements; and no doubt it is a seductive thing to evolve on paper architectural ideas that need not be limited by considerations of cost and expediency. But after all, one object of an annual exhibition of architectural designs should be to illustrate the state of the current architectural work of the year; and in this department the Salon collection is even more deficient than usual; in fact, the drawings illustrating buildings executed or commissioned might we believe in literal truth be counted on the fingers.

In the centre of one room is M. Jean Bréasson's model, one-tenth actual size, for a monument "to the Glory of the Republic." This is a composition with a large circular base in four stages, of which the two middle ones are fountain basins, the water flowing from masks in the band of floral ornament which surrounds the upper stage. On the latter rises a great quadrangular stele terminated with a cantilever cornice, which is sur-

mounted by a draped figure of "La République," holding a statuette of Victory (?) in her upraised right hand. The lower portions of the four faces of the stele are decorated, on one face with has-relief figures of Liberty, Equality, and Fraternity, on the reverse of this with a profile figure of a lion, and on the other two sides with has-relief trophies of arms &c. Opposite the four angles of the stele, on the oblique angles of the plan, four pedestals project into the upper fountain basin, bearing groups of sculpture. "Égalité devant la loi" is represented by a seated female figure pointing out to a European and a negro boy the tables of impartial law; "Instruction pour tous" by another seated woman teaching two children ("instruction for two" we heard it translated); "Liberté de Conscience" is a seated female with a torch and a book; and "Suffrage Universel" is a seated figure of a working man with a hammer dropping his vote into the ballot-box. The design compares well architecturally; the basement groups would be better with a perfectly plain plinth behind them, leaving the elaboration of mouldings to commence above; the architecture and sculpture here seem rather to interfere with each other, but there is a great deal that is striking in the design, and it has the merit of having a meaning in every part.

Large restoration drawings of course occupy some space on the walls, but rather less than is usually the case at the Salon. Nearly the whole wall of one room, however, is occupied by the huge strainers containing M. Redon's drawings of the ruins of Baalbek and a restoration. Four frames are devoted to the "actual state," which is shown in splendidly-executed colour elevations such as we see nowhere but in France, no incitement being given to English architects to produce work of this kind. The colour and texture of the walls are shown to perfection, both in the actual and the restored drawings, which are masterpieces in the art of coloured elevation. The restored elevation would convey a more true effect however, if the two pediments of the temples, which are far back from the frontplane of the elevation, were kept more flat and distant by a more subdued tinting. An actual and a restored plan are also added. The author treats the hexagon court in the rear of the entrance façade as a colonnaded court with tiers of niches and statues in the walls at the back of the colonnade, and places a colossal bronze statue in the centre of the court, for which however his plan of

"état actuel" does not pretend to show any authority. But as a whole, the set of drawings is a great credit to French illustrative architecture. We are bound to add that this splendid workmanship does not seem to attract any general notice among visitors, and that the architectural rooms at the Salon are almost as empty as that at Burlington House, though there is much more to look at.

M. Fournereau's drawings of the temple at Angkor-Thôm in Cambodia are the only set of restoration drawings equalling the last-named in scale and importance. These splendid drawings are part of the result of the architectural "mission" to Cambodia organised by the Ministry of Fine Arts, and the magnificent drawing of the restored elevation, a drawing covering the space of a small room and full of the most elaborate detail, is an effective example of what may be done in the way of archaeological illustration of architecture under a Government that will spend public funds in encouraging such studies. No doubt the architecture itself is *bizarre* in the extreme, from a European point of view; but it represents the ideas of people who were once a great and powerful race, as their architectural remains amply show, and who had moreover, after their own manner, that kind of enthusiasm which pushed them to do the greatest and most elaborate things in art that they were capable of. We referred last year, in speaking of the contents of the Trocadéro Gallery, to the extraordinary boldness of scale and style of some of the casts from Cambodian sculpture exhibited there; and this restored drawing of the temple gives the same kind of impression of extraordinary though barbaric power; especially in the effect of the immense mass of wall, with its portentous mouldings, which forms the base to the whole fantastic composition. M. Fournereau's drawings include plans and sections as existing and as restored, and also (which is unusual in French sets of drawings of this kind) an effective coloured perspective of the existing remains, with their extraordinary and multitudinous carved detail.

Another of the largest drawings exhibited is M. Boileau's design for a monument of 1789, shown as occupying a space to the west of the Place de Carrousel and facing the Tuileries gardens. This is an immense coloured elevation showing a built-up piece of monumental architecture, consisting of a gallery with a triumphal arch and dome in the centre of the long side parallel to the Rue des Tuileries, and a return wing at each end

connecting it with the road, where there is at each side an arched entrance with a cupola over, kept however very much below the line of the central dome, which stands high above the rest of the composition. It does not appear what use is to be made of the interior of the gallery, which is not a colonnade but confined within solid walls and covered with a glass roof; the exterior is divided into three bays at each side by wide pilaster-like piers with vertical panels containing inscriptions in gold on a dark marble ground; the lower half of the spaces between is occupied by an engaged order with wide spaces between the flanking columns filled with sculpture representing scenes in the history of the revolution,—the taking of the Bastille, the voluntary enrolment, banquet of the Girondins &c. The piers terminate in coloured marble obelisks with big gilt stars as finials. Above the bas-reliefs are panels with portrait heads in wreathed medallions. The treatment of the curtain walls is much the best part of the design; the centre dome, on an open circular colonnade of Corinthian columns, looks insecure and gimerack, and the treatment of the eud cupolas is commonplace and showy.

Let us turn to some of the smaller drawings. M. Lafillée exhibits seven frames of most interesting coloured studies of "peinture murale au moyen âge en France," dated approximately and with their place given. Any English architectural student visiting the Salon should look at these, which we hope the author intends to produce in a chromolithograph volume. M. Cordonnier exhibits an elevation of his design for the new façade for Milan; an elaborate Late Gothic façade of which however the details strike one as rather thin and cast-iron in appearance, and in which the author has adopted the principle of flanking the façade with two immense towers far over-topping the central lantern, a treatment which we long ago condemned as a mistake, in speaking of the selected competition designs for Milan.

M. Lambert's "Crouis et relevés des Monuments Français" consist of a large frame of beautifully-executed small pen drawings, chiefly from various châteaux in France, in which artistic touch and effect in pen drawing are combined with accuracy in the indication of detail.

M. Moynéau's series of drawings for the restoration of the château of Nemours, a very prettily-got-up set of water-colour elevations, have for their main object the renewal of the courtyard walls and towers, which are ruined, and the replacing of a timber gallery of communication, of which only the traces now exist, between the angle towers of the principal mass of the building, round the outside of the walls. This restoration of Middle Age castles to their original state is a kind of mania apparently in France at present; it is very pretty work on paper; whether it is worth while carrying into execution all this pretence at the renewal of feudal architecture is another question. This we presume is a private commission, as it bears no official indication of any kind. The imprimatur of the "Monuments Historiques" appears on M. Petitgrand's charming set of drawings of the Romanesque Church of St. Paul at Issore, one of those buildings in which the development of the buttress is so curiously illustrated by the employment of engaged columns and buttresses in two apses of the same chevet. We presume some part of this drawing is restoration, or at least that the building has been finished-up into an appearance or completeness greater than it actually has, in order to give a complete record of its design. The drawings consist entirely of tinted elevations.

M. Deverin's fine set of drawings of the Abbey Church of St. Jouin-des-Marnes include drawings, in the same style, both of the actual state and of the proposed restoration. The north side elevation showing the actual state presents a most strange jumble of an apsidal chevet without its proper cornice terminations, with red tile roofs hanging over the curves like a blanket; a Romanesque tower with

half-effaced details; square "churchwarden" windows built into the wall of the nave, and the remains of a Late Gothic traceried cloister below them. The west front, which requires but little in the way of restoration, is a singular piece of architecture, with flanking turrets formed by a combination of three great shafts on each face, having with their capitals more the look of very elongated Classic columns than of anything Gothic; this columnar collection being crowned with two arched stages and a conical turret. The restoration of the eastern end which is contemplated, or at any rate shown, is very complete, but we fear is likely to confuse history very much. A number of interesting drawings of capitals and other details are added. M. Esquié's project for the restoration of the extraordinary castellated-looking brick church of Venesque (Haute-Garonne) hangs next to this; the drawings do not show very clearly what is intended, but it seems to include a rebuilding of the west front in a characteristic brick style, and with a grey stone or granite base on which the brick is built direct without the intervention of any moulding, as we noted the other day it was done in Mr. Norman Shaw's new building on the Embankment; so he is after all not alone in this piece of architectural immorality. Behind the front is seen the top of the low broad battlemented tower, with bells of unequal sizes hanging in open arches. Altogether this is one of the most curious and interesting bits of work among the drawings connected with restoration work.

M. Marcel's restoration of the Château of Tonquedec is illustrated by some fine water-colour drawings of the existing remains and a set of equally fine tinted elevations of the restoration, together with a bird's-eye view perspective in monochrome. This, which includes no less than twelve large frames, is one of the finest sets of drawings in the collection. The studies for a restoration of the Château of Mesnières, by M. Conin, include a fine water-colour perspective of the building occupying three sides of a courtyard, with a Francis I. façade towards the court, and two immense circular machicolated towers, with conical roofs, at the outer angles of the building. M. Lafargue's restoration of the Château of Lestang is another admirable set of drawings of the same class. Next to this are M. Ridet's drawings and restorations of the Abbey of Fontevrault. The architect has restored the central tower with a short bulbous-shaped spire or pointed dome in masonry, which has rather too modern an appearance, though it is certainly an improvement on the existing ugly timber and slated termination. The most remarkable incident in the plan is the "cuisine," a separate eight-sided building with a lofty conical roof in masonry, and an apse on each side of the octagon, giving it the appearance of a chevet continued all round the centre. This extraordinary structure stands apart opposite the west end of the refectory, which runs parallel with the church on the south side of the cloister. The church itself has a one-aisled nave, with pious piers dividing it into four bays, from which spring transverse round arches with flat soffits, carrying the domes which internally form the roof to each bay. These domes are a restoration, but no doubt a correct one as to the general scheme of the architectural design. As it now stands the nave is covered by a continuous timber roof. A full plan of the church and the contiguous buildings is given. This is a remarkable set of drawings, got up with great completeness. A set of water-colour perspective sketches of existing portions is added. The cloister is partly Renaissance work, with circular arches divided by coupled columns of a small Ionic order.

M. Libaudière shows a beautiful coloured elevation of the Romanesque Church of Le Caillère; and M. Lemoine exhibits drawings of the existing Château de Veul and restoration, with its circular towers curiously divided up into panels by a series of

what may be called wall-mullions. M. Albert Gayet exhibits a fine set of coloured drawings of a restoration of the pavilion of Rameses II. at Medinet-Abou; the colouring is rather harsh and crude, but so probably was the original. Among the drawings illustrating ancient work there is perhaps none finer, as a specimen of illustrative architectural drawing, than M. Bressillon's coloured elevation of the portal of the Church of Sainte-Pierre at Avignon. The sculptured details are worked up with remarkable force and reality of effect, producing almost the appearance of actual relief.

As observed, designs for modern buildings form the minority of the collection; there seem to be rather more of these than usual, at first sight, but on examination it turns out that a large proportion of these, including the largest and most striking drawings, are only "projets"; castles in the air, and the number of illustrations actually executed or commissioned is very small indeed; a practical deficiency in French architectural exhibitions which we have often commented on. M. Laborey shows a good interior view of the "Chapelle de Notre-Dame-de-Sion," at Paris, a Renaissance building with the domed ceiling decorated in a pretty but rather timid manner with powderings and medallions on a gold ground. M. Jasson's drawings of the Victor-Poirer Salle-de-Concerts at Nancy show a well-detailed design of the modern French Renaissance type. Among the "projets" a very pretty one, shown only by a single lightly-tinted elevation, is M. Monpauze's "Façade d'une Eglise Paroissiale," a Renaissance façade with an octagonal dome seen in the rear and a bell-turret at each side of the façade. M. Destors' "Un Cercle Artistique" is a student's competition design of great pretension and shown in a set of very large and well-executed geometrical drawings, but spoiled by utter lack of repose and refinement in the details. M. Le Ray's "Un Hôtel de Journal, avec imprimerie" is a fine and grandiose design, fully illustrated with plans, elevations, and sections, the hotel forming a separate block to the street, the printing rooms a great iron-roofed building in the rear; the façade has the fault of being too showy and occasionally a little vulgar in the details, but its general effect is dignified and suitable; the best part of the design is the treatment of the back of the building towards the courtyard which intervenes between the front block and the printing house. The plan is well laid out, and all the practical details of the building completely shown. "A theatre for a provincial town," by M. Dupuis, is another Students' Competition design; there is nothing of the provincial town about it, for it is nearly as costly and decorative as the Paris Opera House; there is a very rich effect in the treatment of the centre part of the principal façade with its Corinthian order and open arcade between the coupled columns, the lower parts of which are enriched or rather encrusted with ornament in the shape of masques and scrolls; the large detail elevation is a capital piece of work of its kind. In strong contrast to these showy designs is M. Moreau's "Etude d'Hôpital," a plan for an immense pavilion hospital treated with uncompromising simplicity in the architecture. Then we have a "Hôtel pour un architecte décorateur" by M. Gaston Cousin, the slightly tinted elevation of which is a really refined bit of work; there is no order, and the designer has known how to hold his hand and be reticent with his ornament, which is well-placed and well designed; there is a plain masonry wall with a rusticated basement, and windows with decorative "encadrements" equally spaced in the wall, the main wall space being terminated by a cornice with a broad band of carved ornament beneath it as a frieze. M. Le Grand's design for a Mairie for the Xth Arrondissement shows on the plan a clever treatment of an irregular and awkwardly shaped site, but the design is commonplace.

M. Emmanuel Garnier's "Hôtel de M.

G.—at Nismes," we may take to be one of the very few real modern buildings of which any drawings are exhibited. It is shown in a very large and elaborate set of drawings, but does not please us much. It is a Classic building without an order, and to which a certain special effect is given by the treatment of all the window architraves with continuous carved ornament all round, on a basis of perfectly plain masonry; the effect is meant to be rich but is somewhat monotonous, and considering the great size of the elevations the detail really ought to have been better shown; it is not worth while making drawings on so large a scale except with the object of showing detail thoroughly. M. Mougenot's drawings showing a design for baths for Epinal are also only a "projet," but are very interesting. This is one of a class of buildings in which French architects excel; buildings for a practical purpose in which a simple and economical architectural treatment only is admissible. We have here a long red-roofed stone building flanking the sea, with a rusticated basement-story immediately above the pier, with small windows only; and above this two stories with the windows connected vertically and enlivened with a little inlaid tile ornament between. The entrance is on the end elevation at right angles to the sea, with a low wing pavilion at each end of it with heavily rusticated angles, and three large arched entrance-doors in the centre of the connecting wall. The treatment is perfectly unaffected and simple, the building looks like what it is, and the firm and distinct manner in which the elevations are drawn and tinted deserves special praise.

M. Delort de Gléon's "Hôtel Particulier" at Cairo is a strong contrast to the last-named exhibit, being a Cairene treatment by a European architect; a mass of white and yellowish plaster wall with a characteristic cresting, and coloured tile ornament liberally inserted in connexion with the fenestration; the delicately-tinted elevation has a charming effect. Next to this is an admirable coloured elevation of a very different type, M. Baril's competition design for the Mairie of the Xth Arrondissement: a very pleasing design with a slightly-projected centre block with pyramidal roof, a Corinthian order in the upper story with mullioned windows between, and plain wall below with three arched entrances; the slightly-receding wings are kept very plain, throwing out the centre portion; the design is delicately and very artistically tinted, an excellent example of geometrical architectural drawing. The plan is treated with a centre court and a colonnaded loggia round, with a handsome external staircase from the courtyard level to the loggia.

M. Cabanis's coloured drawing of the church of Clermont-Ferrand, a kind of elevation with the effect of a perspective (the ground-line is actually drawn in perspective though the cornice lines of the apse are straight) deserves mention as a very effective drawing, tinted in a light reddish tone which, with the blue sky above, gives a powerful effect of sunlight. It is difficult to determine whether M. Gontier's Château de Villefargeau represents a new house, or is a drawing of an old one: it is a very quiet unassuming house, with a long stretch of low red-roofed buildings, partly offices, behind; if it is a new building, it is a rather agreeable variety among modern French house designs for its exceedingly simple, unpretending, and home-like character.

Of decorative design there is not very much: and what there is will not appeal much to English taste, which in the present day may at least boast of evincing a far more delicate perception and taste as to colour and decorative style than is exhibited in French work of this class. M. Marnze exhibits two designs for tombs, apparently in red granite, and which realise nothing better than the old sarcophagus pattern with sham rings at the sides, and mounted on a lofty and solid mass of plinth. M. Lorain exhibits a drawing of his façade for the portal of the gallery of "Classe 24" at the

1889 Exhibition, a gewgaw arrangement in blue columns and gilding, which might do as a temporary exhibition design, but was certainly not worth exhibiting here for more mature and considerate criticism. M. Onillon exhibits some sketches for decorative tapestry, with the Renaissance *motifs* on a yellow ground which seem to be the prevailing modern idea for tapestry design in France; in the middle of one of them is a nude figure in an architectural alcove, and relieved upon a ground of bright red. The colour effect is what the French themselves, in moments of more sober consideration, would perhaps call *criarde*, and it is needless to remark that of all things in the world classical architectural detail is the kind of thing least suited for treatment in tapestry; it demands clean lines and clear-cut outline, which is exactly what tapestry cannot furnish. M. Guillaumot, a provincial architect at Marly-le-Roi, and pupil of Viollet-le-Duc, sends three coloured interiors illustrative of rooms and furniture in the Château of Marly, which are well executed and interesting as illustrations.

The drawings by M. Robert-de-Massy, representing coloured design for the walls of three rooms, a "cabinet de toilette," a "cabinet de travail," and a "salle de bains," are the same class of design which is exhibited on the Royal Academy walls by Professor Aitchison: they are more precise in execution and more brilliant in colour—much more brilliant; but what colour! The "salle de travail" shows a green self-coloured wall with red doors and a white mantelpiece with strongly coloured blue tiles; in the "salle de bains" the whole wall is enclosed in a bright red frame, within which are tiles, and within this a similar bright red frame enclosing paintings of marine creatures. The "cabinet de toilette" has a very pronounced wall tile pattern as a dado, above which is painted an imitation trellis with flowers trained over it! There are some things, at all events, that we do better in England. M. Hourlier exhibits a design for a ceiling intended to illustrate the twelve months of the Republican calendar, which is enough to knock one down; the general design forms a great red cross from angle to angle of the ceiling, with panels between the arms in which are allegorical figures with representative reptiles and flying things scattered about them in profusion; the thing is not only not decorative in effect or treatment, but it would be enough to lower any room to which it was applied to about half its real height; the large figures in the angles, at the extremities of the cross, are however well designed in a large and grandiose manner. Beneath this is a clever piece of archaeological decorative study by M. Mayeux, the colour statue of Artemis of Ephesus, the nude portion of the figure (down to the waist) painted a strong red, with a pair of wings seen behind somewhat on the model of the decorative wing familiar in Egyptian work. This semi-barbaric figure stands relieved against an alcove of strong and dark blue, and bases her feet on a marble pedestal somewhat resembling an egg with the small end upwards. The figure and niche are framed in a polychrome architecture looking rather of the proportions of wood than stone. The whole effect is distinctly Asiatic rather than Greek, and may so far be in keeping with the probabilities of Ephesian decoration, it is at all events a powerfully executed drawing to which some thought has gone. M. Massy exhibits a small and very delicate water-colour elevation for the Uruguay Pavilion of the 1889 exhibition, this is a very pretty little building; a portion of the "decoration of classe xv." shown in the same frame, is, like nearly all the coloured decoration design, somewhat hard in effect and inharmonious in colour, though it does not do such violence to the eye as some we have mentioned. The best piece of decoration by far that is to be found in the collection is the study by M. Espouy for a scheme for the decoration of the ceiling of a room in the Villa Medici. This is in a not very pure style it is true, the

details consisting of scrolls and festoons and figures dancing about among them after the Renaissance fashion, but it is really refined in design and execution, and pleasing and delicate in colour, and the little figures are very well drawn. A design in another school of Renaissance is that by M. Paquet, for a decorative ceiling in Louis XVI. style; a large circular moulding gives an opening in the centre into the sky and clouds and pink cupids flying about, the sprandrils are loaded with bundles of multifarious objects on a gold ground: a clever drawing reproducing a most vicious style of decoration. A design for a decorative ceiling by M. Pedroni, consisting of very heavy mouldings dividing the ceiling into panels of various shapes, with Renaissance scroll-work on a gold ground in the panels, is inoffensive in taste though not in any way remarkable. If we have a good deal to learn from the French about architectural drawing properly so called, and a good deal to envy them for, we have at all events no cause to be jealous of them in regard to decorative design, in which, if we may accept the Salon as a test, their best things are only tolerable and their worst rather intolerable.

NOTES.

THE advocates of the registration of architects in this country (or those who pose as such) have, we believe, been referring in support of their views to the demonstration which has been got up on the subject in France and America. The French architectural papers have lately been full of excitable and piquant letters from individual architects discussing the subject from various points, most of which however, showed so little pretence of seriousness, and were so obviously prompted mainly by the desire, so common among Frenchmen, to evolve smart and humorous epigrams, that they hardly called for serious consideration. But the decision came to by the official Commission appointed to consider the question of an architectural diploma in France, is insignificant enough. It should be borne in mind that France is the country in which architectural education is more systematically and elaborately carried out than in any other country in the world; that there is probably no country where architecture and architects are held in more respect; and that the Commission consisted almost entirely of men specially qualified to consider the subject in its bearing on the highest interests of architecture as an intellectual art. The decision of this Commission is that the theory of a compulsory or obligatory examination is rejected by a majority of 15 to 3, and that of a "diplôme facultatif," or a diploma given as a distinction to those who claim and can show that they are worthy of it, was rejected by a majority of 12 against 6. This, as is remarked in the *Semaine des Constructeurs*, from which we take the facts, "amounts to the rejection en bloc of all diploma." In regard to the subject of provincial instruction in architecture a resolution was passed that "the Commission is of opinion that the provincial architectural societies should be invited to study in concert with the state or official authorities ('pouvoirs publics') the means of developing or creating schools of architecture."

THE speeches at the Royal Academy dinner of last Saturday were quite up to the usual mark of an occasion when some of the best of the after-dinner speeches of the year are usually made. The Marquis of Salisbury's sketch of the manner in which artists would in future times be taken care of under a "grandmotherly" Government of advanced progress was very happily hit off. "But the time may come when there will be a committee that will examine you and a commission that will reconstruct you. And, worse than that, you will receive the assistance of the Treasury, and you will be exposed in Committee of Supply to the microscope of Parliamentary taste. You yourself, Sir, or at least your successor, will be appointed by

competitive examination, and you will be forbidden by Act of Parliament to work for more than eight hours a day. Then an inspector will come down to you here as everywhere else, and I fancy that it will be an inspector from the County Council. His duty will be to examine beforehand the subjects to which your artists are to devote themselves, and to see that the models whom you employ are properly draped." This prophecy must have been a satisfactory one to Mr. Horsley, at all events. The chief interest of the evening lay in the appearance of Mr. John Morley as the respondent to the toast of literature, who took the opportunity of pointing out the sense in which literature also was an art—"the happiest of all callings, and the most imperishable of all arts," and who made a plea for the protection of the English tongue against such barbarous inventions of words as have already been coined, and are still further threatened, in connexion with the practical application of electricity.

THE London County Council is still on its trial, but it has had its case very succinctly put before the public by Lord Rosebery in his review of the first year's work of the various Committees of the Council. These committees are upwards of twenty in number, and it is therefore not surprising that Lord Rosebery's review, divided into three instalments, occupied nearly an hour in delivery at each of the three last meetings of the Council. There is no doubt that the Local Government Act of 1888, which authorised the election of County Councils all over the country, does not meet all the requirements of London government, and it was confessedly only made applicable to London by reason of the state of things which was revealed by the Royal Commission of Inquiry into the proceedings of the Metropolitan Board of Works. Modified as some of the general provisions of that Act were to meet the special needs of London, and containing as the Act does special clauses applicable to London alone, the working of the measure in London has entailed a great deal of friction and delay in many mere matters of detail. Amendments of the law (some of which are now before Parliament) will no doubt make the administrative machine work more smoothly. In the meantime, the Council will do well to profit by Lord Rosebery's excellent advice, and to bear in mind that they are an administrative and not a legislative body. By the intelligent and diligent discharge of the important work committed to them they will gradually gain the public confidence, and may ultimately have the satisfaction of developing into an ideal municipal body.

WE have good authority for saying that Professor Raschdorff's new design (dated March 9) for the new Cathedral at Berlin has been approved of by the Emperor.

SIR WILLIAM HARCOURT attacked the Chancellor of the Exchequer in the debate on the Budget provision on Monday for not abolishing the Inhabited House Duty. This produced from Mr. Goschen the confession that the entire abolition of this tax had been in his mind, but that he did not like to abolish a tax entirely, on account of the difficulty of introducing it again. But this reasoning seems to be one against abolishing any tax or any part of a tax; because, if necessity requires it, it can be no valid argument against the re-imposition of a tax that at a time when it was not needed it was abolished. The Inhabited House Duty is no doubt a tax easily and inexpensively levied, which is a reason for its continuance, but in the case of many persons it is a tax on a necessity of life. It certainly ought, if possible, not to fall on houses below £250 in annual value—a house above that value falls into the category of luxuries. The fairest way to levy it would be to exempt houses under that value, and to exempt also that amount in the case of houses above that value. Thus a house valued at 200*l.* a year would pay on 75*l.* The present amount is too low.

THE case of "Proudfoot v. Hart," which was decided the end of last week by the Court of Appeal, is one of considerable interest and importance, but whether it really throws light on the relations of landlord and tenant seems rather doubtful. The action was brought by a landlord against the tenant for not delivering up his house at the end of the term in "good tenable repair." The reports of the case which have been published are rather too meagre to be satisfactory, and it may be that when this decision is reported in full in the Law Reports, it will be of greater value than it appears to be at present. In the course of the judgment the Court gave the following definition of "good tenable repair":—"Good tenable repair" is such repair as, taking into account the age, the character, and the locality of the house, would make it reasonably fit for the occupation of a reasonable-minded tenant of the class who would be likely to want the house." It is obvious that this definition requires each case to be judged by its particular facts, and also leaves a good deal to the inclination and personal views of the man who has to decide between landlord and tenant. In the case in question the official referee gave the landlord the costs of painting and papering with new paper (similar to the old paper), some of the rooms; but the Divisional Court and the Court of Appeal reversed this decision, and held that such work was decorative repair, and was not required to be done by the words of the contract. But we might ask whether a house is in tenable repair if it is not papered? And the exclusion of decorative repair in the case in question does not seem to follow from the definition which was laid down by the Court.

ACCORDING to the *Illustrirte Zeitung* of the 3rd inst., the sculptor Reinhold Begas (who is at present favourite of the Emperor), has completed a new model for the much spoken of "National Monument to William I.," which is to have a site found for it in Berlin, and this model is supposed to have been designed in accordance with the ideas of his patron. The same journal brings the news that a new, a second, competition for this monument is being arranged, to which, however, besides Begas, only sculptors, *i.e.*, the four winners of the second prizes at the grand competition of October last, Messrs. Hilger, Otto, Schaper, and Seibling, will be invited. By whom these latter arrangements are being made the journal does not notify; but it distinctly mentions that in this competition, that site against which the assessors of last year's competition distinctly voted, but which seems to have taken the fancy of the young Emperor, *i.e.*, the "Schlosspeihheit," is to be chosen. If this plan really be followed, it will cause great complaint in German artistic circles, and especially among architects, as it will be remembered that the two first prizes in the grand competition were awarded to members of the profession, in whose designs architecture and not sculpture was the prominent feature.

THE great suspension bridge at Buda Pest, which was erected 1842-1849 by Messrs. William & Adam Clark,—famous not only for its construction, but also for its extremely fine outline from the artist's point of view,—is in danger of breaking down, this danger being caused by the rusting and giving way of the worms of the screws on which the main strain tells. The Dutch engineer, Haentjens, who has been consulted as to the quickest and surest way of saving the bridge, is preparing plans for this purpose with the utmost speed.

IT may be worth note that the managers of the Exhibition of Gardening and Horticulture, opened at Berlin on the 25th ult., took special care that the floral arrangements should be brought into connection with architecture, and that the visitors should have not only plants and flowers to

study at their show, but also the different modes of arranging these on, or in combination with, buildings and parts of buildings, both exteriors and interiors.

A VERITABLE Elizabethan house, known as the Shelleys, in St. Anne's, Lewes, will shortly be offered for sale at the Mart, by order of the executors of the late F. W. Cosens, F.S.A. Built of stone, and surrounded by a garden, it retains many of its earlier fittings and decorations. The house derives its name from the removal thither, *circa* 1630, of the Shelley family, descended from the Henry Shelley, of Patcham, Sussex, who towards the close of the sixteenth century migrated from Patcham to the house in Southover, Lewes, which is illustrated in Horsfield's "History and Antiquities of Lewes" (1827). That work states that the male heritable line of the Shelleys of Lewes, one of the three families of this name in Sussex, failed with the death, in 1811, of Henry Shelley, M.P. for the borough. Mr. Cosens's collection of pictures, &c., will be put up for sale at Christie's on Saturday next, May 17, and the following Monday and Tuesday. It includes many cabinet works of the modern Spanish and French Schools; a set of topographical drawings to illustrate the works of Johnson, Goldsmith, Dickens, and other authors, by E. Hull; together with T. Faed's "From Dawn to Sunset" and "Lady of Shalott," Sir F. Leighton's "Dante in Exile," L. Alma Tadema's "Confidences," Clarkson Stanfield's "Dort" and "Naples," D. Roberts's "Edinburgh" and "Interior of St. Peter's," Holman Hunt's "Rienzi," Sir J. E. Millais's "Trust Me," E. W. Cooke's "Millwall," W. P. Frith's "Railway Station" and "Coming of Age in the Olden Time," J. C. Hook's "Valley on the Moor," and John Phillip's "Fair at Seville" and "La Alameda."

IT is stated in the *Standard* that Mr. James Jardine, lately High Sheriff of Cheshire, has contributed 2,500*l.* towards the restoration of the south porch, Manchester Cathedral. The north porch was recently rebuilt, at a cost of 5,600*l.*, by the munificence of Mrs. Worthington and Messrs. Jonas and Thomas Craven. The present cathedral was originally the parish church of St. Mary-the-Virgin, St. Denis, and St. George, famous for the beauty of the stall-work. In 1422 a royal charter was addressed to Thomas, fifth Baron de la Warr, for making the church collegiate. The college having been valued, in the suppression, at 236*l.* 12*s.* 5*d.* yearly, was dissolved in 1547, and in 1578 was refounded as the College of Christ. Dr. Dee was warden during the period 1597-1607. Reinstated at the restoration of King Charles II., the collegiate foundation survived until 1847, when, in terms of the Act 10 & 11 Vict., c. 108, a see was set up, and Dr. James Prince Lee was elected first bishop. The collegiate buildings were latterly occupied by the Blue-coat School. Having been repaired and refitted in 1815, the fabric was restored, and the western tower rebuilt, in 1862-8, by Mr. J. P. Holden, Chapter Architect. Of the two organs, one is by "Father" Smith, the other has an oakencase designed by the late Sir G. G. Scott. Dr. Dee died at Mortlake in December, 1608. His magical black stone (said to be a bit of canal coal) was sold at Christie's on July 14, 1888, in Lord Lonsborough's collection. It had belonged to Lord Peterborough, Lady Betty Germaine, and to Walpole, and is "the Devil's looking-glass, a stone" mentioned in "Hudibras" as used by Kelly, who had been Dee's associate.

CAERPHILLY is known as the site of a great Medieval castle, but it gains another kind of notoriety in Mr. Spear's Report to the Local Government Board upon the prevalence of diphtheria and croup in the Registration Sub-district of Pontypridd, and upon the sanitary condition and administration of the sanitary areas therein contained. One of the first places mentioned in the report, however, is Cilfynydd, a new mining village, with a

population that has grown within the last four years from a couple of hundred, at most, to over 2,000. Here the houses are built in rows and terraces half way up a steep hill-side. "There is no regular sewer system. Most of the 370 houses (or thereabouts), have top-water drains which ultimately discharge into a highway drain and thence into the canal; or, where this method is not available, the sewage runs over adjacent unoccupied land, or into the streets or back lanes; occasionally into the privy cesspools. The back lanes have the appearance of quagmires, and the yard space about dwellings is often sewage ladden. Cess-pit privies, and cesspools receiving the discharge of closets, are in general few. When full, they overflow into the back lanes; and, in times of storm, water from the hill side causes them to overflow, and the contents have been known at such times to be washed into the very houses." In the village of Caerphilly "the sewer is inadequately ventilated by a few small pipe ventilators, and by a few untrapped roadside gullies. The private drains, even in the case of new houses (and in their case in contravention of by-laws) are unprovided with special means of ventilation; and, occasionally, rough untrapped gullies are situated close by the doors and windows of houses, a considerable amount of sewage still finds its way into the rivulet crossing the centre of the village and causes there nuisance. Some of the houses of the village have no privy accommodation of any sort, others have the old-fashioned privy-pit, which is often neglected and the source of much nuisance; others again, and these perhaps the majority, have closets connected with the public sewer, but, as no flushing apparatus is provided, their condition is often very unsatisfactory." "In one of the divisions," we are told, "is a properly organised method of administering sanitary affairs, or of ensuring that the many and varied conditions injurious to health be brought in detail to the knowledge of the Sanitary Authority. The Medical Officers of health never attend the meetings of the Sanitary Authority, and their representation is confined to their annual reports. . . ."

What is wanted in this rural district is one Medical Officer of Health, whose salary should pay the expenditure of time and labour in sanitary organisation and supervision, and who should have under his direction an efficient staff of Inspectors of Nuisances. At present the single Inspector of Nuisances is engaged as a surveyor, engineer, superintendent of scavenging contractors, and collector of rates in districts where the Sanitary Authority have the water supply under their own control."

In spite of the split in the artistic camp in Paris, the exhibition of pictures at the Salon does not seem very materially affected in regard to the general level of work displayed. We are conscious, of course, of missing some eminent and well-known names, and much has been really lost to the Salon last year when the new Salon opens on the fifteenth. But the general appearance of the galleries of the old Salon, considering their extent and the number of works hung, is a remarkable testimony to the extraordinary vitality of French painting at the present time. We shall give a more detailed account of the exhibition when the new Salon is also opened and the two can be compared.

WHILE referring to the subject of French exhibitions, let us once more enter a protest against the insane and exasperating system of cataloguing art exhibitions to which the French adhere. As every English visitor pays to his cost, more especially every one who attempts to make notes or write an account of the exhibition, the catalogue of the pictures is arranged with the names of the artists in alphabetical order, and the numbers in numerical order, but the numbers on the wall follow no order at all: the picture you are looking at may be No. 217, and the next 1,128 and so on. To any one

making a regular progress through the rooms this necessitates a continual and most irritating exercise of constantly turning the leaves of the catalogue backwards and forwards. But this is the smallest annoyance; the serious one is that it is impossible to know where to find any picture you wish to see. You may read in the catalogue the name of a painter and the subject of a work which you know is likely to be one of the best things in the collection, but there is not the slightest guide as to where you may be able to find it over a space of literally several acres of galleries. If it is a small picture, the search for it may cost the best part of an hour, and be unsuccessful after all: it is a mere chance whether you find it or not. At the Royal Academy the arrangement of the catalogue, with the galleries numbered and the picture numbers running consecutively, tells us exactly where to find any picture we wish to see, with the least possible loss of time. Why will the French keep up this absurd and illogical system? If they think that they have not much to learn in art from us, they may at least take a hint from us in the humble but not unimportant practical matter of the convenient arrangement of catalogues.

THE ROYAL ACADEMY EXHIBITION.

THE remark which is heard regularly every year from loungers at the private view, that "it is not a good Academy this year," happens on this occasion to be more true than it sometimes is. The proportion of pictures that are of interest, as against those that are of none, is perhaps pretty much the same every year; but there are years when the best men are not at their best, and when there is no one picture that makes a marked impression; and this is the case with the Academy of 1890.

As far as mere charm of form and colour are concerned, the President has perhaps never done better than in the "Bath of Psyche" (243), which shows a beautifully-painted nude figure standing sideways to the spectator, and with the delicate tints of her body relieved against white drapery hanging on the further side of the figure, which is partially reflected in the water of the bath; the back of the scene is formed by marble Ionic columns with gilded volutes, and a reddish purple curtain hung between them, over which the blue sky is seen. The face of the figure, too, is lovely in its way, though it may be rather *spiritual* than spiritual; and though it must be admitted that the intellectual interest of the work is of the slightest, it at all events succeeds at every point in realising its aim, viz, sensuous charm of a delicate and refined order. The picture has been purchased for the nation from the Chantrey bequest fund, and it is no doubt worth purchasing, but did Chantrey intend that the Royal Academy should act as trustees of a fund for purchasing their own pictures? The "Tragic Poetess" (310), by the same artist, is a picture with more meaning in it: the figure, in dark robes, is seated facing the spectator, and the face is a very fine one, full of intellectual expression; the drawback to the picture is the theatrical effect of the brassy sky behind, which is like nothing in Nature. Mr. Tadmema's contribution, in its usual place in Gallery III, is as good as usual, without more human interest than usual. It is entitled "The Frigidarium" (324); in the foreground is a kind of vestibule to which a lady comes from the bath which is seen beyond, some drapery loosely held round her, while an attendant pulls back a curtain for her admission, showing the open-air bath beyond and the bathers, and bits of architectural detail in the distance, and over the bath enclosure a bright bit of hill, and the open sky: the picture is a variation upon an old theme, but each variation has a charm of its own, though the continued repetition of the same rather expressionless type of face is an element of monotony. Of the same class of work is Mr. Poynter's charming "On the Temple Steps" (866), where a girl is seated on a balustrade beside a profusion of fruit; in this, however, while Mr. Poynter's treatment of architectural and other accessories cannot be said to equal Mr. Tadmema's, the interest of the figure is much greater; she is no cold abstraction of a typical Roman life, but a blooming girl full of warmth and life and expression, and is the centre of attraction of

the picture, instead of being a mere figure to hang draperies on; and though Mr. Tadmema has never been equalled in his technical treatment of marble and Classical architectural detail, and in the clear effect of sunlight which floods his scenes, one cannot but feel that the production of a beautiful and attractive figure counts for more than the best marble-painting.

One of the most important pictures of the year is unquestionably Sir John Millais's landscape (25), bearing for title Byron's hackneyed line,—

"The moon is up and yet it is not night."

Painters really might go a little further out of the beaten track than they do for quotations; one would suppose, to look at the Academy catalogue in this light, that artists never read at all. The landscape in question, being, like all Sir John Millais's landscapes, not "composed" at all (to all appearance), but simply a transcript from Nature, and representing a scene in a half light, is not striking at first sight, but it grows upon one very much as it is studied (it is one of the pictures that will bear study), and we feel how true it is in effect both in foreground and distance; poetical too it is in its result, but it is the poetry of the scene itself, not of the picture, which seems totally free from any attempt to produce an effect, or to do anything but copy Nature as faithfully as possible, within the limit of the powers of painting. This last qualification is important, because there are painters who wreck themselves by attempting a closer imitation than can really be achieved, thereby losing all breadth and tone; Sir John Millais never, in these days at least, carries realism to the verge of hardness. The scene, we should observe, appears to be on the outskirts of a deer-forest. The work will be a valuable addition to the small but remarkable series of landscapes by this gifted painter. Of his large portrait of Mr. Gladstone this year (361) we cannot say much, and we fear it has generally been felt not to be a success; its reputation being perhaps killed in advance by its far more brilliant predecessor a good many years ago, the standing portrait of Mr. Gladstone, one of the most remarkable portraits ever executed by ancient or modern artist.

Mr. Orchardson's work is one of the first things one looks for each year, because he is one of the few painters who not only has a style of his own but who paints pictures which have an intellectual significance and form a "criticism of life." In the latter sense he has disappointed us this year, his principal picture being only a collection of people seated in a room and forming "Portraits" (235). In regard to pictorial effect and harmony of colour the picture is in his best manner, but of course one cannot feel the same interest in a collection of portrait figures who tell no story that one does in such imaginative scenes of history or society as Mr. Orchardson has been wont to give us. Mr. Seymour Lucas, on the other hand, is unusually successful and interesting in his historical scene representing "Louis XI." (291) acting the gracious monarch in a morning call in the house of an artisan. The naturally shrewd and cynical cast of features in the countenance of the old fox, with which the desire to appear the benevolent monarch evidently struggles, is represented admirably, and this is something like a real personification of a character in history, not a mere stage figure labelled with the name. The woman and child are very reverential to their guest; the face of the husband, turned towards his wife but unseen by the King, does not convey by any means the same serious view of the situation. Altogether, this is a very clever and dramatically expressive work. Another historical painting in the same gallery, Mr. Crofts's "Whitehall, January 30th, 1649" (216) has also the merit of reality, save and except as regards the building itself, which is certainly not well painted. The spectator is among the crowd of horsemen in the road, Puritan soldiers on guard, and looking up at the scaffold, on which are conspicuous the figures of Charles and Bishop Juxon at the moment when the King gives something into his keeping, and the Bishop holds out both his hands, in an attitude in which eager attention and reverence for the King are touchingly combined. The figure of Charles is dignified and characteristic; as even a Puritan poet said,—

"He nothing common did or mean
Upon that memorable scene."

These two figures stand out as very real and

life-like in conception; they are the principal figures in the scene, though on a small scale. The painter had a difficult task in dealing with the foreground figures, in representing a number of mounted men all turned away from the spectator and looking towards the scaffold; he has partially broken the monotony of this treatment by showing one of the Puritans turning round to repress the zeal of a belated cavalier who mourns with clasped and uplifted hands. The painter is to be credited with a serious and powerful rendering of one of the most remarkable scenes in English history; a picture which has the rare merit of giving us a more real and vivid conception of the scene, without which quality a historical painting (so-called) is a mere fraud and pretence.

Can the same be said of Mr. Gow's "After Waterloo: 'Sauve qui peut!'" (123) It is a variation, at all events, from the conventional treatment of such a scene. The artist shows us not a wide field of battle, with clouds of smoke, but a small portion of the road to Gemappes, which we are told in the accepted accounts was choked with the stream of fugitives and with wounded and dying men. Napoleon and some of his staff ride down the road in the middle of a medley of men and horses, a camp waggon driven by a woman in front of the group. This does not seem true: Napoleon was probably far ahead of most of the fugitives; he and his staff being well mounted would most likely have made a quick cut across country and struck the high road in advance of the throng. The look of Napoleon in the picture, somewhat dazed in aspect and forgetting to guide his horse, is dramatically effective, but we think out of keeping with the character of the man, who was always cool-headed. It does not therefore impress us as real, but it is a very clever painting, with much to study in the various figures.

Mr. Dicksee's large picture of the "Redemption of Fannhauser" holds a very conspicuous position in the rooms, its claim to which, except in regard to size and number of figures we confess we cannot see. Mr. Watts's contribution, a study of an old white horse (137) his coat stained with the rust, of his constant chains, is pathetic in intention; it is an appeal on behalf of the suffering and patient brute creation, and as such to be regarded with respect; it is what may be called a moral picture, and its intention in this sense is not perceived, we imagine, by many who see it; but we fear that pious moral intentions do not make a picture, and the work is from an artistic point of view a mistake. Another animal painting, without a moral, we confess, but much more successful as a painting, is Mr. Swan's powerful picture of "a lioness defending her cubs" (614); the little animals are half-hiding behind their mother, yet spitting and snarling at the same time; the lioness crouches with an expression of determined ferocity against an unseen foe whose presence is indicated by an arrow in the ground. Mr. Collier's "Death of Cleopatra" (55), a very large picture which hangs opposite the entry from the octagon, is essentially a very brilliant picture of an Egyptian architectural interior, painted with great power; but the stout recumbent figure of Cleopatra extended on a couch and lightly swathed in its semi-transparent coverings, is a most prosaic conception; one of the attendant maidens has fallen on the pavement in a swoon, the other sits at the head of the couch in a somewhat *nonchalant* attitude. Remembering the wonderfully tragic and pathetic character of the scene as presented by Shakespeare (to which the picture evidently refers), one can only regard this as another of the numerous instances in which English painters have reduced a great poetic scene to mere prose. Mr. Chevallier Taylor, on the other hand, in "The Last Blessing" (758) a scene at the death of a peasant boy, has treated a scene in ordinary life with real pathos. The priest, a short and rather coarse-looking personage, stands at the foot of the bed in the act of benediction; the dying invalid's countenance is fixed on him, the mother bows her head at his side; the father, a rough working-man, kneels with reverence of posture but almost expressionless countenance. There is a truthfulness in the whole scene which raises it above the ordinary level of pictures of this class. Mr. Walter Urwick's "A Worcestershire Hop-garden" (895) is fine in colour and original in style, but unreal; the figures are specimens of the ideal or sentimental peasant who exists chiefly in the works of a certain idyllic school of painters.

A strong contrast to this is Mr. Stanhope Forbes's frankly realistic picture "By Order of the Court" (1,146), a sale by auction of effects which, from the heterogeneous mass of objects on the table, painted with the greatest care and truth, does not seem likely to realise very much. The picture is perhaps hardly so interesting as the artist's last year's picture, "The Health of the Bride," but it has the same quality in the careful study of character in the personages, each of whom has his or her specially-marked character and physiognomy; they are not so many "figures" but so many real people, whom we should know again, and whose idiosyncrasies of character we can estimate from their personality and behaviour. The nature of the scene has allowed the artist to give more force to his representation of the humbler class of persons represented by contrasting them with the lady and gentleman who have come to the sale to see what they can pick up; on the opposite side of the group of buyers a sad-looking elderly woman holds out her hand in a timid and helpless kind of way to make a bid. The scene is mainly lighted from a window at the back, through which one sees the heads of curious spectators looking in. This arrangement throws a good deal of the interior group more or less into shadow and gives a rather heavy and dulled effect to the whole; but there is something to study in every figure.

Mr. Logsdail's "Ninth of November" (1,028) is another realistic picture far inferior in delicacy of characterisation to the last-named, but a success, as it deals with a subject in which, in every sense, the colours can be laid on thick. It represents the Lord Mayor's coach on Show-day, preceded by three liveried functionaries who are depicted with contemptuous fidelity; the crowd contains some good and interesting figures, and the whole scene, with its well-known architectural surroundings, is treated with a great deal of effect. It is exactly the kind of subject to bring out the special powers of the artist, who is a very clever painter of ordinary life and of commonplace crowds in all the height (or depth) of their commonplaceness. Mr. Dendy Sadler's "Hunting Morn" (1,034) is a very clever realisation of what must have been the style and personality of the well-fed John Bull type of country gentleman, when the human machine was entirely given over to the work of hunting and feeding, and no brain exercise interfered with its expression of rucund jollity. Mr. Eyre Crowe's "Rifle Match at Dunnotar, N.B." (794) may be classed with these in regard to the type of subject, a realistic picture of actual life, but it is far superior to them in delicacy of taste and handling. The rifle match takes place near a headland projecting into the sea, at the extremity of which the target is situated; a man lies prone in the foreground taking aim, and other figures stand round in different attitudes of interest, conspicuous among whom a tall big man with his Tam o' Shanter on the back of his head, planted in a sturdy attitude behind the marksman, is a capital figure, evidently a faithful study from life. The distant sea is hardly a success, but the general open-air feeling of the scene is well conveyed, and the painter has entered thoroughly into the spirit of it. Is the marksman aiming straight for the target, is a query that may occur; his rifle appears to point rather to the right of it. Mr. Eugène de Blaas has a very clever picture, "Scandal" (1,062), which however is only of the same young women and the modest and conscious man who looks in an embarrassed manner at his round hat, with whom we are familiar in other pictures by the same artist.

Mr. G. Hitchcock's "Tulip Culture" is one of the specialties of the year (750), a bright and effective transcription of the appearance of the successive heads of the flowers, each bed of one prevailing hue; one or two figures are introduced, but the object of the picture is the succession of tulip beds with their bright colours. It is not a subject out of which a picture in the proper sense can really be made; but it is a pretty incident worth reproducing in painting, and makes a point in the exhibition. Another very clever piece of painting which cannot be passed over is Mr. Chadwick's "A Greek Girl" (790) in which however the figure is very poor, but the painting of the white polished marble architecture, the strip of sand and the dark blue of the sea beyond, forms a leaf taken out of Mr. Tadema's book with remarkable success.

Among landscapes the largest are not the best, and Mr. Goodall's "Thames from Windsor

Castle" (366), and Mr. Vicat Cole's "Thames at Greenwich" (390) belong to that painful, respectable order of large landscapes about which it is almost equally impossible to say either good or evil. "Summer Time in the Channel Islands," by Mr. Henry Moore (257) is one of those paintings of dark fresh breezes the equal of which cannot be found at the present day among the works of any other nation, though one or two French paintings appear to have been "trying it on," so to speak, with doubtful success. Mr. Shaw's two seas, "A November Day" and "Off Bolt Head" (20) are good examples of his rendering of the sea, a Mr. Peter Graham's "Low Tide" (215) presents another aspect of it as it appears to him. A these pictures contain remarkable truth in the way, each representing one aspect of the sea as it appeared to one artist. Mr. Mackworth's "Cloud Chariot" (156) is a fine and unusual painting of the grandeur of cumulus clouds which however seem a little too thick and heavy in substance and too yellow in tone. Mr. Herkomer's "Our Village" (143), a view of the open space in the centre of a village with groups of people and children scattered about irregularly, has the defect that it is in no sense a picture. Mr. H. W. B. Davis's two pictures on the Wye (68 and 780) are only variations of the same theme, a sunlit landscape, rippling shallows, and peaceful white cattle loitering in the foreground; they are painted with great brilliancy and wonderful truth of texture and local colour—are almost deceptive in the effect on the eye, in fact; but they are not more than that.

Among Mr. J. C. Hook's works the most prominent in his usual style is "Last Night's Disaster" (75), a morning sea after a gale, and some men employed in clearing out an unfortunate wrecked boat from the sand which had been piled round her; but the painter also sends an example of what may be called his "brimming Holland" style of picture, "Dutch Pedlar" (305), one of those paintings of a calm and full river waterways which he paints with such sympathy. Mr. F. Brangwyn's "Stand by" (248) and one or two other works of the same type, is treating shipping craft with spirit, knowledge, and originality, but why veil them all in such monotonous greyness? This is not truth; the deck of the steamer in "All Hands Shorten Sail" (76) for instance, is not the colour that the deck of a steamer really is; it is merely conventionalised grey tone to produce a certain effect of coldness and desolation in the whole work. One of the finest sea-pictures of the year is Mr. Fraser's of a deserted ship on a reef (1,107); this is a powerful work both in regard to execution and sentiment. Of landscape and portrait, and miscellaneous works of various types, we may have some further notes to make.

Dispersal of the Wells Collection.—The sale will be begun on Saturday, May 10, by Messrs. Christie, Manson, & Woods, of the late Mr. William Wells's fine collection of porcelain water-colours, and ancient and modern pictures. In the latter are included examples of A. Van de Velde and W. Van de Velde, Hobbema, Rembrandt, and Murillo (the Magdalene), together with several paintings rendered popular by engravings, such as Wilkie's "Dissemination for Rent" and "Jew's Harp"; Creswick's "Killarney"; T. Webster's "Smile and Frown"; E. W. Cooke's "Rembrandt's Mill"; W. Collins's "Hop-Pickers"; and Sir Edwin Landseer's "None but the Brave Deserve the Fair," "Shepherd's Grave," and other works by him, all painted especially for Mr. Wells.

Royal Military Exhibition, 1890.—An exhibition of soldiers' industrial work, military equipments and manufactures, a loan collection of pictures, and other objects of interest in connexion with the military service, past and present, was opened on Wednesday by the Prince of Wales. The exhibition is being held by the kind permission of the Commissioners on a portion of the grounds of the Royal Hospital, Chelsea, in aid of the establishment and maintenance of Church of England Soldiers' Institutes. These institutes are club-houses, are open and free to every man wearing the Queen's uniform, and are described as absolutely unsectarian. Those which have been established at Aldershot and Colchester show how much such institutes are appreciated and made use of by soldiers of all denominations.

ARCHITECTURE AT THE ROYAL ACADEMY.—II.

1,710. "A Theatre Façade": Mr. W. T. Horton. This is a pretty pen perspective drawing, a kind of practical protest in favour of a less pretentious and more simple and sober style of architecture than is at present considered "generally necessary" for theatres. The basement story, in which the entrances are located, is rusticated, there are plain walls above and an open loggia of rather Eastern character in the upper stage. The two side portions are advanced slightly as wings. It is not very easy to see how this should express the internal character of the entrance portion of a theatre; a plan should have been given. This quiet sort of architecture is no doubt preferable to the vulgarities of average theatre design in this country, but we do not know that it would suggest a theatre, which after all is a class of building to which show and a kind of *bravura* architectural design, if it be carried out with refinement, seem naturally to belong.

1,711. "Design for Premises, Market-square, Dover": Mr. Kingsley Oliphant. A street front with a shop on ground story, treated with elliptical arches with dark and light courses and voussours, thus separating the shop portion from the rest. The upper portion, in light stone (a water-colour elevation), is very rococo in detail, rather by comparison with the plain pillioned windows in the centre portion: but it has a certain special character as shop architecture.

1,713. "Notting-hill Free Library": Messrs. P. Figgis and R. H. Wilson. This is something really original, at all events. It is a brick building with stone dressings, the angle and entrance marked by square turrets with vertical strips of stone run up them and terminated by niches with foliage ornament: the salient point of the design is the treatment of the upper part of the front over the main windows, which is treated as an expanse of flowing foliate carving with three statues in front of and partially involved in it. As far as can be judged from the drawing, which is rather rough in execution, we should say the detail of the carving was much too large and coarse for its situation and for the scale of the building, and that the general design had better be considered in detailing it; the execution (we believe the building is not finished); but the architects are nevertheless entitled to the credit of a bold and new treatment of a district library front, which will give the building a special and picturesque interest.

1,716. "Bed-room in a Country House": Professor Aitchison, A.R.A. We may as well consider this along with No. 1,744, which bears the same title, and of which a reproduction in monochrome will be found among the illustrations to the present number. Both are rooms unscotched to a considerable height, with a pattern paper over. In 1,716 the panelled wainscot is left plain, apparently stained oak, with a mantelpiece in the centre, which we prefer of polished walnut or some such wood. There is a main shelf and an upper one with colonnettes of Renaissance type: the grate is surrounded by a tile border of prevalent green and blue with a warm-toned pattern; the paper above leans to yellowish greens and yellow ochres. In 1,744, as will be seen, the panels of the wainscot are treated with inlay, and the mantel is more important and of more dignified design than the other; the grate tiles in this case are light blue in ground tone, and the wallpaper is a prevalent green powdered with light flowers. In the matter of harmonious colour-effect we rather prefer the simpler scheme of 1,716; the inlay ornament in the one illustrated seems a little too busy, and leaves no rest to the eye; the mantel is very rich and effective; whether it is not a little too important in style for a bed-room might be a question.

1,717. "New Font and Canopy, Bentham Church, Lancashire": Mr. W. B. Lethaby. This is a piece of really original work. The font is solid circular marble oak, with a bold moulding at the base and a curved enrichment round the upper edge, it stands on a plain octagonal base of less diameter than the bowl; the canopy supported on eight broad flat wooden supports radiating (on plan) from the centre of the font, and curved into a pierced foliate design of very rich character: these supports carry a cornice and terminate in pinnacles above, the centre of the canopy is crowned by an armillary sphere as a terminal: we do not know whether this has any special significance; if not, it is not a good deco-

orative form for the position; but Mr. Lethaby may be congratulated on having produced a font design which is effective in itself and quite original.

1,718. "Design for Church of St. Thomas, Keusal-road": Mr. John T. Lee. A good coloured perspective view hung high, showing a red brick and red-tiled church with stone dressings, with windows in a very simple style of tracery; there is a bell-cot over the east gable of the nave. There is little attempt at architectural effectiveness, but the building is solid and unaffected in style, and a satisfactory example of modern Gothic of the simpler variety.

1,721. "Design for a Corner of a Boudoir": Mr. T. Armstrong Stenhouse. A white-wainscotted room, with a frieze of white rococo ornament on a gold ground; the "corner" is seen through a wide arch below the capping of the wainscot, a window on one side and a bookcase on the other; the carpet and upholstery are in harmony with the general scheme, which has a bright and attractive effect.

1,722. "Catholic Church, Calcar, Germany": Mr. H. W. Brewer. A pencil edition of the drawing published in the *Builder* of March 8, 1890.

1,724. "Staircase in St. Maclou, Rouen": Mr. Arthur E. Bartlett. A good specimen of rather slight and free pencil sketching.

1,725. "Melrose Abbey: South Transept": Mr. John Begg. This is an admirable drawing of a bit of ancient Gothic architecture; executed as a monochrome on tinted paper, the whole exceedingly carefully and correctly drawn.

1,729. "Corpus Christi Priory, Manchester: sketch design": Mr. Leonard Stokes. This is a remarkable and unusual design; it appears to be architecturally a kind of Christian Pantheon, the plan showing a circular church with an arcade round, a projecting porch or entrance, and an apse opposite. The main drawing is a view of the interior. Round the lower portion runs a low and solidly-built arcade in handed courses of red and white stone; above a tier of lofty pointed arches with deep splays and each containing a narrow window; above this is what might be called a triforium arcade of round arches on shafts, placed in the position of a frieze. Above the arcade is a cornice and a hemispherical dome, the surface of which appears to be covered with decoration rather too faintly indicated to be made out in the sketch. A flat pilaster strip, but without a capital termination, runs right through from the floor to the dome cornice, between each bay of the arcades. We hope this work is going to be carried out; the sketch promises something very fine and original in the way of interior church design.

1,730. "St. Saviour's, Southwark: New Nave." Sir Arthur Blomfield, A.R.A. We give an illustration of this drawing in the present number; it is a pencil drawing very slightly and delicately tinted, and which consequently does not reproduce in a manner to do justice to the original, but it serves to show the design and renders description here unnecessary. The question of building a modern nave in a pure reproduction of Medieval architecture, instead of giving it frankly the aspect of a modern addition, is one on which, as we have before suggested, there is a good deal to be said; but if it is to be done, it could not be done with better taste and feeling, or in a manner more in harmony with the ancient portions of the church, than in the design here shown.

1,731. "Sculpture Gallery, Avery-hill": Mr. Thomas W. Cutler. This is a very good water-colour drawing showing a gallery built of very sumptuous materials but of rather ordinary design. It is a long room with an order of dark red marble pilasters, dividing the wall into bays, between which the wall is treated as a large panel of grey marble with a darker border. There is a plinth of dark red marble. Small rectangular windows in the upper part of the walls between the pilasters are filled with stained glass, with good effect. The Gallery is suited for its purpose of exhibiting sculpture, but this device of planting pilasters at wide distances along the walls of a picture gallery or sculpture gallery, however sanctioned by fashion, is a very poor and commonplace architectural treatment, in however costly materials it may be carried out.

1,734. "6, Carlton House-terrace": Messrs. Ernest George and Peto. A drawing of an interior of hall and staircase, in a very sketchy style in brown ink line drawing, and which gives no information as to what is new and what is old. We presume the coffered ceiling

is part of the new treatment. If the pilasters and cornices to the doors are part of the new treatment, they are ill-proportioned and too wide for their height. Not a bit of detail is really discernible throughout the drawing; nothing but a kind of scribble which produces a generally picturesque effect, and leaves all detail to the imagination. That is not the way to draw architecture.

1,735. "Beauvais Cathedral: sketch of Apse": Mr. H. Wilson. A slight but very spirited water-colour sketch of the exterior of the apse, with its scaffolding and buttresses, the only fault of which is that it does not seem to give the scale of the building, especially by comparison with the roughly-sketched figures in the foreground.

1,733. "Church of St. Luke, Richmond; interior." and 1,736. "St. Mary's Chapel, Mill Hill; interior": Messrs. Goldie, Child, and Goldie. These claim mention as excellently-executed pen drawings of very solid and correct modern Gothic interiors, of which however there is really nothing to be said except that they are solid and correct. No. 1,736 was illustrated in the *Builder* for April 27, 1889.

1,738. "New organ case, St. John's College Chapel Cambridge": Mr. J. Oldrid Scott. A carefully executed pen drawing. The organ is divided into two equal portions, symmetrically treated, and appearing side by side beneath two contiguous arches. The lower part of the case is covered over as a bracket, and the pipes arranged in turrets, square or lozenge shape on plan, with wooden cresting and perforated ornament over the upper part. The general effect is pretty, but a little angular in line. It does not suggest any new ideas for organ cases, of which we are a good deal in need.

ON THE PLANNING AND CONSTRUCTION OF HOSPITALS.*

THE subject for our consideration this evening is one which beyond all others demands from the architect the utmost knowledge and attention to the laws of health. For while in any building devoted to the reception of large numbers of people in normal health careful precautions are necessary in order that nothing in the structure itself or its surroundings shall prevent or hamper the maintenance of a proper standard of health, in a hospital the very fact of bringing together a large number of sick and wounded people is of itself an element of special danger, and calls for special means of defence.

A hospital is primarily a building devoted to the care and treatment of the sick and injured poor; in its secondary and scarcely less important function, it is a training-school for the teaching of the science and art of Medicine and Surgery.

Now, in order that both these functions may be performed to the best advantage, it is necessary that large numbers of patients should be brought together in one hospital, for it will easily be seen that the task of administering one hospital for 300 beds will be far easier and less costly than that of administering ten hospitals for thirty beds each; and for teaching purposes the larger the amount of material the better both for teachers and students.

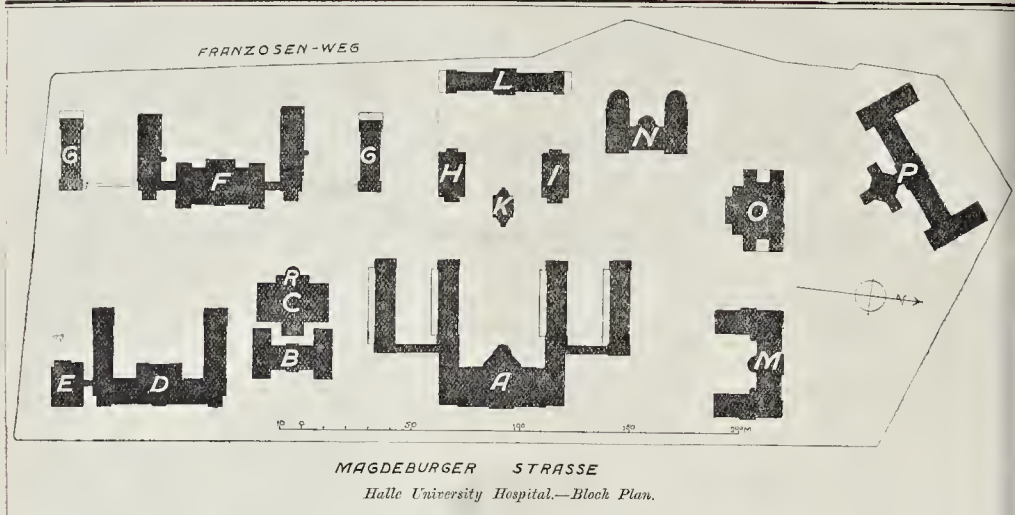
The risks, therefore, inherent on the aggregation of large numbers of sick people, are, and must be, encountered, because it would be impossible to furnish the necessary medical and surgical aid to the sick poor in any other way.

Let us consider briefly of what these risks consist, and how the experience of the past helps us to overcome them.

In the first place, it must be remembered that a hospital ward is filled either with people whose condition is that of disease, the exhalations of whose bodies are laden with infection; or with those with open wounds, to the exposed surfaces of which the contact of impure air means the production of a special class of traumatic or wound diseases. In either case it is the contamination of the air of the ward which retards or prevents the recovery of the patients. This contamination of air may be accomplished in several ways: it may either be by the overcrowding of patients in the wards; by imperfect ventilation; by improper arrangement of buildings; by defective drainage, or by defective keeping or maladministration.

As an example of all these defects, the old

* A paper by Mr. Keith D. Young, F.R.I.B.A., read on the 2nd inst. before the Architectural Association, as elsewhere mentioned.



Hôtel Dieu at Paris was full of instructive lessons. This remarkable institution, whose origin as a hospital for the sick dates certainly from the twelfth century, possibly from earlier times still, had become, at the time Tenon wrote his notable "Mémoires sur les Hôpitaux de Paris," an enormous mass of buildings built partly on one bank, partly on the other bank of the river, the one part connected to the other by two bridges, one of which was actually occupied by wards. Into this vast network of buildings, where ward opened into ward, so that each was, as it were, but the ante-chamber to the next, and consequently the air in each was freely in communication with that of all the others, between three and four thousand patients were crowded. Every imaginable case of disease, including even lunacy and infectious fevers, was received, and a large proportion of the patients had to lie two, four, and even six in a bed. With remarkable prescience Tenon points out one by one the insanitary conditions of this hospital; the want of ventilation to the wards caused by the crowding of offices of all kinds, blocking up the free air-space on all sides, and by the placing of wards side by side; the crowded condition of the wards; the abominable and "unspeakable" state of the latrines; and the infected state of the whole atmosphere of the hospital consequent upon these and other defects. The result of all this was that operations which were performed with comparative safety in other hospitals were almost uniformly fatal in the old Hôtel Dieu.*

The example of the Hôtel Dieu has been often quoted, but the lesson which it teaches cannot be too strongly enforced, as it lies at the root of all hospital hygiene.

Coming now to more recent times, the experience, dearly bought indeed during the Crimean War, showed how terribly the injuries wrought by human weapons can be multiplied and intensified by foul air. In the hospital at Scutari,—which at one time, according to Miss Nightingale, had 2,500 sick and wounded under its roof,—two patients out of every five died; while in the huts on the heights above Balaklava the mortality did not reach three per cent. The lessons thus taught have not been without their value, for the great wars that have followed, notably the Civil War in America and the Franco-Prussian War, have been comparatively free from wound diseases. Instances could be multiplied almost indefinitely showing how in this hospital persistent attacks of pyæmia or erysipelas were traced to the contamination of the ward air by emanations from the foul linen in the closely-adjacent laundry; in another, similar evils were traceable to the close proximity of the out-patient department or *post-mortem* room to the wards; and in a third, how foul, leaky, and unventilated drains and cesspools produced a chronic condition of unhealthiness both in patients and staff.

Time will not permit me to enlarge more on

* We published a view and plan of the new Hôtel-Dieu at Paris (M. Diet, architect) in the *Builder* for January 3, 1880. —Ed.

this part of my subject, but the vital importance of it cannot be too strongly insisted upon. Cleanliness supreme and all-pervading, cleanliness of air, of soil, of building, is the key-note of every point of good hospital construction and administration.

In considering the principles which should guide us in the planning of a hospital, the first question to be determined, assuming that the number of patients and staff and the necessary classification has been settled, is the position of the various buildings in relation one to another.

There must be in every general hospital,—and it is with this class of hospital only that I am now concerned,—at least five separate departments:—1. The administration, which comprises all the purely official and domestic parts; 2, the nurses' quarters; 3, the wards; 4, the out-patient department; and 5, the mortuary. In many important hospitals of recent date these have been again subdivided, and separate buildings provided for kitchen, offices, and the operation-room. The main fact, however, which I wish to impress is that all these five buildings should be as separate and distinct as it is possible to make them.

In most hospitals erected during the last century you will find that every department, including also frequently a laundry, is housed in one building, and that every part of that building is in more or less direct atmospheric communication with every other part. The evils of this arrangement have over and over again been demonstrated, and many such hospitals have been within recent years either demolished or very materially altered, much to the gain of the patients.

As an example of what is thought necessary by eminent medical authorities in our day, I have here the plans of two recent hospitals,—the University Hospital at Halle, and the Johns Hopkins Hospital at Baltimore.

The University Hospital at Halle consists of sixteen detached buildings, of which thirteen belong to the hospital proper, the remaining three being devoted to teaching purposes only. The large central block (see block plan above) with four wings is the surgical department, and forms in itself a complete hospital in all but the kitchen offices. The E-shaped block in the south-east corner is the Gynaecological department, with the Director's residence adjoining; and the two blocks between this and the surgical house are respectively the kitchen offices and the engine-house. Behind these is another E-shaped block, with two detached buildings, one on either side. These together form the Medical Department. The long building at the extreme west contains isolation wards, and the two smaller blocks between this and the surgical house are for additional isolation, the small building between them being the chapel. The E-shaped block to the north of the surgical house is devoted to diseases of the eye, the throat, and ear.

The Johns Hopkins Hospital at Baltimore, the munificent gift of the citizen whose name it bears, occupies a site rectangular in form and

thirteen acres in extent. The buildings are twenty-two in number, and are all connected together by corridors. The corridors, however, which connect the ward blocks communicate only with the basements under the wards. The communication between the wards themselves being by way of the flat roof over the corridors. Thus the wards themselves are practically detached buildings. In the block plan (see next page) the large block marked A is the administration building, B B are blocks for paying patients; C C, bath-houses; D, dispensary and drug-store; E, kitchen and domestic apartments; F, nurses' house; H H pavilions with octagonal wards; K K, isolation blocks; L, lecture theatre and students' building; M, out-patient's department; O, mortuary and *post-mortem* room; P, laundry and wash-house; S, greenhouse. The principle of absolute detachment of wards is here carried out, but not quite to the same extent as at Halle, while the plan of restricting the height of the wards to one story only is strictly observed. The progress of this hospital will be observed with especial interest from the fact that it is the outcome of the matured experience and observation of one of the most experienced surgeons in the United States, and that no time, pains, or money have been spared to carry into effect what have been thought the essentials of perfect hospital hygiene.

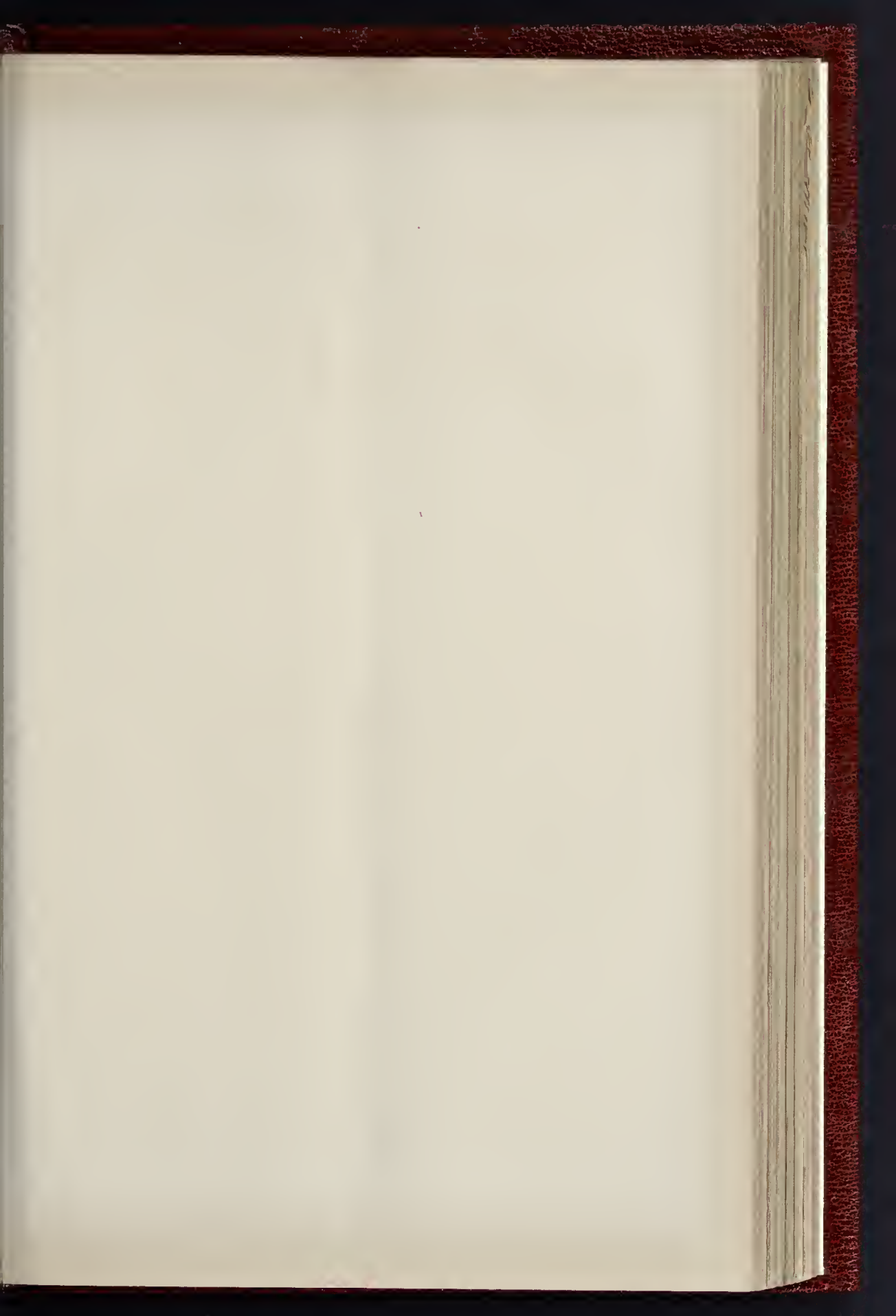
In these two hospitals the principle of absolute severance between the several parts is carried to an extent that has not, so far as I know, been attempted in this country, and certainly could not be carried out except at enormous cost in London or in any great town. There is, too, in this country a strong opposition to the system of detached buildings, and it would probably be very difficult, if not impossible, to get any Committee to approve of a plan in which no covered communication between the wards and the administration department existed.

Assuming, then, that the wards and the administration building are to be connected by means of a corridor, it is essential to provide that any interchange of air between the two shall be, as far as possible, abolished.

In the Great Northern Central Hospital we have endeavoured to accomplish this upon a very limited site.* The wards are attached to the back portion of the administration building by a short piece of corridor, which is ventilated on both sides, and the lifts and staircase, which necessarily form shafts of communication between the different floors, are kept entirely outside the ward pavilion.

The necessity for keeping the mortuary building absolutely detached is sufficiently obvious. Nothing could be more fatal to the health of the living than any communication between the wards and air tainted with the emanations from the dead.

* A view, plan, and description of this hospital were published in the *Builder* for December 25, 1886; and further descriptive particulars on the occasion of the partial opening of the hospital (see *Builder* for July 28, 1888). —Ed.

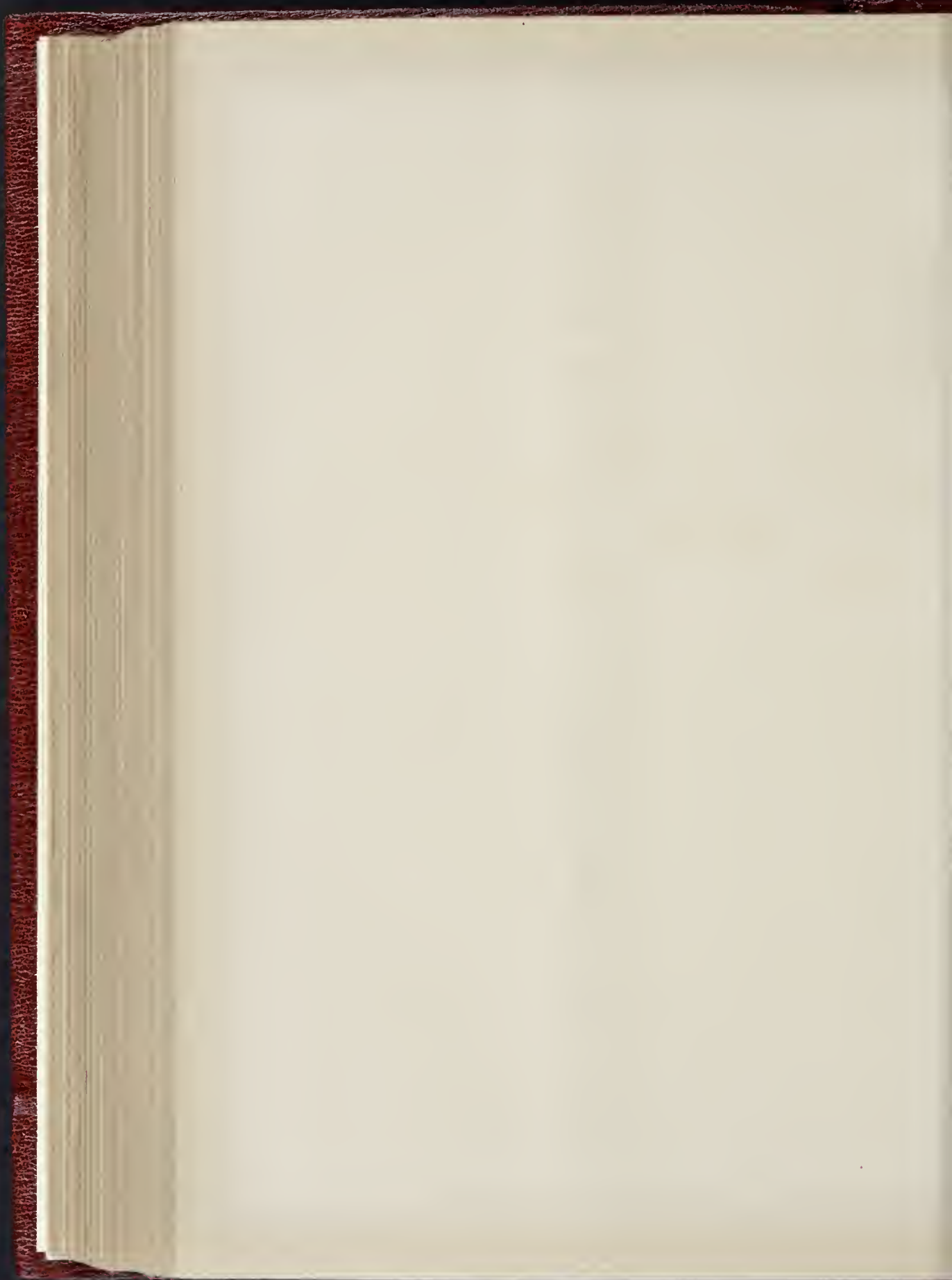


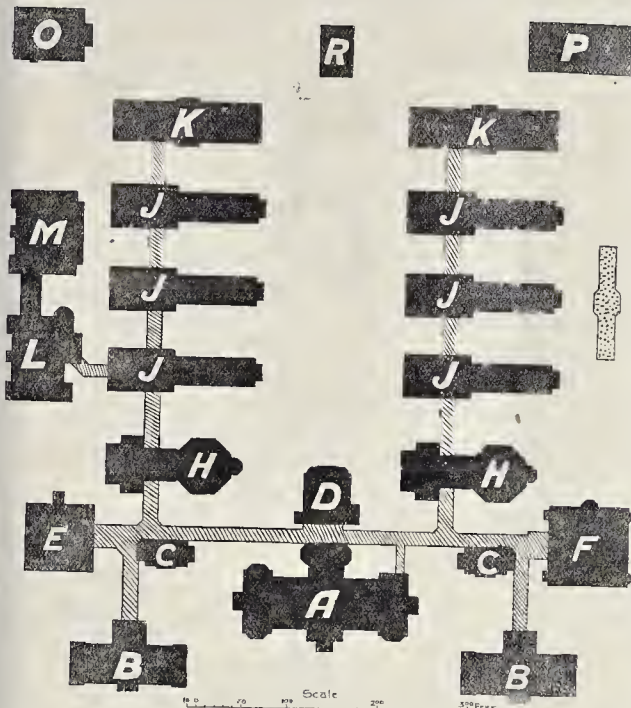
SAINTE SAVIOURS CHURCH
SOUTHWARK
NAVE RESTORED
ARTHUR W. BLOOMFIELD A.R.A. 1867





"INK PHOTO. SERAQUE & CO. 40, MARTIN LANE. ARCHT. ST. LONDON, E.C.





The Johns Hopkins Hospital, Baltimore—Block Plan.

The out-patient department should be kept separate, because the air of the waiting-rooms, and in a lesser degree of the consulting-rooms, becomes much vitiated from various causes, and also because it is practically impossible to foretell what cases of an infectious disease may at any moment present themselves.

The nurses' home may or may not, be in direct communication with the hospital proper. For the sake of the nurses themselves, probably the more complete the severance is the better.

Let us now consider these various departments more in detail.

First, then, the administration department. Under this head are comprised the official quarters, including the Board-room, Secretary's Office, and Matron's Office,—the residential quarters comprising the rooms for the resident medical staff, the Secretary or Superintendent, the Matron, the Steward, and the servants,—and the domestic department including the stores, kitchen offices, and linen-room.

The detailed planning of the administration building will necessarily vary according to the size of the hospital, and no very minute rules can be laid down respecting it. I may, however, point out that unless the kitchen offices are placed in a one-story separate building they should certainly be put at the top of the house. There is no practical difficulty attending this arrangement, examples of which may be seen at the Hospital for Consumption, Brompton,* the Great Northern Central Hospital, and the Hastings Hospital.†

The provision of ample store accommodation is also an important point. It is far better to provide too much store room than not enough, for the difficulty of increasing store room in an existing building is very great indeed.

We may now pass on to the wards, which, together with their offices, form the most important part of the building.

Formerly a ward was regarded merely as a room into which a certain number of beds were

* View, plans, and descriptions were published in the *Builder* for November 22, 1879.—Ed.

† A view and plans, with description of the design first prepared for the East Sussex, Hastings, and St. Leonards Infirmary, were published in the *Builder* for December, 1884. These plans were subsequently considerably modified, and circular wards added. For view and plans of the hospital as erected see the *Builder* for January 29, 1887.—Ed.

to be put without much thought being taken of how the well-being of the patients would be affected by the conditions under which they were to be housed. The old Hôtel Dieu, at Paris, was, of course, a typical instance of how wards should not be arranged. At La Clinique, another large Paris hospital, the wards were long and narrow, and the windows were placed in the two ends; between these windows no less than eight beds were placed. Again, in many old hospitals the wards formed a series of rooms arranged on each side of a corridor, which formed a channel of communication connecting all the wards together. Yet another form of ward is what is called the "double ward," which consists of two long wards placed side by side with the windows in the sides, and with openings out through at intervals in the dividing wall. This arrangement gives four beds between the opposite windows. The fault of all these forms is in a greater or less degree the want of efficient ventilation, and it was the recognition of the evils consequent upon a defective air-supply that resulted in the pavilion system of wards.

The essential feature of the pavilion system is that the wards are long rectangular buildings, projecting out usually at right-angles to a main corridor. The space between the pavilions should be equal to at least twice the height of the buildings, and the long axis of the wards should be nearly due north and south, so that the maximum amount of sunshine available should be admitted to the wards.

The question of the number of stories admissible in a ward pavilion is one upon which authorities differ materially. In many of the most recent hospitals in France and Germany, and notably in the magnificent hospital at Baltimore, the wards are restricted to one story only. Such a system is obviously a most costly one in the matter of site; and it seems to me that it is to be justified only on the score of really important benefit to be gained. Personally, I am unable to see any sufficient gain to be obtained at all commensurate to the enormous cost involved.

But,—and this lies at the root of the matter,—if two or three stories of wards are to be superimposed, each must be absolutely independent atmospherically of the other; there must be no shafts, whether for staircases or

lifts, to communicate the air of one floor with that above.

In nearly all the earlier pavilion hospitals you will find that the staircase and one or more lifts, and sometimes that abomination called a dust-shoot, are all closely adjacent to the ward. It is so at the Herbert Hospital, Woolwich,* one of the earliest pavilion hospitals, at Leeds, at the Norfolk and Norwich, and at St. Thomas's.†

At the Great Northern we have placed the staircase and the lifts in such a position that they cannot form shafts from one ward to the other. It would appear from the plan of the Johns Hopkins Hospital that the staircase and the lifts are so placed that they must form channels of communication between the different pavilions by way of the basement; but the system of artificial ventilation is intended to act in so perfect a manner that all chance of such an occurrence is obviated.

In considering the internal arrangement of the wards, the first point to be settled is the space to be allotted to each patient. Space in a ward is very commonly referred to as cubic space only; but it is equally important to consider floor-space, and the distance to be allowed between each bed and its neighbour. Upon this question of space authorities differ widely. In the table given in Mr. Snell's work, the floor-space varies from 69 ft. per bed to 149 ft., and the cubic space from 864 ft. to 2,544 ft. The last figures are those of the Hospital of St. Andrew at Genoa, whose wards are considerably over 20 ft. high. Now it was the opinion of so eminent an authority on ventilation as the late Professor de Chaumont that nothing is gained by making the height of a ward exceed 12 ft., and in making calculations in actual practice he was accustomed to exclude all space in excess of this amount. You will see, therefore, how important it is to arrange your cubic space in relation to your floor-space, and not to increase the one at the expense of the other. In the first place, then, the wall space or distance from centre to centre of each bed should be determined. In a large ward, say for twenty beds, the space should not be less than 8 ft.,—8 ft. 6 in. or 9 ft. by preference. For the width of the ward, 25 ft. is a good dimension. It allows plenty of free floor-space in the centre of the ward, which is a point that must always be remembered, especially where clinical teaching is carried on. These figures give a floor-space of 112 ft. as a minimum. Taking 12 ft. as the standard height, you get a cubic space per bed of 1,344 ft. A height of 12 ft. will, however, be found, for appearance sake, too low for a ward upwards of 80 ft. long, and I think something must be conceded to one's sense of proportion.‡

Building Materials in Hungary.—We have been officially informed by the Commercial Department of the Imperial and Royal Austro-Hungarian Embassy, 11, Queen Victoria-street, E.C., that, acting on the initiative of the Minister of Commerce, who wishes to develop as far as he can all industrial enterprise in Hungary, a law has been passed granting for many years exemption from rates and taxes, and allowing certain reductions of rates, for the carriage of building material on the Hungarian State Railways, in order to encourage the establishment of new factories of every description and the working of mining undertakings.

National Physical Recreation Society, for the promotion of Physical Recreation among the Working Classes.—At a meeting of the executive committee of this Society, held at the offices of this Society last week, it was reported that the Royal Agricultural Hall, Islington, had been secured for the purpose of the annual display, which has been fixed for the week commencing Monday, May 26, and will include mass gymnastics, physical exercises by girls, quarter-staff play, pole-jumping, reeling, boxing, musical drill, football matches, and a house on fire, with the rescue of the inmates by the Metropolitan Fire Brigade.

* A birds' eye view and ground plan of this hospital were published in the *Builder* for April 14, 1890.—Ed.

† We gave a view and ground plan of the new St. Thomas's Hospital in the *Builder* for August 5, 1865. A view of the Albert and Victoria wards, and of the Chapel, as seen from the river, and a plan of the same, were given in the *Builder* for June 24, 1871.—Ed.

‡ The remainder, with some notes of the discussion, in our next.

Illustrations.

SAINT SAVIOUR'S, SOUTHWARK.

SINCE the publication in 1881 of Mr. F. T. Dollman's valuable and profusely illustrated work on the Priory of Saint Mary Overie, Southwark, the history of the church (now known as "Saint Saviour's") has been familiar to all students of ecclesiastical architecture, who owe the author a deep debt of gratitude.

The present nave was begun in 1839, and finished in the following year.

Without any reference to the architectural character of the work, its condemnation is carried in the fact that it is so constructed as to render its use in connexion with the transepts and choir impossible—the floor being raised 7 ft. 6 in. above the old level.

The work shortly to be begun consists in the first instance of taking down this modern building and erecting a new nave and aisles on the lines of the old structure, which was finally demolished in 1838.

It is believed that the whole of the old foundations remain intact, though how far this is the case, and of what value they may be if it is so, can only be determined after the removal of the existing superstructure.

Some small portions of the old work which still exist in the modern nave will be carefully preserved.

After anxious thought and consultation with those most interested in the work, and best qualified to form a correct judgment in the matter, it was decided that the proposed new building, while not professing to be an exact reproduction of what formerly existed, should be carried out on the old lines, and made to harmonise as far as possible with the beautiful work of the choir.

Until this portion of the work is completed the remainder of the church will not be touched, except so far as may be necessary for the safety of the fabric.

The architect for the new nave is Sir Arthur Blomfield.

COMPETITION DESIGN FOR SHEFFIELD MUNICIPAL BUILDINGS.

We give the elevation and the three principal floor plans of the design submitted in the Sheffield Municipal Buildings Competition by Mr. John Slater and Mr. H. H. Statham.

The elevation is not of course, the one originally submitted; it is taken from an enlarged drawing made to $\frac{1}{4}$ inch scale, the original of which is hung in the Architectural Room at the Royal Academy. The drawing shows the detail a little more fully, but the design is exactly as sent in, with the exception of a slight modification in the treatment of the balustrade over the main cornice.

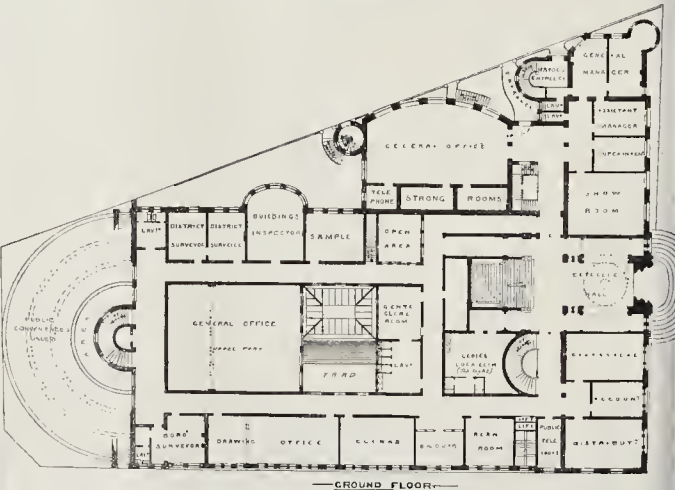
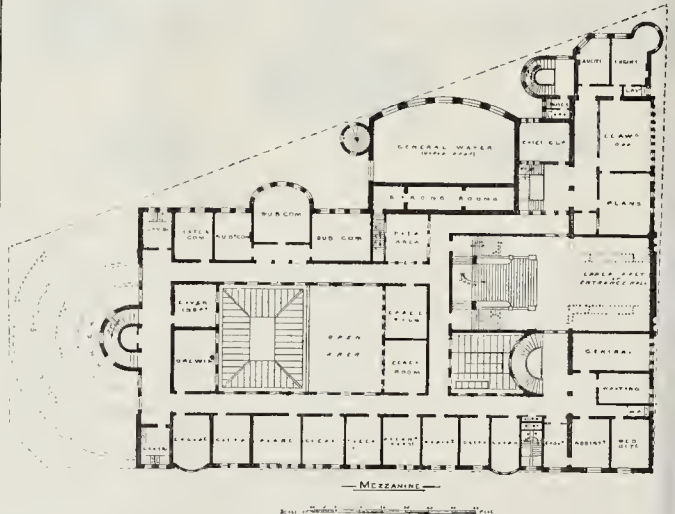
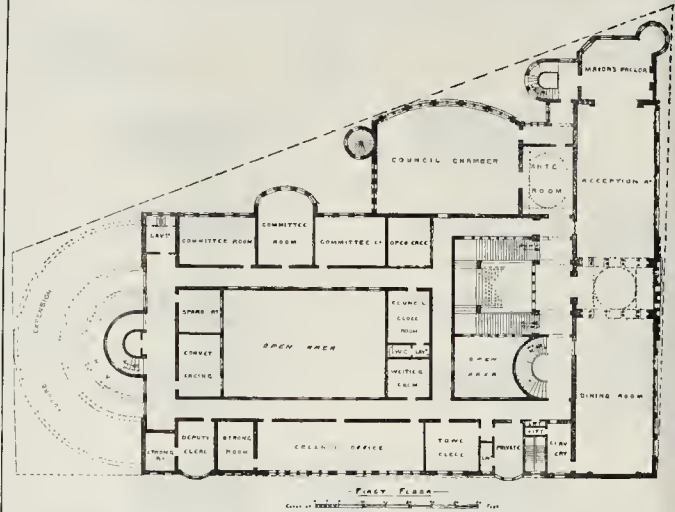
The following quotations from the report sent in with the drawings will explain the intention of the design:—

"The system adopted in this plan is to arrange those departments in which the rooms are comparatively small on a mezzanine between the ground-floor and first-floor, the general Water Office and the main entrance hall going up through both stories, thus giving more height and dignity to the entrance hall.

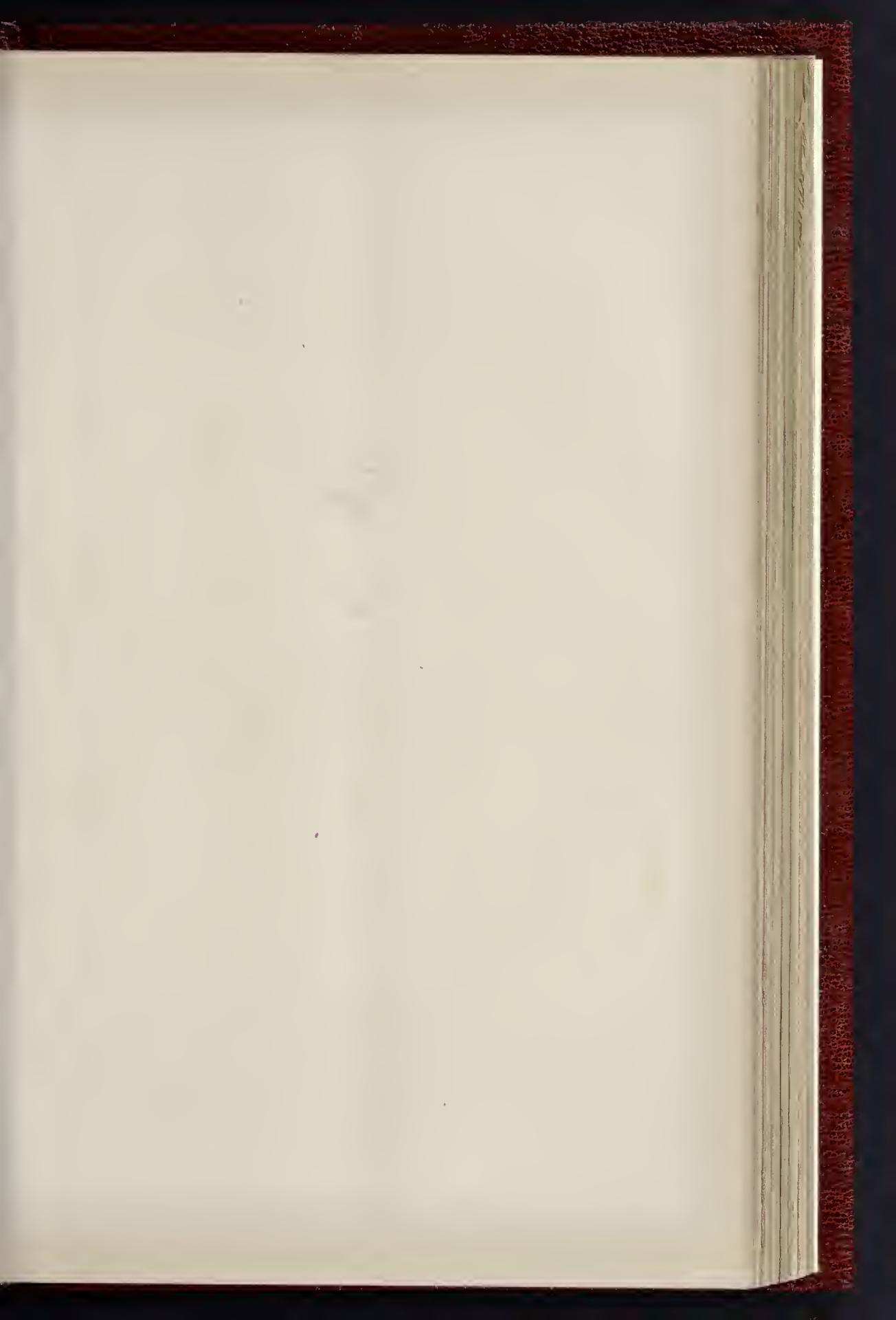
For a building in which state receptions are given, a state staircase is essential for dignity of effect; a staircase which is in everyday use for the traffic of the building cannot be kept in a fitting condition for receptions. This staircase is intended to be used by the councillors on ordinary occasions, but not by the public or the general staff of officials. The business stairs are each arranged in single flights from floor to floor, and in connexion with the eastern staircase is a public lift for use if required. The introduction of the ante-room between the reception-room and the dining-room is not a necessity of the plan, but it is offered as a great improvement to the effect of the rooms. Large double folding-doors could be arranged to divide off the rooms when required, and otherwise to fold back against the blank portion of the walls on either side of the ante-room.

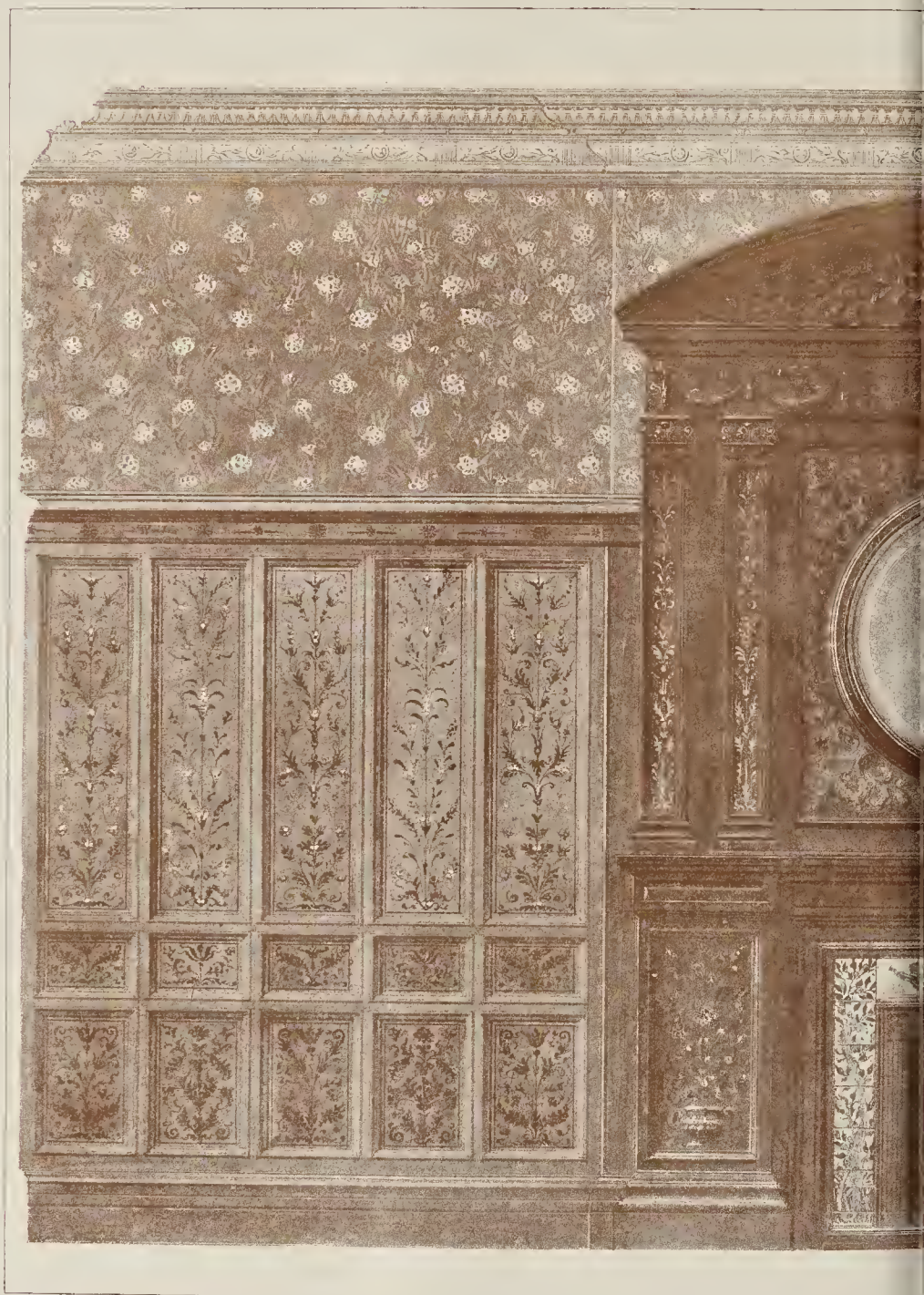
A private entry and staircase for the Mayor is provided, with a special entrance to the Council Chamber. The ante-room to the Council Chamber can be used *en suite* with the other state rooms if required.

The site towards the churchyard is obviously the quiet quarter for Council Chamber and committee-rooms, and the small committee-rooms are arranged in this quarter on the mezzanine, councillors having direct communication with this floor by doors from the landing of main staircase. The Council Chamber,



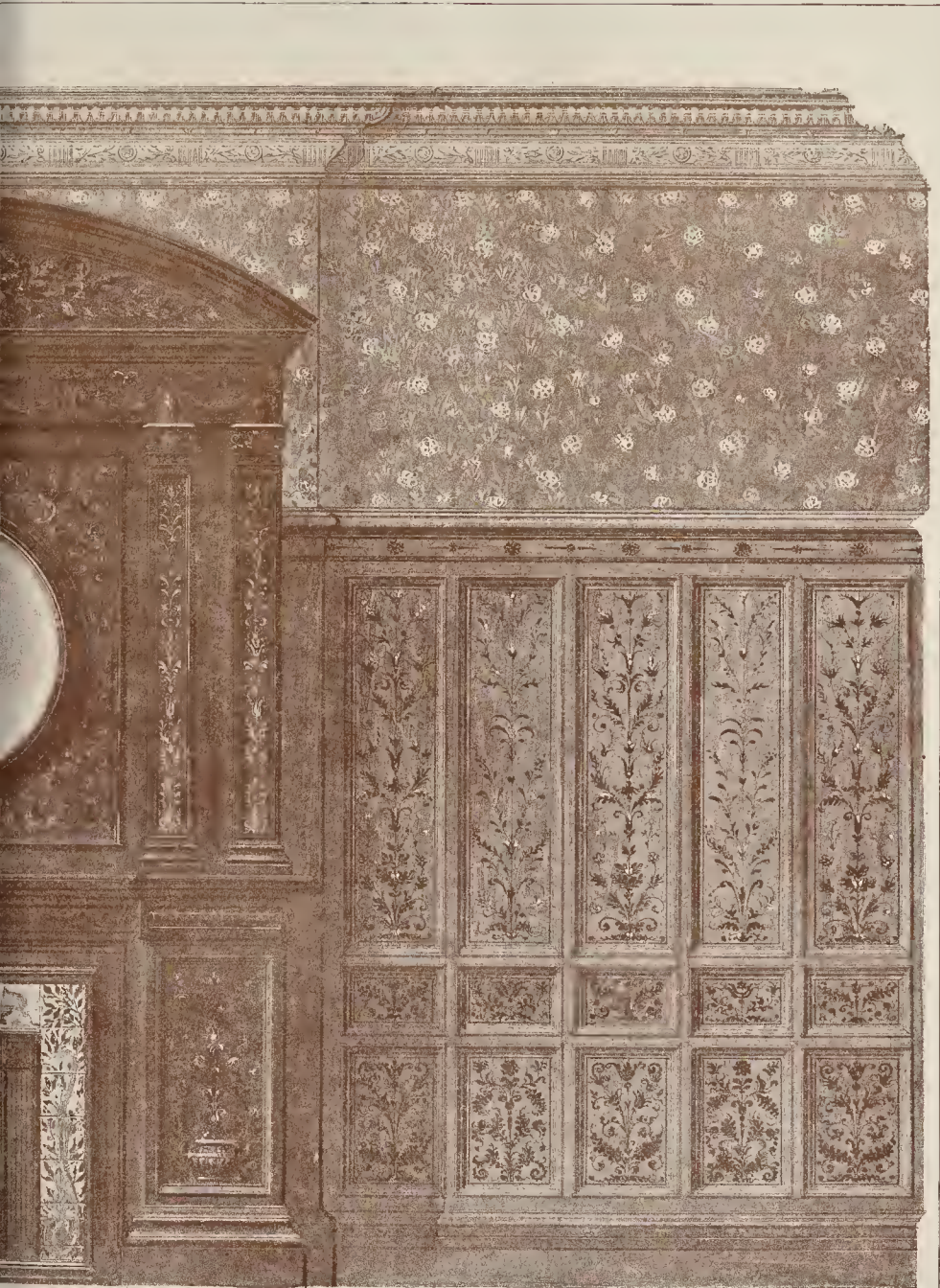
Plans of Competition Design for Sheffield Municipal Buildings. By Mr. J. Slater, F.R.I.B.A., and Mr. H. H. Statham, F.R.I.B.A.





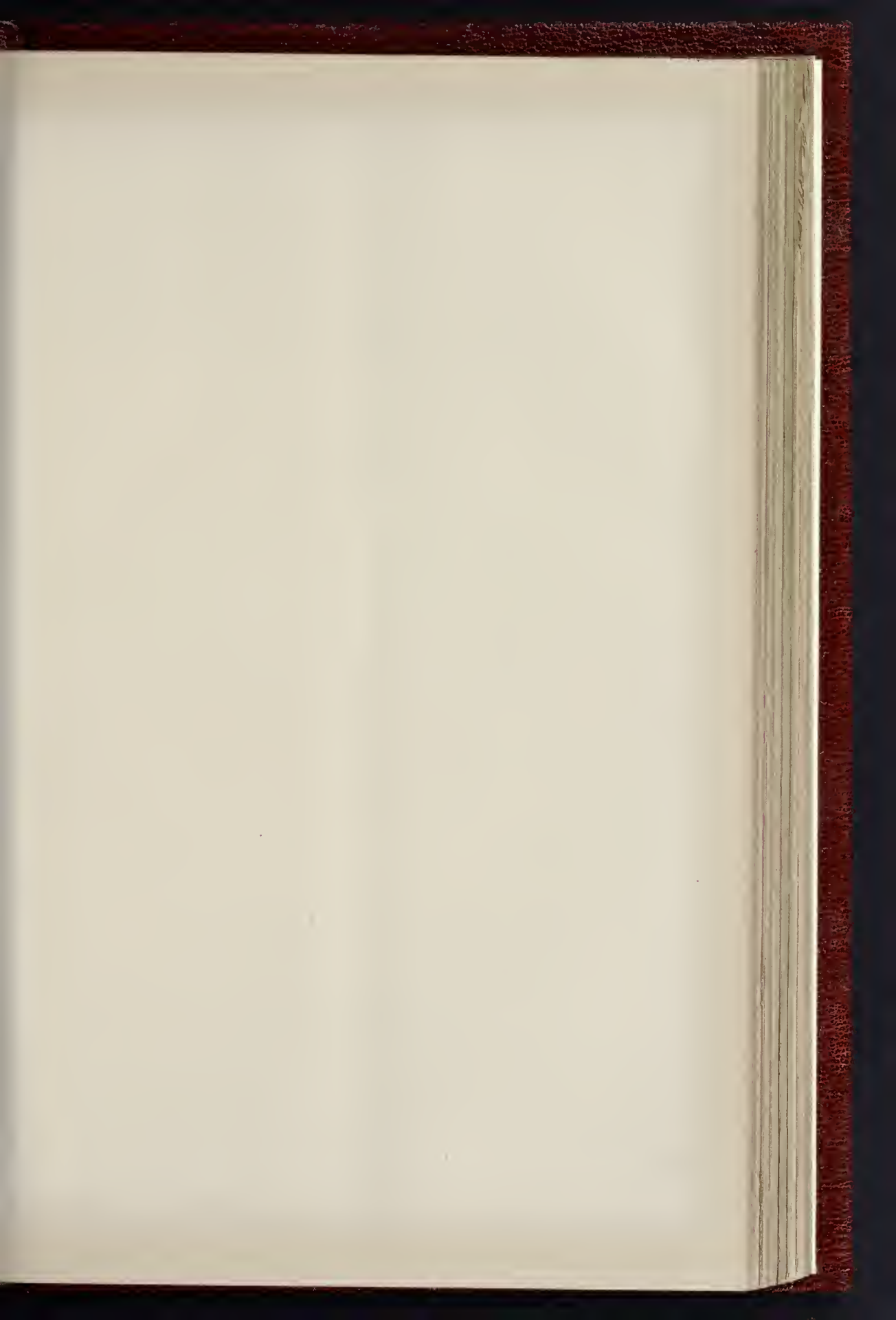
No. 1744 Royal Academy Exhibition.

BEDROOM IN A COUNTRY H

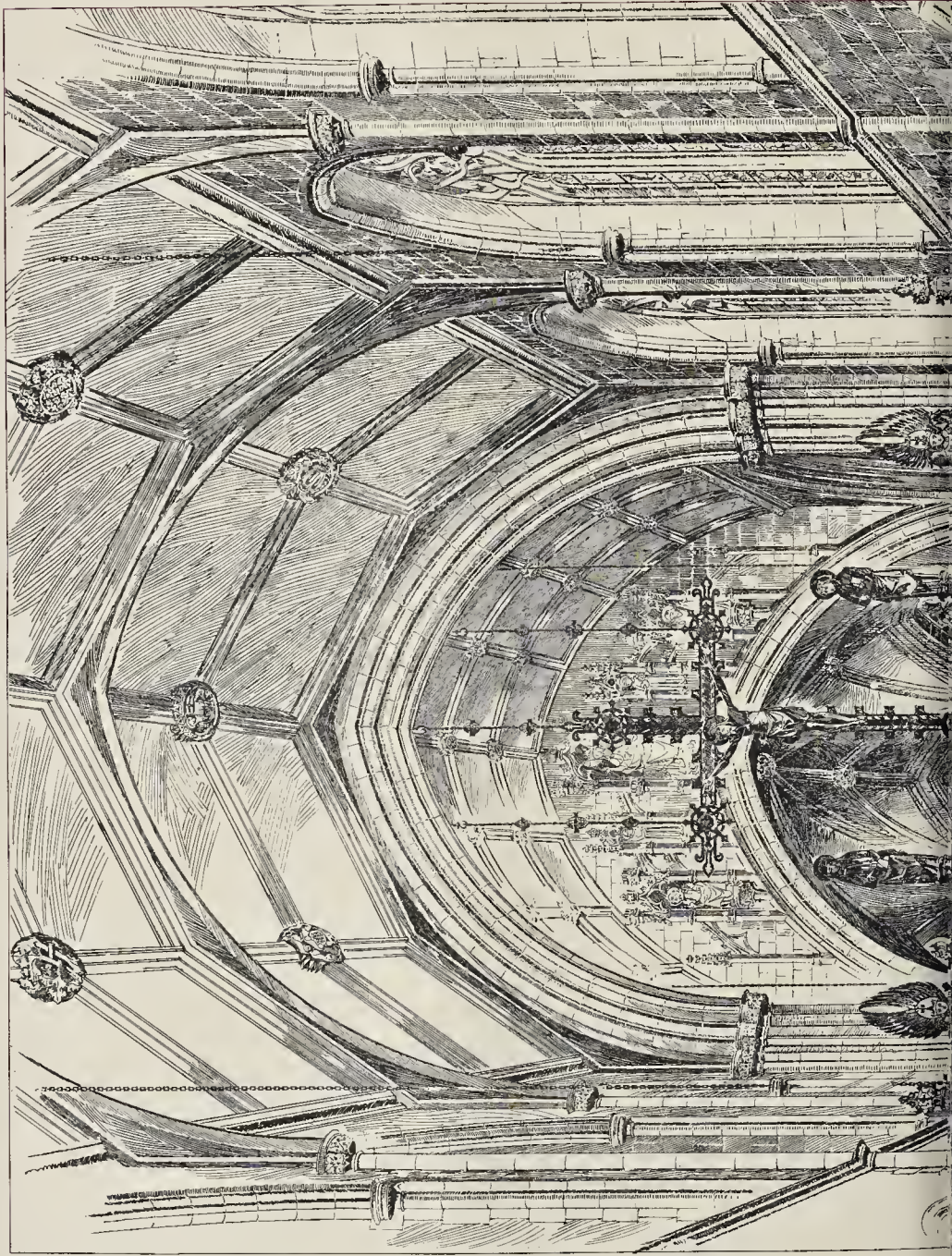


THE PHOTOGRAPH BY MR. MARTIN LANE, KNIGHT, LONDON, E.C.

BY ARCHITECT, A.R.A., ARCHITECT.



THE BUILDER, MAY 10, 1890.



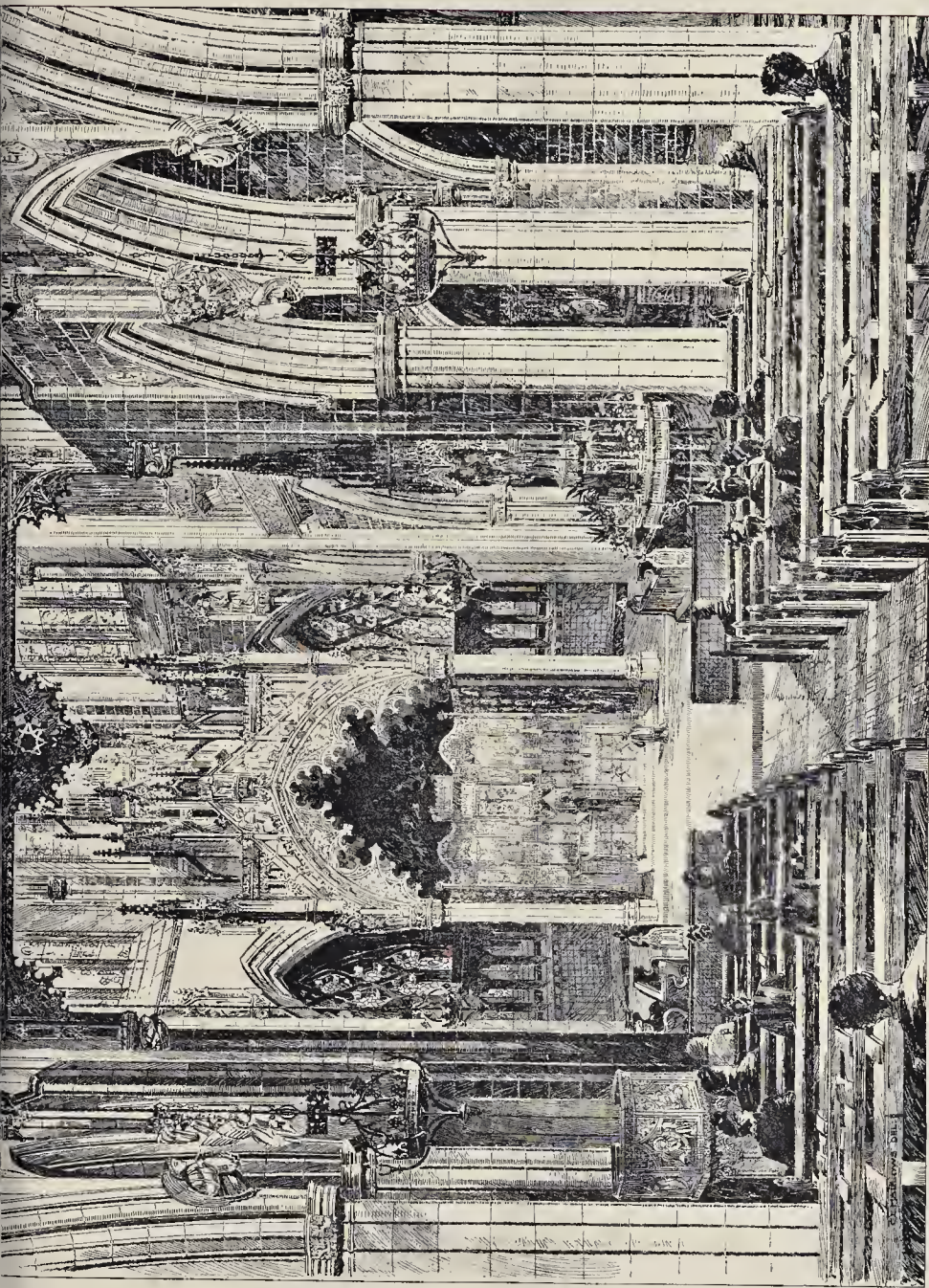
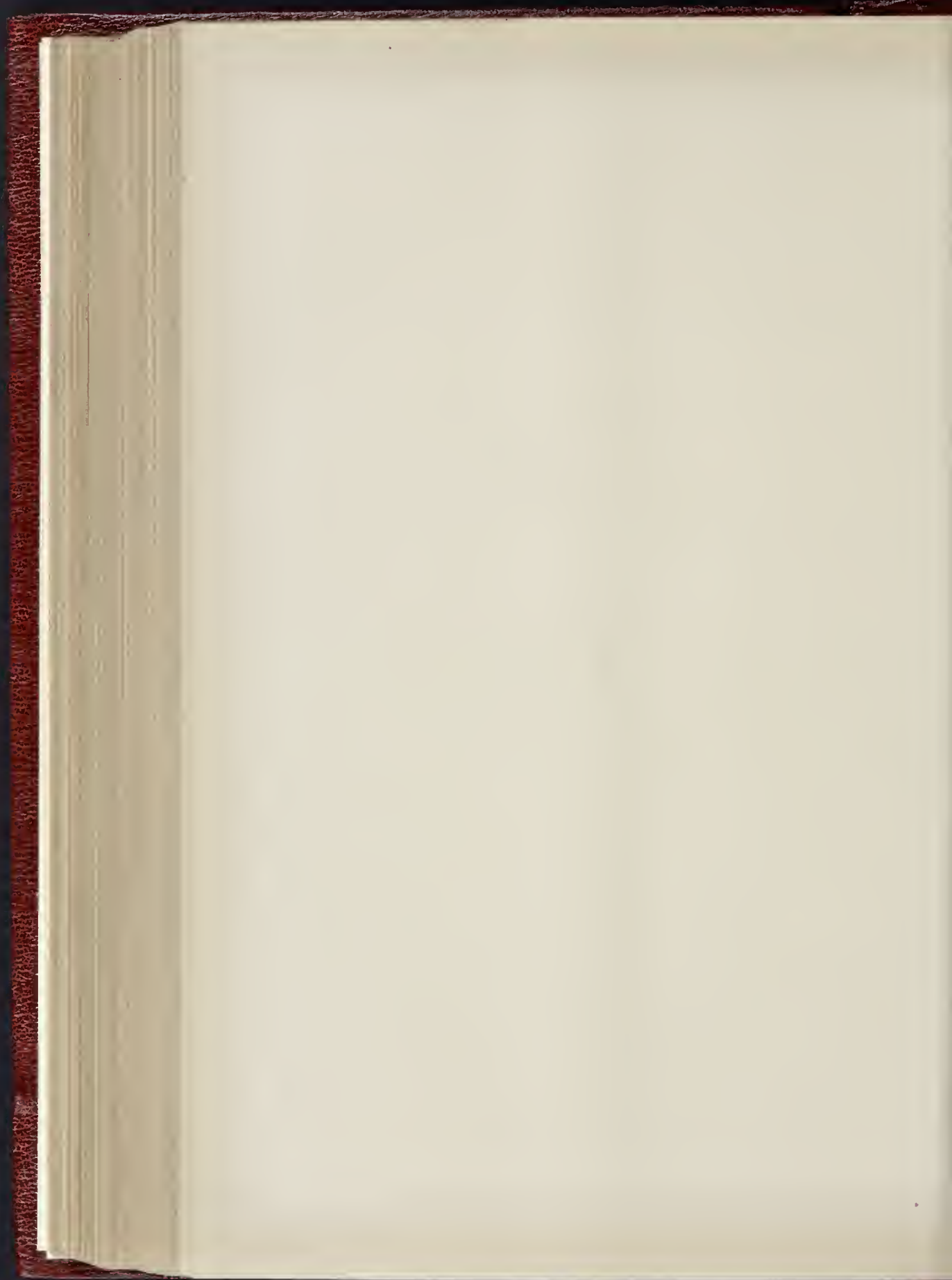


PHOTO LITHO. SIMMONS & CO. 22, MARK LANE CANON, ST. LONDON, E.C.

CHURCH OF THE SACRED HEART, WIMBLEDON.—MR. F. A. WALTERS, A.R.I.B.A., ARCHITECT.



in committee-rooms, and Town Clerk's department are all on the first floor.

The ladies' and gentlemen's cloak-rooms for the latter are available at other times for staff, are placed on the ground-floor; it would be a complete mistake to place them (as required) on the first-floor, as it would destroy the whole action and meaning of a state staircase to have a motley company in overcoats and wrappers jiggling up it; in such a case it would be absurd to have a state staircase at all. A special lavatory floor-arrangement for councillors is provided on the 1st-floor.

The public lavatories are at the east end, sunk very below the ground, with prism lights from pavement. In case of extension of the building, provision for lighting these otherwise, from an arcade, is made and indicated by dotted lines on sub-basement plan.

Future extension is provided for at the east end by the addition of a semi-circular block, as shown by dotted lines, with the existing main corridors carried round it and meeting. In this way, the new addition, instead of being an excrescence, would form a new and effective architectural feature to the building, without in any way interfering with the original design.

The design of the Finstone-street front speaks for itself; it need only be remarked that the idea is to have an enriched story of "plano nobilis" on a lofty very solidly-treated basement. A large screen made, with niches for statues, gives dignity to the arcade, and forms the exterior expression of the entrance-hall. Great importance is now attached to the combination of sculpture with architecture, and these niches might be filled with historic portraits of eminent citizens of Sheffield in past times.

The upper portion of the tower is designed for a bell with forty-eight bells, hung visibly in open bays, and struck by hammers from within; rivaling in effect the celebrated carillon of Louvain.

As to porte-cochère is shown: a porte-cochère is always more or less an architectural excrescence, and experience in similar cases has shown that there is no facility in providing for the comfort of drivers at receptions by a large temporary awning.

As the Corporation have decided to adopt stone, we are convinced that the only stone which it would be right to use for a building of this importance is a close-grained sandstone containing as little foreign matter as possible. We believe that the best stone in the United Kingdom for use in Sheffield would be the Craigleith stone obtained in the neighbourhood of Edinburgh. We are of the opinion that the cost of this stone is more than that of any of the Yorkshire sandstones, but it would be worth the while of the Corporation to decide in advance of any other. If this stone should be considered too costly, we should advise the selection of one of the best stones of what is known as the Lower Keuper formation, such as Hollingdale. The hacking of the walls would be of hard red bricks, and all the open areas in the interior of the building would be faced with white glazed tiles. The roofs would be covered with blue and slate interspersed.

All the strong-rooms would be lined with salt-glazed fire-bricks. The floors would be all proof, and we should recommend what is known as Lindsey's steel decking for the purpose. The internal columns of the entrance-hall, vestibule, and staircase would be of various kinds of marble, &c. We should use alabaster for the staircase balustrade, and also as panels in the arcade at top stairs. The internal finishings of the suite of committee-rooms would be of American walnut.

Although in the United States steam-heating is easily adopted, yet there are many drawbacks and is so attendant on it, and we are of opinion that on the whole the best plan to adopt would be hot-water-heating. In the sub-basement would be a boiler and furnace sufficient to heat the water for the whole of the building, and from it would be a series of flow and return pipes which would in some cases be merely covered by an iron grating, and connected with coils of pipes, as might be most expedient. We should have separate flow and return pipes for the hot water which would be required for the various lavatories. In all cases fresh air should be introduced into the rooms by Tobin tubes. In those rooms which are of excessive size the air would be exhausted by flues 9 in. square cut on the walls and ascending to the roof. In large rooms, such as the Rates Office, the Water Office, the Town Clerk's general office, the Council Chamber and the suite of reception-rooms, this is not sufficient, and we should propose a series of flues from these rooms to a small chamber in the roof, which would be placed an exhaust fan worked by a small electric motor. By means of a small electric motor would be effectively eliminated.

We should certainly recommend that the whole lighting be lit by electricity. We calculate that about 1,100 incandescent lamps of sixteen-candle power would be required for the whole building, though probably not more than 750 would ever

be in use at the same time. These would necessitate two gas-engines of forty-horse power indicated, and to guard against contingencies it would be desirable to have three dynamo machines, which would all be placed in the sub-basement, as shown on plan. We should not, however, depend upon dynamo alone, as we should advise that storage cells forming an accumulator-battery sufficient to supply the whole building for one day be fixed in the store-room appropriated to them, and that the whole of the current from the dynamo be conducted through the accumulator. This would prevent any fluctuations in the beat of the gas-engine being perceived in the lamps. We should place two glow-lamps in each strong-room, arranged so that the opening of the door turns the light on and closing it again turns it off. This will be found practically of the greatest possible convenience. The small electric motor previously mentioned would be driven from the accumulator."

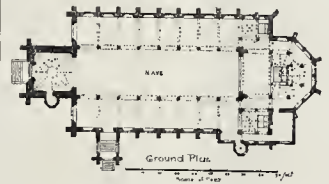
DECORATION OF BEDROOM FOR A COUNTRY HOUSE.

THIS is a reproduction of a design by Professor Aitchison, which is exhibited at the Royal Academy, and is referred to in our notes on Royal Academy architecture in another column.

The room is panelled in sequoia wood, which is beautiful in its colour and markings, but difficult to carve, as it requires very sharp tools, and rapidly takes the edge off them. In consequence of this, the chimney-piece was executed in pale mahogany. The whole is in a low tone, but a bit of brilliant colour has been got with Mr. De Morgan's tiles. The carving was done by the School of Wood-Carving, at the Guilds Institute, Princes-gate.

CHURCH OF THE SACRED HEART, WIMBLEDON.

THIS church will, when completed, consist of apsidal chancel, with ambulatory round same, side chapels (with organ-chamber over that on south side), nave, aisles, western tower, and south porch. The total internal length will be 160 ft., and the width 65 ft., the height of the nave being 60 ft. from floor to top of over-side of



panelled ceiling. The style is of the "Flowing Decorated" period of English architecture, and externally the walls are faced with knapped flint, with dressings of Ancaster stone, Deer stone being used internally. The nave is divided into eight bays, separated internally by clustered columns and moulded arches, with a richly-sculptured and canopied niche projecting from the wall at every alternate bay. The clearstory is filled with a series of lofty three-light windows of varied design, between which are wall-shafts with foliated caps supporting the arched principals of the roof, over which is a panelled ceiling with carved and decorated wood bosses at intersection of ribs. The wall-shafts are supported between the arches by angels bearing instruments of the Passion. The roof and beam filling the upper part of the chancel arch are richly sculptured and decorated in gold and colour, the chief figures being studded from those in the Collegiate Church at Louvain, while the banking chernikon on wheels are similar to those formerly in Westminster Abbey, and as described in the "Kites of Durham". The lower arch across the chancel stopping the vaulting of apse is surmounted by canopied niches containing figures of Our Lord in Glory, SS. Peter and Paul, and attendant angels. The high altar will stand on the chord of the apse under a baldachin supported by clustered columns, and crowned by a rich and lofty canopy. Mr. Fredk. A. Walters, F.S.A., is the architect of the church, and the contractors for the nave and other portions built were Messrs. Goddard & Sons, of Farnham, the carving being all by the late Mr. James McCulloch.

THE INSTITUTE OF BUILDERS.

THE annual dinner of this Institute was held at the Savoy Hotel on Thursday, the 1st inst., Mr. T. F. Rider, F.R.G.S., President, in the chair. Among those present were the Deputy-Chairman of the London County Council, the Master of the Carpenters' Company, Col. Bird, Dr. F. Elgar, Messrs. Eddle, Franklin, E. S. Henshaw, Maton, Preston, and Rickman.

After the toast of "The Queen," and that of "The Prince and Princess of Wales and the other members of the Royal Family," the President proposed "The Navy, Army, and Auxiliary Forces," to which Col. Bird responded.

Mr. H. T. Ashby proposed "The London County Council" to which Mr. A. H. Haggis, Deputy-Chairman of the Council, replied.

The toast of the "Architects and Surveyors" having been proposed by Mr. H. H. Bartlett, was responded to by Mr. Banister Fletcher and Mr. Franklin.

In proposing "The Institute of Builders," the President said that although only incorporated in 1854, the Institute had been in existence as the "Builders' Society" for fifty-six years, and was greatly extending its usefulness.

Mr. J. Howard Colls proposed "The President," to which Mr. Rider responded.

The toast of "The Visitors," proposed by the President and replied to by Mr. Stanton Wm. Preston, was the concluding item on the list.

THE ART-UNION OF LONDON:

ANNUAL MEETING AND PRIZE DISTRIBUTION.

THE annual meeting of the Art-Union of London was held on Tuesday last in the Adelphi Theatre, the President, the Earl of Derby, in the chair.

The Annual Report of the Council, read by Mr. J. A. Hallett, contained the following paragraphs:-

"For the year now closing, the Council have to report the amount of subscription to be £5,192 18s 6d."

The following is a brief summary of the receipts and expenditure: a detailed account will, as usual, be printed in the Report.

Table with financial data: Amount of subscriptions £5,192 18 6; Allocated for prizes £1,198 0 0; Set apart towards providing works of art for accumulated payments 361 10 0; For print of the year exhibition, report, and reserve 1,781 7 8; Agents' commission and charges, advertisements, printing, postage, rent, &c. 2,578 12 9; Total £5,192 18 0.

To the local honorary secretaries and agents in all parts of the world we have, as usual, to express the thanks of the Art Union.

The amount to be expended on prizes will be thus allotted:—One work at 100l., one at 50l., four works at 30l. each, four at 25l. each, six at 20l. each, ten at 15l. each, twelve at 10l. each, making a total of 300l. In addition to ten Bellerophon repoussé bronze vases and thirty silver "Stothard" medals, making with the prizes given to unsuccessful members, 270 prizes.

In October last the Council was deprived by death of the valuable services of Mr. Troughton, who had been Honorary Secretary since the death of Mr. Pocock. Mr. Troughton was one of the founders of the Art Union in 1836, and was a most diligent attendant at the meetings of Council. His practical knowledge of art, and excellent taste, rendered his opinion highly valuable in the selection of works for prizesholders requiring assistance, and in the arrangement of the exhibitions the want of his presence will be keenly felt. His genial and urbane character justly endeared him to his colleagues. Mr. Troughton was a writer of no mean order, his tragedy of 'Sina Sforza' was produced at the Haymarket Theatre during Mr. Macready's management.

In February last died Mr. H. R. Haines, who had been for several years a diligent and useful member of the Council. Mr. Haines was possessed of great taste and much knowledge of art, and his colleagues will deeply feel the loss of his judicious and practical suggestions.

At Kensington, on the 16th March, 1889, passed away Mr. Samuel Carter Hall, who for many years occupied a very prominent position in art literature. He was born in 1800. A casual remark of Charles Landseer at a public dinner, that there was no periodical publication to represent art led to the foundation of the Art Journal, or, as was first called, the Art Union, from the initiative of this society. It is the lot of but few periodicals to prolong their existence into a second half century, and it is an almost unique circumstance for the conduct of a magazine to have had but a single change during that period. It was on February 13, 1839, that the first number of this journal appeared, and for more than half a century the veteran originator had the pleasure of seeing his offspring grow, mature, and prosper in its career of usefulness. The number printed of the first edition was 350—since then as much as 70,000 has been received from its sale in a single year. At the time when the journal first appeared there was no patronage for British art—collectors would look only at old masters, which were consequently manufactured and imported for them, at a rate which was certified by the customs at 10,000 a year. To Mr. Hall was due the bursting of this bubble, and he had to assert the truth of his strong language concerning this traffic in the law

courts. In 1843 Mr. Hall visited every important manufacturing centre in Great Britain, and found that nowhere was there any persistent or consistent effort being made to weld together arts and manufactures. Everywhere there was an entire dependence for patterns and designs on borrowings, purchases, or thefts, from France and other countries, and a regular trade in foreign patterns brought much gain to those concerned in it. Mr. Hall retired from the editorship of the *Art Journal* in 1858.

After chronicling the death of Mr. T. O. Barlow, R.A., Mr. Fred. Taylor, and Mr. J. R. Herbert, R.A., the Report went on to give a summary of the proceedings of the Edinburgh Congress of the National Association for the Advancement of Art. One paragraph which occurred in the summary or review referred to was as follows:—

"It is remarkable that no one was found at the meeting to say a word for the efforts which the Art-Union has been making for fifty years and more to excite in the minds of the people not only of the United Kingdom, but wherever the English language is to be found, an interest and an appreciation of the refining and ennobling effects of fine-art works by the dissemination of thousands of reproductions by choice engraving, of the finest works of British artists, as well as copies, both antique and modern specimens of sculpture. There is abundant evidence to prove that these exertions have not been put forward in vain. The mere fact of the continued improvement in the quality of works selected by prizeholders, year after year, proves that the influence of the Art-Union's teaching has been very considerable."

Following this came a review of the Paris Exhibition, and the Council then make the following remarks as to their programme for the ensuing year:—

"For the ensuing year the Council have secured the services of four well-known Fellows of the Royal Society of Painter-Etchers to produce etchings of the following works in the National Gallery:—

"Landscape" by Thos. Barker, No. 1,033, etched by E. Barclay.

"Entrance to Pisa from Leghorn" by Sir A. Colcott, No. 346 etched by C. O. Murray.

"A House at Hampstead" by John Constable, No. 1,245, etched by H. R. Robertson.

"The Windmill" by John Crome, No. 926, etched by Pery Thomas.

The choice of these four artists has been carefully considered. They represent one of the most remarkable movements in the history of English art.

The landscape painting of Europe had been so completely conventional that reference to nature was not only seldom made by the painter, but was resented as an impertinence by the art critic. Hence the neglect under which Wilson, Gainsborough (as a landscape painter), Crome, Constable, and Müller all suffered. They lived before their age.

Constable said of his work:—"My art flatters nobody by imitation, it courts nobody by smoothness, it tickles nobody by pettiness, it is without fal-lal or fiddle-dee—how then can I hope to be popular?" Nevertheless no English painter has had a more wide-reaching power as a teacher, and his picture of "The Haywain," sent in 1824 to Paris, for which he received the Gold Medal, is acknowledged by the French critics themselves to have had a vast influence on French art.

There is no doubt that the school of Troyon was initiated by the admiration of these fine works. He brought about the frank acceptance and induced an admiration for nature as taking the place of the ordinary conventional "composition" which prevailed so exclusively before his time and the time of his contemporaries.

The group of Englishmen (whose work we shall put before our subscribers next year) had the gift to see nature again after centuries of blindness.

So with Gainsborough and so with John Crome, who with Constable were all natives of Norfolk and Suffolk, a district which at the end of the last century was little visited, and retained a rural wildness of aspect that has since been improved off the land,—wide wandering roads, wayside pools, large oaks and other timber. These characters sank into the minds of the gifted men who were so numerous in the last century, and stimulated Gainsborough to a most artless recording of the country he lived in. The same may be said for John Crome, who by his faithful rendering of the canals, oaks, and heaths of his native county will live as a great painter as long as his canvas lasts.

In all, the truly English impression of nature is seen, large, without meretricious effect, with a due respect for what has been called the "passion of nature" in her stormy, showery, and breezy moods, without excess of minute detail, yet all that is essential is there.

Sir A. Colcott took the middle phase and was a successful and even fashionable painter. His Italian sketches, made after he was fifty years of age, show a masculine directness that is very valuable, and characteristic of his age and its way of regarding nature.

Of Thomas Barker, of Bath, too, we may say he worked like a man; his contrasts of colour as of form and human expression are full of force, and all in the truly simple English taste, strong without theatrical exaggeration. These men were the masters and fathers of our English Landscape art, and deserve our truest and frankest acknowledgments for their work.

Aprons of English art a very interesting address was given by Mr. Orrock at the Society of Arts on March 11 last, on the claims of the British school of painting to a thorough representation in the National Gallery. . . .

When the attention of the officials of the National Gallery is called to the desirability of securing at a sale some fine rare examples of one of our own masters, the reply always is, "There are no funds." Out of available funds amounting to some 45,000*l.*, about 3,000*l.* was spent on English pictures. We want fine specimens of English art for the benefit of painters, students, and all lovers of national art.

It is believed that several large sums and a number of choice works in water-colour have been already promised towards the formation of a real Gallery of English Art; but it is not likely that such an arrangement will be carried out if the works presented are to

be hidden away in badly-lighted underground rooms. Let there be a properly-lighted and proportioned gallery provided, open to the calm, clear silver light which is required to allow their infinite beauty and delicate treatment to be studied and felt, and thus we shall encourage others to add to the collection, and convince the nation that we indeed have a school."

Lord Derby, in moving the adoption of the report, said it was not his wish or his duty to follow the various points raised in it, but he was compelled to admit his appreciation of its spirit. He thought he could venture to say, as one of the Trustees of the National Portrait Gallery, that the Trustees would be glad to receive portraits of eminent artists, though he did not think it would be advisable to hang them in a distinct group or class. He was sorry to say that there had been a very considerable falling off in the list of subscribers to the Art Union, who in 1880 numbered 15,000, but to-day only 6,000. It could not be said that this was owing to a decline in the artistic taste, for the demand for artistic work was greater now than it had ever been before. Probably the cause would be found to rest partly with the commercial depression which existed of late years. If they had suffered in bad times, it was only reasonable to hope that with the revival of trade they would benefit. Another and perhaps permanent cause arose from the Art Union's own success, which had brought imitators into the field. He did not despair of the Art Union's prospects, and urged the executive not to lose heart, but to energetically face the increased competition. The report was unanimously adopted.

Several votes of thanks having been passed, the drawing for prizes took place, with the result that the principal prize of 100*l.* was drawn by Mr. H. R. Ferry, of Granville Park, Blackheath.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held in the Council Chamber at the "County Hall,"* Spring-gardens, on Tuesday last, Lord Rosebery in the chair.

The Chairman resumed and concluded his review of the committee-work of the Council for the past year, dealing with the work of the Standing Committee, the Standing Joint Committee, the Theatres Committee, the Parliamentary Committee, the Finance Committee, and the Contracts Committee. With regard to

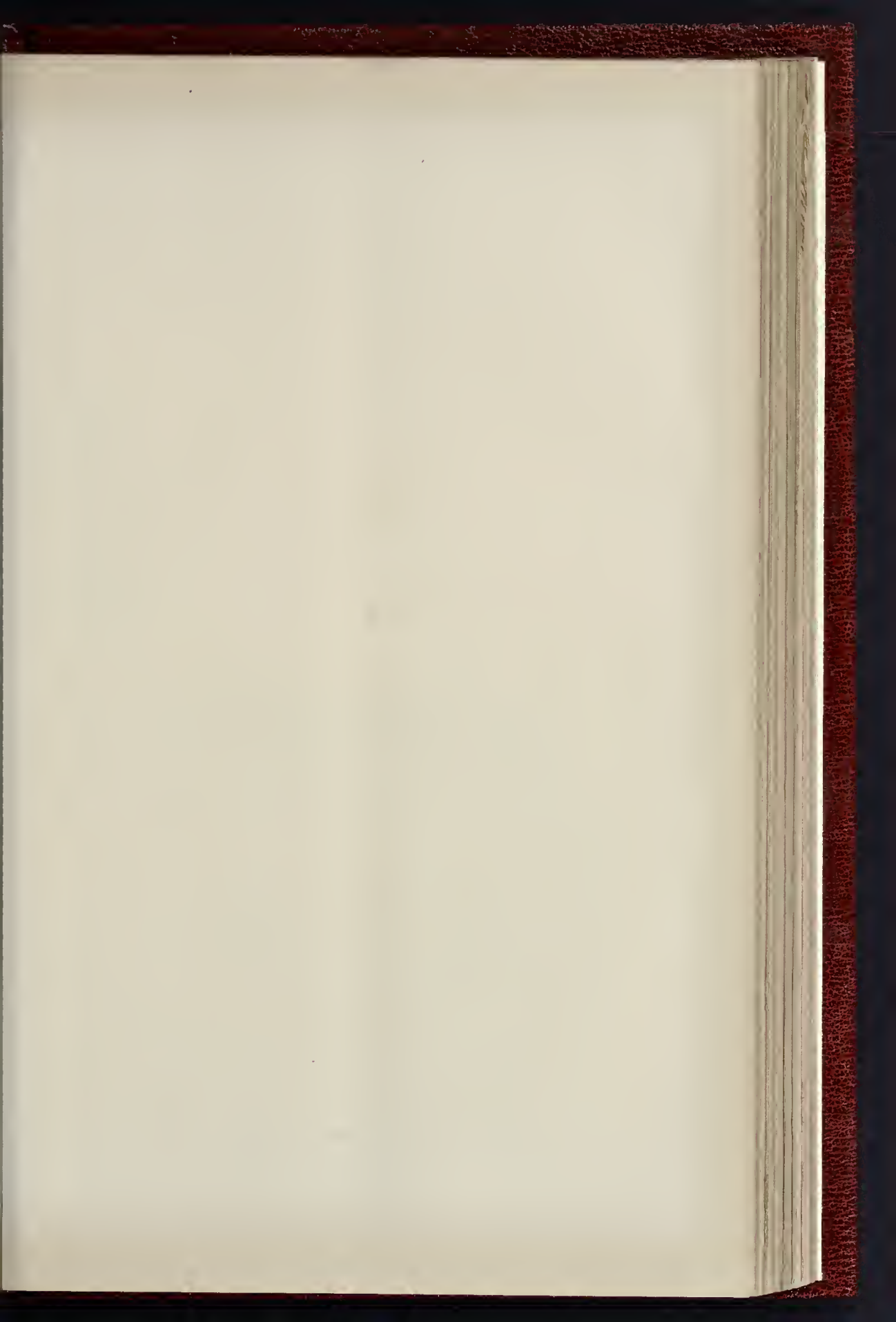
The Finance Committee, which by its statutory obligations had, he said, exercised the most invidious functions of any of their committees. The Finance Committee had had the difficulty of imposing the rate—that much-abused, much-explained rate. After the two letters of Sir Thomas Farrer in the *Times*, he should have thought that all misconception was impossible, but none were so blind as those who would not see, and it might be worth while for one moment to touch upon that subject. Their critics said: "The Metropolitan Board rate was 10*l.* 10*d.*, and your precept is 13*l.* 2*d.*, therefore your rate is 3*d.* more than the Metropolitan Board rate." That was perfectly true, and if the work of the School Board were added to the work of the County Council their rate would be 15*d.* more than the rate of the Metropolitan Board of Works, and if the care of the British Museum were added to their charges their rates would be again considerably enhanced; and if they had to pay for the Brigade of Guards and their maintenance their rates again would be considerably enhanced. That was the whole question. The rate they were raising was not the rate of the Metropolitan Board; it was a great many other rates; and of course those who desired to discredit the London County Council deliberately ignored that fact and made capital out of their supposed ignorance. They had a good many other rates the collection of which was not voluntary, but was imposed upon them by Parliament. As it happened, their rate for Metropolitan Board purposes last year was smaller than that of the Metropolitan Board itself. It was 10*l.* 6*d.*, as against 10*l.* 10*d.*. But they were a totally different body to the Metropolitan Board of Works; they were a municipality, not a Commission of Works and Sewers. The Government wished to create a great municipality for London, and, having created that municipality, it had handed over to it the powers of the

Metropolitan Board of Works and a great many other powers besides. It handed also a certain income over to them with which to discharge those new duties. That income was totally inadequate, and it was in respect to that inadequacy that the rate was raised in the present year. He read out a list of the new duties imposed upon them by Act of Parliament in addition to those imposed on the Metropolitan Board of Works, each which involved expenditure to the County Council—payments to Guardians towards remuneration of teachers in Poor Law schools, to public vaccinators, to local authorities for Medical Officers of Health, to Poor Law Guardians for registrars of births and deaths, to Guardians for Poor Law medical expenses, to Guardians and others for pauper lunatics, to Guardians of 4*d.* a head a day,—that alone was an item of 4326,000*l.* a year,—and to Croydon for union officers. Besides these payments there were old county liabilities,—the interest on the debt, pensions of officers of prisons, lunatic asylums, and Feltham School, and the proportion of the liability of 2,400*l.* a year contributed by the old counties of Surrey and Middlesex towards the cost of metropolitan Thames bridges. Then under the head of judicial work—criminal prosecutions, Central Criminal Court expenses, judicial salaries, and Sessions Houses maintenance. Then provision of new lunatic asylums, coroners' salaries and disbursements, industrial schools, weights and measures, main roads maintenance, county bridges (other than Thames) maintenance, registration of voters and revising barristers, Medical Officers of Health, expenses of burial of human bodies cast on shore (that was a small item), licensing for music and dancing, licensing slaughterhouses and cow-houses, county rate—preparation of basis for rate in Penge, and compiling the valuation lists for rest of county, rabies—that was now 4,200*l.*—a new item of expense, and electric lighting. Those items cost the Council altogether 1,206,742*l.*, towards which the Government gave 823,384*l.*, and there were small receipts amounting to 29,771*l.*, so that it set off against their 1,206,742*l.* of additional expenditure they had 853,155*l.* of additional income, which left 354,000*l.* a year to be met out of the rates,—that was, a rate of nearly 2*d.* In the Report of the Finance Committee issued that day there was a very instructive tabular showing how in each parish or union of London the rate was diminished by the contribution which the Council made. This question of rate impaired their popularity, it crippled their usefulness, and it put a stop to metropolitan improvement. Their credit was in no respect diminished. One great feature of the work of the Finance Committee of this year had been the raising of its first loan. The Metropolitan Board created first a 3*d.* per cent. stock in 1869. This continued till 1887. Then one at 3 per cent., which continued till 1887. The average price of issue in that year was over par. A body creating stock does not get the full value of the security when the rate of interest commands more than the price at which the security will be ultimately redeemed. The choice lay between 2*d.* and 2½ per cent. The present Government chose 2½ per cent. The average price produced to the Council on its 2½ per cent. stock was 99*l.* 12*s.*; its net produce 91*l.* 0*s.* 10*d.* The rate of interest on the sterling is 2*l.* 14*s.* 11*d.*, and, adding bank management and Government duty, 2*l.* 17*s.* 5*d.*, exclusive of cost of redemption in par. The average rate of interest on 1*l.* sterling of the three issues of stock (3 per cent.) previously to that of 1889 was—1889, 3*l.* 4*s.* 1*d.*, 1886, 3*l.* 2*s.* 9*d.*; 1887, 3*l.* 2*s.* 10*d.* as compared with 1889, 2*l.* 17*s.* 5*d.*. Their grade was greatly due to Lord Lingard.

The Contracts Committee.—The Chairman referred to the work of the Contracts Committee. They had to examine the allegations that sub-contracting was going on in the works, and sub-contracting meant sweating an inferior work. They had not reported, but the Council had done a good deal in the direction of what the Contracts Committee was appointed to promote.

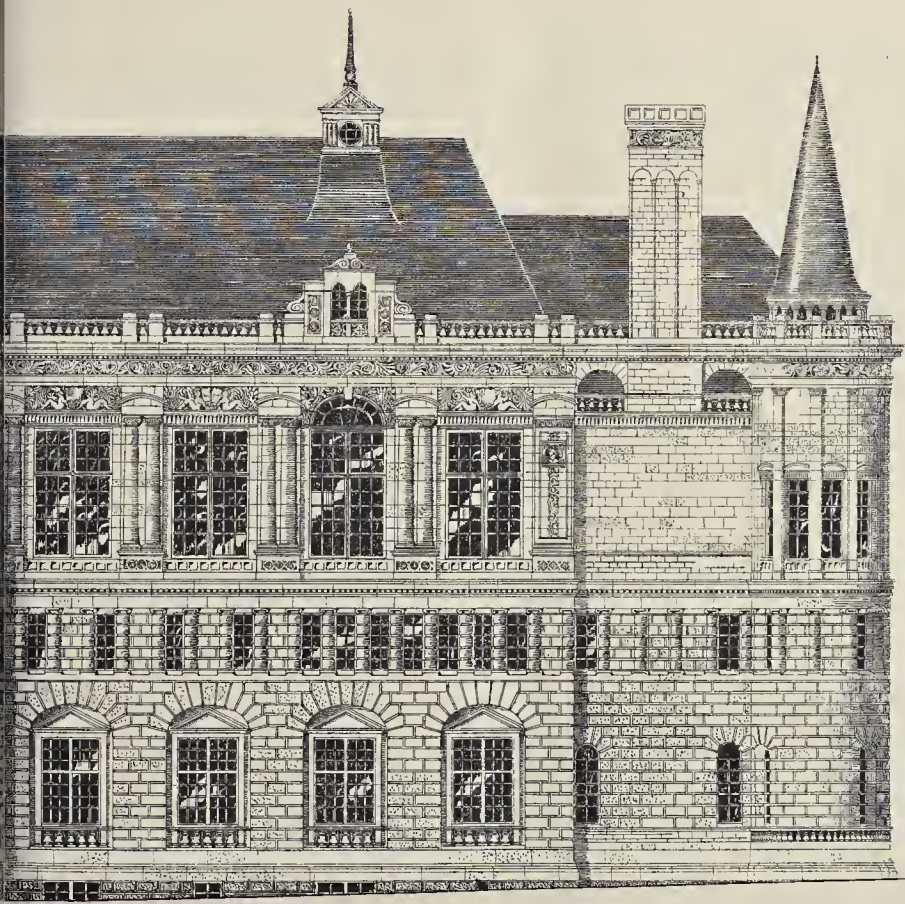
General Work of the Council.—In conclusion the Chairman made some remarks on questions of policy or principle affecting the work of the Council. The present Council, he said, had lived fourteen months, and they had only eighteen months more to live. In that time seemed to him that they ought to complete

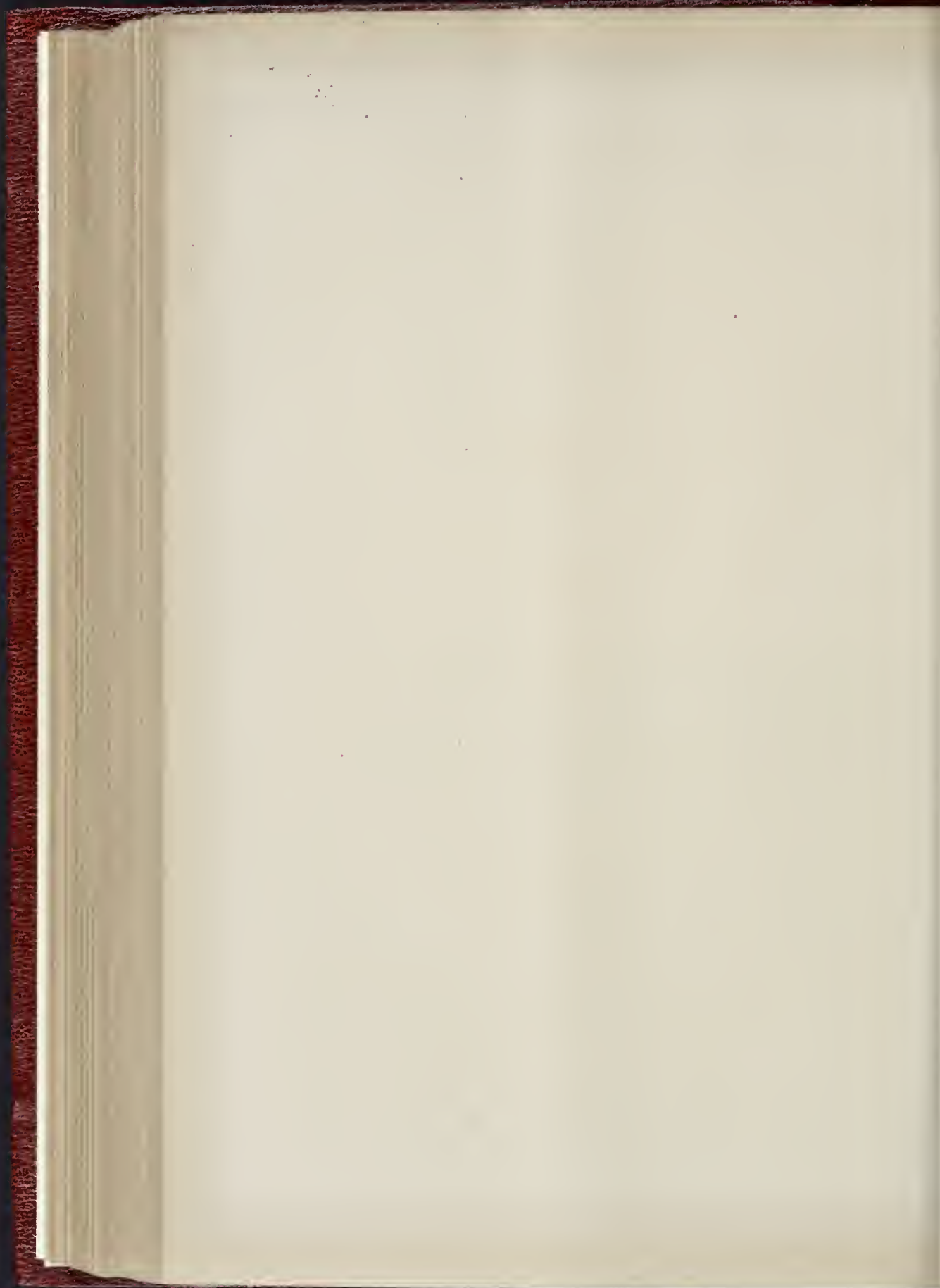
* So the premises in Spring-gardens are designated on the engravings convening the meeting.





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 C I P A L : B V I L D I N G S
 C O M P E T I T I O N : E L E V A T
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 A N D : M R . D . D . S T A T H A M





their organisation, as far as it was possible, and they ought to lay down a definite scheme of policy to guide them. They could not fully complete their organisation, because that was a matter of growth and development, but he thought from their experience they could evolve a rational and elastic plan which would be of use to themselves and a guide to their successors. Their present position was in some degree anomalous. They were an administrative body without any executive. They worked through some eighteen committees. It was quite clear that under these circumstances their work must always be liable to be faulty and inconsistent. Suppose the House of Commons were to administer in the same way. Suppose that instead of having sixteen or seventeen ministers at the head of departments they had sixteen or seventeen committees administering the War Office, the Admiralty, and so forth, and each of them made a weekly report to the House of Commons and received the House of Commons' directions as to the work it was to pursue, he ventured to say that such a scene of administrative chaos could not have been witnessed in the course of human history. He could perceive the evil, but he did not perceive the remedy. It was quite clear that 137 was too large a number for an executive body, while, on the other hand, he did not quite see what was to assist that body in performing its executive functions. He ventured to think that the Council would not do hadly if it applied itself through some Committee or otherwise to see if they could not find a remedy for that state of things. With regard to the

Relations of the Council with the Corporation of London.—He said that this was a matter of some complexity, and he would beseech them, in what he was going to say, to believe that he spoke, not as member for the City, but as Chairman of the Council. The position of the City was peculiar; it was not natural, it had no elements of durability—in its present shape it had no elements of durability. It was something like the scheme that was planned for Pagan Rome at the Second Empire—that the Pope was to occupy what was called the Leonine City and live in perfect harmony with the rest of the metropolis, which was to be given up to the kingdom of Italy; and so close was the parallel, strangely enough, that when the Emperor Napoleon III. was planning something of this sort, he sent over to London to try and find out if he could not obtain some information about the exceptional privileges of the City of London, in relation to the rest of the Metropolis, which would give him some guidance as to the relations which he might hope to establish between the Leonine City and the rest of Rome; and the result that he obtained was summed up comprehensively by his own Minister in the words that it was not possible for St. Peter to follow St. Paul in this matter. As they were aware, in some respects the Metropolis was one already; but the Corporation and the privileges of the City of London were maintained intact. Their duty, it seemed to him, was to respect that arrangement in all courtesy and good faith. The condition of things, as he had said, must in its nature be provisional. In time, in the fulness of time, the Metropolis would be one,—one in all respects. It would not be easy to reconcile and to blend all the various elements which would be required in order to solve that great problem of mingling the pomp and the splendour of the City with the simple democracy of that body—to sew the purple of the City and that of the County Council together; but that was not their work. It might be it was the work of statesmen and of Parliament, and no action of the Council, as far as he knew, would either further or facilitate that work. He hoped it would be accomplished, when it was accomplished, with the least possible friction and the least possible irritation; but in the meantime he believed that their duty in the matter was perfectly clear, that their relations with the City should be marked by dignity and friendliness and fair dealing; not encroaching on the privileges of the City nor allowing the City to encroach on theirs; not allowing the interests of the community of London at large to suffer by any neglect on their part either in action or in representation, but not unnecessarily interfering with that ancient body where they had no direct interest of the community to serve. Now he ended the record that he had to lay before them. It was a review of hard and

honest work. They had had to learn their business and to do it. Of the quality of that work the results must be the test, but of the quantity he could testify himself. He had watched them doing it through the short days of winter and the long summer afternoons, sometimes baffled and depressed owing to the internal inconsistency of the evils to be overcome and the difficulty of overcoming them. What had sustained them, he believed, in this work had been neither fees, nor fame, nor praise; it had been the pure impulse of a clear duty and a high hope and a generous ideal. He hoped that they would always cherish that spirit among them, for without it their work would degenerate into a revolting round of oppressive detail; without it they might easily dwindle into mean corruption and to petty intrigue; and without it the Council itself could never realise that high destiny which, as the greatest municipality in the world, worked by the greatest race in the world in the greatest city of the world, if wisely guided and well served, in the fulness of time it could not fail to obtain.

The Vice-Chairman (Sir John Lubbock) moved that the Council should request the Chairman to allow his address to be printed and circulated.

The Deputy-Chairman (Mr. Haggis) seconded the motion, which was unanimously adopted.

A Model Lodging-House to be built in Drury-lane.—The Council then resumed the adjourned debate on the report of the Housing of the Working Classes Committee, which recommended that the Council, subject to an estimate to be approved by the Finance Committee, should undertake the erection of a model lodging-house on the model of those erected and controlled by the Corporation of Glasgow, to accommodate from 300 to 350 persons, on a plot of vacant land, now in possession of the Council, in Shelton-street, Drury-lane. To this an amendment had been moved by Mr. Alderman Debenham:—

“That whilst agreeing with the general tenor of the report, the Council disavows the recommendations which pledge the Council to undertake the building of a common lodging-house.”

After a long discussion, the amendment was negatived on a division by 87 to 24 votes, and the recommendation of the Committee was approved.

After the transaction of a great deal of other business, the Council adjourned.

ARCHITECTURAL SOCIETIES.

The Architectural Association.—The ordinary fortnightly meeting of this Association was held on the 2nd inst., at 9, Conduit-street, Mr. Leonard Stokes, President, in the chair. The “House List” of officers and committee for the ensuing session was read, and two additional nominations were taken. After a long discussion, it was resolved by a large majority, on the motion of Mr. Collard, that the votes for officers be counted the evening preceding the next meeting, and that the scrutineers be instructed to report the number of votes given to each candidate. Mr. F. R. Farrow, the senior honorary secretary, announced that the first meeting of the Sketching and Measuring Class would take place on May 17, when Rainham in Essex would be visited. Mr. Farrow also announced that a special business meeting would be held on Friday, May 9* to consider the report of the Committee on Education. Mr. E. S. Gale, honorary secretary, proposed a vote of thanks to Mr. J. M. Brydon, the architect of the new hospital, Euston-road, for kindly showing them over that building on the occasion of their visit. Mr. Keith D. Young then read a paper on “Hospitals.” (See p. 337, ante).

Liverpool Architectural Society.—The closing address of the President of this society, Mr. T. Mellard Reade, F.R.I.B.A., &c., was delivered on Monday last. Referring to the question of the Registration of Architects, Mr. Reade said:—“The Institute at present represents, and I hope will continue to represent, the views of the majority of architects, and so long as this representative body opposes the Bill, it is unlikely to pass into law.”

Royal Institute of the Architects of Ireland.—The regular monthly Council meeting of this Institute was held at 37, Dawson-street, on Monday, May 5. Present: T. Drew, in the chair; J. R. Carroll, R. Millar, S. Symes, J. H.

*According to the advertisement which appears on another page, this special meeting will be held on May 16 instead of the 9th, as was announced.

Peutland, W. M. Mitchell, C. Geoghegan, Albert E. Murray, hon. sec. and treas. The minutes of last meeting were read and signed. A vote of thanks was passed to Mr. A. Oliver, of London, for his kind gift to the Institute of the Design for Royal Exchange, Dublin, dated 1768, by the late Mr. H. Newton, architect. The matter of the Dublin Corporation Improvement Bill was again under discussion, and the correspondence having been read, in which the Corporation declined to accept the amendment proposed by this Institute, the following resolution was unanimously passed:—“Having read the correspondence between the President of this Institute and the Town Clerk relative to amendment (dated February 3, 1890) proposed in clauses 40 and 61 of the Dublin Improvement Bill by this Institute, the Council has to express its disappointment and dissatisfaction that the Corporation Committee having charge of the Bill has determined to maintain those injudicious clauses as drafted. The Council can do no more than enter its protest against the rejection of its advice, founded on thorough experience of the working and wants of building legislation in Dublin, and record its opinion that the arbitrary powers sought under these clauses are unwise in the interest of future Committees of the Corporation as well as in those of the citizens.”

OBITUARY.

Mr. John Carrick.—It is with much regret that we see announced in the Glasgow papers the death of Mr. John Carrick, the City Architect of Glasgow, which occurred on the 2nd inst. According to the *Glasgow Herald*, he was a native of Denny, in Stirlingshire. After completing his education he served an apprenticeship with the late Mr. John Bryce, architect, brother of the better-known David Bryce, of Edinburgh. Afterwards he was assistant to the late Mr. Herbertson, and he also spent a short time in England and in foreign travel acquiring further experience in his profession. Returning to Glasgow, he began business in partnership with a Mr. Brown, under the firm of Brown & Carrick, but the co-partnership lasted only a few years, Mr. Brown retiring on falling heir to the estate of Currie, near Edinburgh. Soon afterwards Mr. Carrick entered the service of the Corporation, succeeding the late Mr. Hume in the office then known as Superintendent of Streets. This was in the beginning of the year 1844.

Mr. James Nasmyth, the famous engineer, whose invention of the steam hammer will have made his name familiar wherever the English language is spoken, died on Wednesday morning last. According to the *Times*, for some six months he had been in failing health, but this arose merely from his great age, and he was accustomed to say till up to a few months ago that he had never known what it was to be ill. About a month ago he left his place at Penhurst, near Tunbridge, and came to town, where he stayed at Bailey's Hotel, Gloucester-road, Queen's-gate, and there he died. He was born in Edinburgh, on August 19, 1808, and he was consequently in his eighty-second year at the time of his death. A very interesting autobiography by Mr. Nasmyth, edited by Dr. Smiles, was published in 1883.

STAINED GLASS.

Brecon.—The officers, non-commissioned officers, and men of the 24th Regiment being desirous of erecting a memorial to their comrades who fell in the Burmese War, have commissioned Mr. Taylor, of Berners-street, to execute a stained-glass window and memorial brass bearing the name of every man who fell in action or died during the campaign, to be placed in the Priory Church, Brecon, where the memorial to their comrades who fell in the South African campaign is erected.

Durton-on-Trent.—Sir Francis Burdett, Bart., has recently presented the church of Foremark with painted glass. In the altar screen angels in adoration are introduced, with a representation of the Holy Spirit, descending in the form of a dove, above. The whole, treated in monochrome, is from the studio of Messrs. Charles Evans & Co., London.

Ingelton.—The parish church of Ingelton, Yorkshire, has lately received a stained-glass window in memory of the late Rev. Richard Denny, B.A., for twenty-nine years the faithful pastor of this parish, and the founder of its school. The window consists of two lights,

and the subject selected for illustration is "The Good Shepherd." The work has been executed by Messrs. Mayer & Co.

SEWERAGE AND DRAINAGE WORKS.

Draycott.—The sewerage works and sewage farm at Draycott, near Derby, are now completed, and the sewage was turned on the farm last week. We are informed that members of local authorities, or others interested in sanitary work, may see the farm at any time. The population whose sewage is dealt with number 1,200. The land is six acres in extent, and it has been drained, levelled, steam scuffled, and laid out with carriers. The sewers are flushed automatically every twelve hours with brook water. The engineer for the works is Mr. W. H. Radford, of Nottingham, and the contractors are Messrs. Holmes Bros., of Nottingham.

St. Helen's.—The first contract of the new intercepting sewer has been commenced, and the contractor, Mr. John Riddell, of St. Helen's, has now made good progress with the work. The sewer is over one mile and a half long, in three sizes, viz., 6 ft. circular at outfall, 6 ft. by 4 ft., and 4 ft. by 2 ft. 8 in. egg-shaped, the greatest depth of cutting being about 30 ft., and the average depth 20 ft. The whole of the work is being carried out by Mr. Geo. J. C. Broom, Assoc. M.Inst.C.E., the Borough Surveyor, engineer for the works. The estimated cost of the whole scheme is over 30,000.

A PARTY-WALL CASE.

FOOT v. HODGSON.

This case came before the Queen's Bench Division of the High Court of Justice on Monday (Mr. Justice Mathew and Mr. Justice Grantham on the Bench). It raised a question of some general importance under the Metropolitan Building Act, 1855 (18 & 19 Vict., c. 122), as to the rights of adjoining owners of houses as to pulling down and rebuilding "party walls" between their houses, and it turned upon what is a "story" of a house. In the schedule of the Act a scale is given for the thickness of party-walls, and the wall of the "two most stories" is to be of a certain thickness, and the rules provide that the height of every topmost story shall be measured from the level of its floor up to half the vertical height of the rafters when the roof has no "tie" or to the "tie" when it has one. The 33rd section of the Act, subsection 7, gives a right to the building-owner to pull down any party structure that is of insufficient strength for any building intended to be built and to rebuild it of sufficient strength for the purpose upon condition of "making good all damage." The house in question, of which Hodgson was the building-owner, was in Little Trinity-lane, in the City, and had been burnt, except the party-wall between it and the adjoining house, of which Foot was building-owner. Hodgson's house, which was burnt, had at the top a floor with a slanting or shelving roof, which is now very common, and he desired to rebuild it with such a top floor as before. But the District Surveyor found that, treating this floor as a "story," and as the topmost story, it required the party-wall to be of greater strength and thickness, and Hodgson accordingly proposed to pull down the party-wall and re-erect it of the required strength. To this Foot, the building-owner of the adjoining house, objected, contending that the top floor was not a "story," and that the greater thickness of the wall was not required, whereas Hodgson insisted that it was. The contention of Foot was that, as the roof was shelving over the top room, and that as a matter of law it could not be "the topmost story," whereas Hodgson contended that it was a "topmost story," and so required the extra strength of the wall, and on a reference under the Act to a surveyor or arbitrator he so decided. But the Act gives a right of appeal to the County Court, and the adjoining building-owner so appealed, and Mr. Kerr, the Judge of the City Court, took the contrary view, and decided against the defendant,* who appealed.

Mr. Spokes appeared on his behalf in support of his appeal. Mr. Finlay, Q.C. (with Mr. Fullerton), appeared for the plaintiff, the adjoining owner, in support of the judgment of the City Court Judge.

The Court came to the conclusion, however, that that the judge was wrong, and that the defendant was right, in his contention as to the mode of measurement to be adopted, which showed the room in question to be the "topmost story," so as to require the wall to be of the greater strength and thickness; and that thus the building-owner was justified in rebuilding it of the strength required.

Judgment was given for the defendant; consequently the award of the arbitrator (Prof. T. Roger Smith) was sustained, and the appeal was allowed.

* As reported in the *Builder* for March 23 last, p. 235.

RUDE CHURCHES.

Sir,—In the notice of "Baynard's Castle" in last week's *Builder*, Mr. Macmichael is quoted as having lately asked, "Is there a village church in the United Kingdom and Ireland (sic) where the bare floor still exists?" I am sure there are many Catholic churches in Ireland that have clay floors. I have been in scores of them, and in many with thatched roofs; but they are fast disappearing. A few years ago I got a tile floor laid in a church near the city of Limerick, and beside a railway station, to replace a clay floor. About thirty years ago I was in walls partly built for a church, but never roofed or floored, in the mountains not far from the town of Donegal. A rude thatched open shed was formed against the inside of the east end, and a rough stone bench, which served as an altar, under it, upon which Mass was said every Sunday, the space enclosed by the walls being first cleaned and swept, as cattle and sheep had free access to it during the remainder of the week. The more careful of the large congregation knelt and sat upon stones.

In the north of the same county, and at about the same time, I saw on the natural grassy terraces sloping down to the sea in Sheephaven, near the village of Milford, what was called a "schabul," being a wall of rough masonry about 10 ft. long and 6 ft. thick for 3 ft. high, and 2½ ft. to 3 ft. thick for a further height of 6 ft. or 8 ft., leaving an offset at one side over which a thatched penthouse roof projected, and under its meagre shelter Mass was said every Sunday, the people kneeling on the fine short grass of the gentle slope to the strand and some on opposite side of the bay half a mile off. I have also been in a quarry-like hollow on the banks of the Black Water, in the county Cork, near Lisamore, where the ground had subsided in a horse-shoe form into one of the oarves of the locality, leaving a recess with a ledge of rock upon which Mass was said whenever it was safe, and the yeomen were away, for whom my father-in-law, when a boy, not being a suspect, watched on a neighbouring hill to give a signal to the Papists to disperse if the "yoes" were coming. M. M. May 6, 1890.

METHOD OF TAKING ANGLES.

Sir,—I should be much obliged if you would insert this question in your next issue, or answer me otherwise:

In taking angles with the theodolite round any figure, is it more correct to clamp the reading of an angle, say, at A, and bring this reading to bear on A from the next point B, so measure the angle at B, than to adjust the vernier at O° each time an angle is measured? If so, why?

ONE IN DOUBT.

** "One in Doubt" is referred to The Student's Column," Article XV., April 9, 1887, and Articles V. and VI., July 30 and August 6, 1887, where the operation of multiplying the angle mechanically is shown to lead to numerical inaccuracies, as the process of dividing the total angle read by the number of repetitions obtains an average, calculated to obviate any slight mechanical inaccuracies of subdivision in the instrument, but of course this does not overcome errors resulting from want of adjustment.

VENTILATION BY SASH WINDOWS.

Sir,—I can back up what you have said on pages 309 and 325. I have used various ways of carrying out Dr. Hinkes Bird's principle of admitting fresh air between the sashes. One plan I used for years was placing a movable piece of wood, about 2 in. thick, below the bottom sash, which, of course, raised it up 2 in., and so allowed the fresh air to come in between the sashes; when the wood was removed the lower sash could be pushed down. Another plan, which I like better, is to put a thin strip of wood, ¼ in. thick, close along the top of the upper sash, either outside or inside. It is about 3 in. deep, so that when the top sash is pulled down the fresh air comes in between the sashes. This has been in use for several years at my present house, and wood slip being fixed inside for all the front windows, and outside for the back ones.

I published a drawing of the plan in 1883, and stated it was Dr. Bird's. It will be found in fig. 297 F, page 275, of "Buchart's Plumbing," in Weale's Series. W. P. BUCHAN.

New Stores in High Holborn.—The Great Central Hall, High Holborn, recently erected as a fire-proof structure, after the designs of Mr. R. Emerie Yorke, architect, is about to be opened as the Central Co-Operative Stores. The property extends over 21,794 feet superficial, and has three entrances in High Holborn, and three in Eagle-street. Partly freehold, and partly leased for 5701 annual rent, it has been valued *ad hoc* at 60,900.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—XIX.

ALTERNATING CURRENT CIRCUIT.

THE application of Ohm's law to an alternating current is not so simple as in the case of the continuous current, owing to the difficulty of assigning the right value to the electro-motive force producing the current at any particular instant.

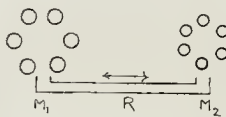


Fig. 54.

Fig. 54 represents two alternating current machines, M_1 and M_2 , of which M_1 is the larger, coupled up in series through an external circuit. The resistance, through which current flows, is R , but self-induction is supposed to be entirely absent. If the machines have the same number of armature bobbins, and run at the same speed, the curves representing the E.M.F. in each will have the same period, though that for M_1 will be the taller of the two. Again, if the armatures are not at the same time in the same position, relatively to their field magnets, the phases of the curves will be different; in other words, they will not have their maximum and minimum values at the same instant.

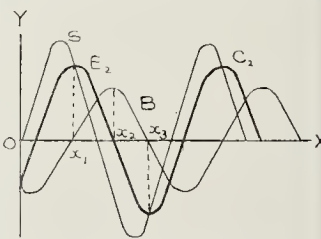


Fig. 55.

Draw (fig. 55) the curve S to represent the E.M.F. of M_1 at any instant, and B that of M_2 ,* then the curve C , representing the resultant E.M.F. acting at any instant, can be obtained by taking for its ordinates the algebraic sum of the ordinates of S and B , giving the positive sign to ordinates measured above, the negative sign to those measured below OX . We do, in fact, precisely what we should do in any other case in which we desire to use Ohm's law, viz., consider electro-motive forces acting in one direction round the circuit \rightarrow , in the opposite direction \leftarrow , find their algebraic sum and take this sum to be the value of E in the expression $C = \frac{E}{R}$.

To draw a curve representing the current flowing at any instant, the ordinates of E_2 must be divided by R ; to avoid confusing the figure, R is assumed to be 1 ohm, so that the curve C_2 for the current is coincident with E_2 .

The curve B can be made to assume any position, relatively to S , by shifting the armature of one of the machines backwards or forwards; in the figure, B is drawn for the special case in which it cuts OX when C_2 has its maximum or minimum value, and *vice versa*. Now substitute for M_2 a bobbin, *b*, fig. 56, having a high co-efficient of self-induction. The actual number of lines of force within *b* at any instant depends upon the value of C_2 , but the E. M. F. set up in the coil depends upon the rate at which the lines are passing into or out of the coil, that is, upon the rate at which the value of C_2 is varying. When C_2 is on the point of reversing, it and the lines of force it is producing are, for the instant, steady, and the E. M. F. due to self-induction is therefore zero, so that B cuts OX when C_2 or E_2 has its highest and lowest values. Again, the current is changing in value most rapidly where C_2 crosses OX , hence when C_2 is zero, B has its maximum or minimum value.

It has been shown that self-induction opposes an increasing current and helps a diminishing current.

* A similar curve was shown, fig. 51, in the previous article.

one; it follows, therefore, that the curve B is exactly a quarter phase behind C_1 and E_1 .

If we suppose the machine M, to be replaced by the secondary coil, *s*, fig. 56, of a transformer, the curves in figure 55 will now serve for the secondary circuit of the transformer system shown in figure 56.

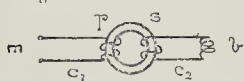


Fig. 56.

Since the resistance of the secondary circuit has been assumed to be 1 ohm, if there were no self induction in *b* the curve S would represent the current flowing at any instant, as well as the E.M.F. of the secondary coil. The current could, however, be reduced to its former value by throwing extra resistance into the circuit; but although the curve for the current would still be shaped like C_2 in the figure, its position would be shifted, as it would then cut O X in the same points as S does. When the current is diminished by the introduction of resistance, heat is generated in that resistance and power absorbed; we have seen that the current can also be diminished to the same extent, not by increasing the resistance of the circuit, but by shunting it so as to introduce the necessary amount of self induction; it is, therefore, sometimes erroneously supposed that the "self-induction" will absorb the same amount of power as the "resistance" that would have to be employed to achieve the same object.

The power at any instant is measured by the product of the number of volts into the number of amperes, or, in fig. 55, by the product of the corresponding ordinates of C_1 and B. Between O and x_1 , these products are negative, the cutting into the coil of the lines of force sets up an E.M.F. opposing the current, and the coil absorbs work, but between x_1 and x_2 these products are positive, though of the same numerical value for the same value of C_1 , hence from x_1 to x_2 the lines of force in cutting out of the coil put back into the circuit exactly as much work as it absorbed between the points O and x_1 . The difference between the action of resistance and self-induction may otherwise be resisted in this way—Resistance absorbs electrical energy, both while the current is increasing and while it is diminishing; the energy thus absorbed is returned as heat energy to the atmosphere and surrounding bodies. Self-induction absorbs electrical energy while the current is increasing; the energy thus absorbed is returned as electrical energy to the circuit while the current is diminishing, and as a net result no electrical energy is taken from the circuit. From these causes, "choking coils," that is, coils with a large co-efficient of self-induction, are used for reducing alternating currents, instead of wasteful resistances.

Passing on now to the consideration of the primary circuit, identically the same lines of force which set up E.M.F. in the secondary coil, *s*, fig. 56, also produce a corresponding E.M.F. in *p*, the primary coil; indeed, these lines are the connecting link between the two circuits. If N and n are the number of turns of wire in

constant $\frac{N}{n}$. A new diagram is used for the primary circuit, to avoid confusion.

The curve P now shows the E.M.F. in the primary coil at any instant; it must be noted P indicates not the flux of lines through the core of the transformer, but the rate at which they are changing, and a curve showing the actual value of the flux will be one which is a quarter phase in advance of P. Calculate the value of the flux from the expressions given in the last article,* and draw the flux curve F on a scale such that the flux produced by one ampere in the primary coil is represented on the same scale as one ampere. Now, the magnetisation of the core is due to the algebraic sum of the ampere turns in both *p* and *s*. Imagine, for the purposes of construction, the ampere turns in *s* transferred into *p*; this we can do by multiplying the ordinates of C_2 , fig. 55, by $\frac{n}{N}$ and tracing the dotted curve C_2' , fig. 57, to represent the equivalent current in the primary coil. But F may be regarded as being produced by the sum of the real current in the primary circuit, and this fictitious current C_2' ; subtract, therefore, C_2' from F, and we obtain C_1 , the actual current flowing in the primary circuit.

Again, to avoid drawing a separate curve, assume the resistance of the primary circuit, like that of the secondary, to be 1 ohm, then E_1 , the curve for the resultant E.M.F. producing current, is coincident with C_1 . But E_1 is the sum of P and M, representing the E.M.F. of the machine. Hence M is obtained by subtracting P from E_1 .

Starting from the machine; it produces an electromotive force, M, the current from it experiences an electromotive force, P, lagging considerably behind it, in the primary coils of the transformer, the two combined, E_1 , being the actual electromotive force which determines the primary current, C_1 . The varying lines of force in the case of the transformer produce the electromotive force, S, in the secondary coils, and the secondary current, C_2 , together with C_1 , determine both P and S. The current in the secondary circuit sets up an electromotive force, B, due to self induction in the external circuit, and this, together with S, determines E_2 , the actual electromotive force which causes the current, C_2 , to flow.

Owing to the size of the figures, 57 and 55, it has been impossible to draw them to scale; M is, as a rule, more than 100 times higher than S, and the other curves assume corresponding proportions. The object, however, of these figures is to show the general positions of the curves relatively to one another, and the methods of drawing them.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

8,852, Wood Mosaic or Parquetry. F. F. Faulkner.

This invention provides an improved method for covering floors, walls, &c., with wood mosaic or parquetry work, or imitations thereof, without the trouble and expense due to the special preparation of the floor or situation of the doors or other parts of the rooms because of the extra thickness of the parquetry work. The work is made in thin layers like veneer, and backed with canvas, and then laid on and cemented down in much the same manner as veneer is laid.

8,914, Flush Bolts. A. G. Tonks and F. R. Baker.

This patent relates chiefly to improvements in the manufacture. The cases or bodies in which the bolts slide are made of a trough or channel form, the trough receiving the thumb-pieces of the bolts. The cases may be stamped out of one piece of metal, and afterwards shaped for use.

13,196, Sanitary Pipes. J. P. Baylis.

The pipes which are the subject of this patent are made with an invert shoulder at the socket-end of the pipe, and the spigot end of the adjoining pipe is bedded therein. This causes the pipes to be laid with a true gradient. It is said that pipes as at present made and laid never have a true gradient, the spigot of the pipe always resting on the flange and causing a difference of level of pipes at every joint, and the joints at inverts can never be properly clayed or cemented, thereby leaving an open space at inverts, allowing the draining of water out of the land to get into the pipes.

18,003, Fastening for Doors and Windows. W. Batley.

According to this invention, a circular plate or segment of metal is let into the floor, or let into the

frame of the door or window. A pin or bolt at the end of a rod, controlled by the latch or lock, slips into holes in this segment, and allows the door to be held securely fast in any position.

18,323, Sen-walls, &c. D. Nicoll.

This specification relates to an improvement in the form of slabs or blocks of concrete previously patented. The blocks are moulded while in a plastic condition, and perforated by an iron column or columns when they are required to be extra strong. This also prevents the blocks from shifting from the tenon and mortise formation provided for the completion of the structure.

1,960, Door-plates. F. Boffa.

By this invention, zinc door-plates are cast with the number plainly shown in the centre, and around the border inside is formed in raised letters the name of the street or square, to facilitate reference.

NEW APPLICATIONS FOR PATENTS.

April 21.—5,995, J. Goodman, Wash-out Closets.

April 22.—6,063, W. Silcock, Fastenings for Windows.—6,080, J. Ward and C. Griffiths, Water-Exp. Filter.—6,085, E. Edwards, Supporting Windows and other Sashes.—6,088, E. Brook, Kins.—6,089, J. Eckerley and Others, Discharge Valve Apparatus for Water-closets, &c.—6,137, S. Pitt, Raising and Lowering Window-sashes, &c.

April 23.—6,147, A. Drummond, Glazing Structures.—6,151, W. Clark, Stoves and Fireplaces.—6,171, J. Montgomerie, Scaffolding.—6,174, W. Thomson, Door Knobs and attaching same to Spindles.—6,183, F. & A. Widner, Flushing Cisterns, &c.—6,187, A. Overend, Greenhouses, &c.—6,196, W. May, Glazed Bricks and Tiles.

April 24.—6,226, T. Street, Flushing Sewers and Drains.—6,231, A. Fielding, Ovens or Kilns.—6,237, T. Jones, Window Sashes, &c.—6,265, C. Orr, Door-closing Apparatus.

April 25.—6,283, W. Tanner, Domestic Fire-places.

April 26.—6,358, T. Maggeon and J. Hadfield, Chimneys, Chimney-tops, and Ventilating Buildings.

PROVISIONAL SPECIFICATIONS ACCEPTED.

3,221, W. Hawkins, Flushing Apparatus for Water-closets.—3,418, J. Dean, Water-closets.—3,533, A. Clark, Fairlight Fastener and Opener.—3,763, H. Horsey, Glazing Windows, &c.—3,793, E. Carniss, Brick Moulds or Dies.—3,974, J. Hart, Nails, &c.—4,069, W. Conway, Brick for building purposes.—4,462, J. Bartlett, Ventilators.—5,096, O. Wagner and E. Howard, Window Fastener.—5,113, H. Besson, Bevelling Glass.—5,129, J. Plumridge and others, Band Saw Guides.—5,475, A. Booth, Sawing Machines.—5,514, J. Pride, Cow or Ventilator.—5,581, G. Skelsey, Kins.—5,600, H. Marsden, Nails.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

3,756, W. Dowland, Plane-iron for Carpenters.—7,001, B. Mitchell, Scouring Door in any desired position when open.—8,111, W. Hassall, Fire-places for Heating Pottery, &c.—4,219, G. Engel, Decorating Doors, &c.—4,678, H. Hinckley, Indicators for Doors.

RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

April 16.—By WYATT & SON (at Chichester). Chichester—E. house and shop in George-st. £145

April 22.—By WILKINSON, SON, & WELCH (at Brighton). Findon, Sussex—The f. residence "Homecroft," and 4 acres £1,910

ottage and 14. r. 29p. £270

Land, 41a. or. 8p. in lots, &c. £1,290

April 23.—By H. SCUTTON.

Clapton, Chatsworth-rd.—F. g. r. of 41a. reversion in 83 yrs. 475

Rhurton-rd.—F. g. r. of 44a. reversion in 83 yrs. 810

By SIMMONS & SOXS.

Henley-on-Thames, near—Two plots of f. land .. 430

Caversham—Two plots of f. land .. 860

By WALFORD & WILKIN.

Beckenham—77, Cope's-rd., u. t. 75 yrs., g. r. £8, 10s., r. £75

King's Hall-rd.—The residence "Ardwell," u. t. 74 yrs., g. r. £6 .. 1,090

By H. V. CHEW.

Poplar—14 to 17, Stattendale-rd., n. t. 82 yrs., g. r. £16 .. 250

1 to 4, Stewart-ter., u. t. 58 yrs., g. r. £26 r. £72 11s. 280

By MOKES & MOKES.

Idlington—45, Freeling st., u. t. 64 yrs., g. r. £6 .. 290

Finsbury park—77, Lothair rd. North, u. t. 87 yrs., g. r. £8, 6s. 215

By W. LEVENS.

Beckenham, The Avenue—"Downs House," and 24 a., u. t. 74 yrs., g. r. £58 .. 1,100

By E. HOLSWORTH.

Stoke Newington—153, Evering-rd., u. t. 90 yrs., g. r. £8, 10s. 525

By EASTMAN BROS.

Forest Hill, Tyson-rd.—"Tyson House," u. t. 80 yrs., g. r. 16s. 1,750

Dartmouth Park—"Brunswick House," u. t. 70 yrs., g. r. £21 .. 490

By DYER, SON, & HILTON.

Blackheath—29, Kidbrooke-rd., u. t. 73 yrs., g. r. £2 .. 2,700

By FURBER, PRICE, & FURBER.

Regent's park—16, Chalcut cres., u. t. 61 yrs., g. r. £26 .. 400

Dorset-st.—49, Balcombe-st., u. t. 90 yrs., g. r. £11, r. £60 .. 600

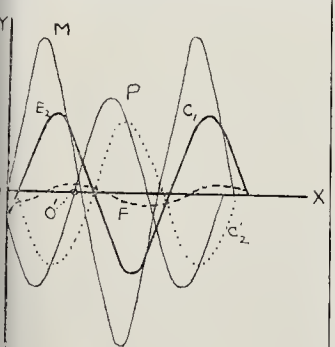


Fig. 57.

the primary and secondary coils respectively, reproduce as P, fig. 57, the curve S, fig. 55, multiplying the ordinates, however, by the

* The maximum height of a curve of sines is $\frac{\pi}{2}$ times its mean height.

St. John's-wood—30 and 32, Ordinance-rd., u.t. 45 yrs., g.r. £16, r. £83. 4763

Kentish Town—12, 13, and 14, Castle-pl., u.t. 45 yrs., g.r. £13. 10s., r. £67. 480

Islington—43, College-st., u.t. 25 yrs., g.r. £7, r. £32. 210

Westbourne-grove—2 to 8 (even), Chepstow-pl., u.t. 53 yrs., no g.r., r. £176. 2,400

Notting-hill—75, Tlarendon-rd., u.t. 46 yrs., g.r. £12. 10s., r. £55. 378

By DERRIHAM, TAYSON, & CO.

Enston-rd.—Nos. 251 and 253, and 7, Beaumont-pl., f. 9,500

Tufnell-park—20 and 28, St. George's-avenue, u.t. 77 yrs., g.r. £14. 15s., r. £90. 1,025

54, Huddleston-rd., u.t. 77 yrs., g.r. £7, r. £48. 1,350

Brighton, Dyke rd.—No. 2, Belmont, f., r. £50. 2,500

No. 3, Belmont, f., r. £101. 3,000

No. 5 and 6, Belmont, f., r. £175 p.a. 3,000

APRIL 30.—By H. DANN.

South Darenth, Kent—F. residence, and 11 a. 2 r. 39 p. 3,200

A plot of f. land, 1 a. 0 r. 30 p. 200

A plot of f. land, 2 a. 1 r. 30 p. 200

By R. TIDEY & SON.

Kingsland—1 and 3, Buckingham-rd., u.t. 27 yrs., g.r. £9, r. £70. 675

11 and 49, Englefield-rd., u.t. 31 yrs., g.r. £7. 10s. 485

Moxton—74 and 76, De Beauvoir-cres., u.t. 13 yrs., g.r. £5. 2s., r. £56. 150

By W. N. WILLOUGHBY.

Bickley, Southborough-rd.—"Home Lea," f., r. £110 p.a. 2,200

By FLOOD & SOSS.

Paddington—18, 19, and 20, Harrow-st., u.t. 29 yrs., g.r. £54, r. £90. 380

By ARBER, REPTER, & WAGHORN.

Paddington—1, Beaumont-st., u.t. 28 yrs., g.r. £15, r. £90. 825

By F. J. BISLEY.

Deptford—6 and 7, Windmill-la., u.t. 43 yrs., g.r. £4, r. £45. 10s. 300

By ELLIS, MORRIS SUPERBLAND, & CO.

Clapton—Residence, "Helskeldingh," u.t. 42 yrs., g.r. £6. 6s. 370

Lewisham—50, Breakspear-rd., u.t. 84 yrs., g.r. £11. 1,215

By DRAYTON & SON.

Ashington, Sussex—"Church Farm," 156a. 1r. 2p., f. 3,500

MAY 1.—By REYNOLDS & EASON.

East Ham—5, Grove-villas, u.t. 37 yrs., g.r. £3. 250

Brixton—25, Anstey-rd., u.t. 83 yrs., g.r. £7, r. £32. 330

By NEWBON & HARDING.

Anerley—7, Station-rd., f., r. £35. 335

Hornsey—17, Westfield-rd., f., r. £45. 400

Winton—18, Copenhagen-st., f., r. £45. 450

Notting-hill—29, 39, 41, and 43, Rackham-st., u.t. 84 yrs., g.r. £2b, r. £157. 700

Holloway—1, 2, and 3, Manor-mews, u.t. 57 yrs., g.r. £2, r. £20. 280

By MARLER & BENNETT.

Chelsea—6 to 9, Little Smith-st., u.t. 3 yrs., g.r. £45. 75

By FOSTER & CRANFIELD.

Streakham, High-st.—"Glenclon House," u.t. 75 yrs., g.r. £28. 1,800

MAY 2.—By HORNE, SON, & EVERSFIELD.

Marylebone—51 and 52, Crawford-st., u.t. 17 yrs., g.r. £70, r. £160. 600

Peckham—5 and 6, Sturdy-rd., u.t. 75 yrs., g.r. £8, r. £45. 10s. 300

By BEARD & SON.

Bayswater—18, St. Stephen's-rd., u.t. 65 yrs., g.r. £15. 850

Paddington—7, Hasborough-st., u.t. 68 yrs., g.r. £7, r. £60. 635

[Contracts used in these lists.—F. r. for freehold ground-rent; l. r. for leasehold ground-rent; i. r. for improved ground-rent; g. r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e. f. for estimated rental; u. for unexpired term; p. a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

sider the Report of the Special Committee on Education, &c. 7.30 p.m.

Royal Institution.—Professor R. Meldola, F.R.S., on "The Photographic Image." 9 p.m.

SATURDAY, MAY 17.

Royal Institution.—Dr. Charles Waldstein on "Recent Excavations in Greece." II. 3 p.m.

Association of Municipal and Sanitary Engineers and Surveyors.—Midland Counties' District Meeting at Hereford.

Miscellanea.

Breakwater Construction.—At a meeting of the Society of Engineers, held at the Town-hall, Westminster, on Monday evening, May 5, Mr. Henry Adams, President, in the chair, a paper was read by Mr. F. H. Chesewright, Assoc. M. Inst. C.E., on "Breakwater Construction." The author touched upon the origin of breakwaters, showing that the earliest system employed in their construction is virtually the system in use at the present day. He then described some of the modifications that have taken place, and briefly demonstrated the inefficiency of this system by pointing out some of its most salient defects. This was followed by a short descriptive account of some of the typical breakwaters of the world, both at home and abroad, with a view to proving that even the best-constructed leave a great deal to be desired. Some expert evidence before Select Committees of the House of Commons was quoted as a further proof that up to the present day no perfect breakwater has been constructed, and that improvements in the direction of obtaining a vertical wall structure would lead to the best form of breakwater. The author then went on to show that all the suggestions of these eminent experts are embodied in the Lewthwaite System, which he fully described. It is claimed for this system that it produces a perfect vertical wall on any bottom; that it possesses perfect continuity, that most desirable of qualities in a breakwater; and that in cost it is cheaper by three-fourths than any other known system. In conclusion, the author pointed out the possibilities that lie in the adoption of this new system, not only in the construction of breakwaters, but also for the erection of deep-sea semaphores, probably the complete suppression of lightships, certainly the protection of our coast lines from the encroachments of the sea, and the erection of sea walls and docks. He believed that its utility for national purposes was very great in the construction of works which have hitherto been impossible, as, for instance, fortifying such places as Bombay, and constructing a harbour of refuge at Dover, the latter being a work which has defied the ingenuity of the greatest experts in breakwater construction.

Competition: Worcester Victoria Institute.—Mr. Waterhouse, R.A., the assessor appointed by the Corporation to advise them in their choice of plans for the Victoria Institute buildings, has completed his examination of the sketch plans submitted in the first competition, and selected six. Sixty-eight architects in all sent in plans, which were hung in the Council Chamber of the Guildhall for inspection by Mr. Waterhouse. The six selected are Messrs. John W. Simpson and E. J. Milner-Allen, Strand, London; Messrs. Smith, Woodhouse, and Willoughby, Manchester; Messrs. Theo. Moore and W. Henry White, Mile-End-road, London; Messrs. S. Salter and Adams, Russell-square, London; Messrs. F. C. Ryde and Bedford, Great George-street, Westminster, London; and Messrs. Walter Cook and G. H. Grocock, Cardiff. By the conditions of the competition 300l. is divisible among these six architects or firms, and they will be requested to submit detailed plans and specifications in a second competition, the date for completing these being fixed as July 31. The Council, guided by Mr. Waterhouse, will then make the final choice of plans for the buildings. Mr. Samuel Smith, the secretary, writes to the local papers:—"On behalf of my committee, I have asked the whole of the unsuccessful architects engaged in the first competition for permission to publicly exhibit their plans. A large proportion decline to give permission, and many who do give it, attach such conditions that it will be impossible to hold a satisfactory exhibition. Under the circumstances, therefore, the committee have no alternative left but to regretfully return the plans at once to their authors. In the final competition, however, care will be taken to exhibit to the citizens the whole of the plans then sent in."

Central London Electric Railway.—At the twelfth sitting of the Committee on this Bill, on Tuesday, Mr. Pember, Q.C., proceeded to reply upon the whole case on behalf of the promoters. He said that there had been six points put forward by the opponents of the scheme,—(1) engineering risks; (2) injury to tradesmen on the line of route; (3) interference with the subsoil; (4) the question of the feasibility of the system of electrical traction proposed, and (5) the working expenses incidental to it; (6) the chances of traffic if the line were once put into operation; and (7) the plea for postponement. As regards the damage to the subsoil, he would be willing to have a clause inserted in the Bill providing that the owners of any subsoil should be compensated under the 68th section of the Lands Clauses Consolidation Act, and as regards the other points, judged by the ordinary standard of Parliamentary proof, the evidence in favour of the scheme and the probabilities of its ultimate success were unusually high. The opposition to the scheme was intended to bring about the utter waste of all the time, money, and energy which had been expended upon its promotion, to say nothing of the disappointment and mortification to the promoters, or the discouragement which, by such action as rejecting the Bill, Parliament would throw upon legitimate enterprise directed to satisfy great public needs. The Committee, after having deliberated in private for about half an hour, found that the preamble had been proved, on the understanding that (1) a compensation clause should be inserted in the Bill similar to the one in the Midland Railway (Additional Powers) Bill, 1881; (2) that stringent clauses should be inserted affording every opportunity to the Engineers of the Corporation of London and of the County Council to inspect the works during their progress, lest any possible damage should be done to the city until the City and estimated capital of the company should be somewhat reduced; and (4) that until the City and Southwark Subway had been opened and used by the travelling public for a certain time, no prospectus should be issued or capital raised by the Central London Company. The Committee then adjourned until Tuesday, the 13th inst., for the discussion of clauses.—Times.

Properties for Sale.—1. Armathwaite Hall, covering nearly 2,000 acres, situated upon the banks of the river Eden, and lying in Wetheral parish, five miles south-east from Carlisle. Near to the priority ruins are some curious caves, known as St. Constantine's cells, excavated out of the cliff some 40 ft. above the river; being somewhat similar to the artificial caves at Hawthornden, on the North Esk. The parish church of Holy Trinity was restored in 1872-3, at the cost of the Dean and Chapter of Carlisle, under directions of Mr. R. J. Withers, architect. It comprises a chapel, which contains many monuments to the Howards of Corby. 2. The Calderwood Estate, in Lanarkshire, to which we adverted in a "Note" on September 1, 1888, has again been placed in the market, and will be put up for sale by public roup, at Edinburgh, on June 11 next. Long Calderwood is famed as being the native place of William Hunter and his brother John, anatomists. Near to Calderwood House are Bothwell Brig, Drumclog, and other scenes whose names are familiar to readers of "Old Mortality."

Slow-Combustion Stoves.—From that well-known firm Messrs. Barnard, Bishop, & Barnards (Limited), Norwich, we have received their illustrated price-list of registered slow-combustion stoves. Stoves of this type have many advantages, and in this list they are shown in every conceivable variety, and in forms suited to widely-differing needs. We may specially mention "The Norfolk" stove, which, though constructed on "slow-combustion" principles, is so arranged that air can be admitted from below if a more rapid combustion be required. It is provided with a fluted firebrick back, which overhangs the fire, and by becoming heated helps to greatly diminish the amount of smoke which passes up into the flue. It and the catalogue generally (which includes wood and marble fenders, tile hearths and splays, and mantels and over-mantels in wood and cast-iron) are well worth the notice of architects, builders, and building-owners.

The A.A. Lyric Club.—A *propos* of our notice in last week's issue, we are asked to note that the 22nd inst. is not a Monday, but a Thursday.

MEETINGS.

SATURDAY, MAY 10.

Royal Institution.—Dr. Charles Waldstein on "Recent Excavations in Greece." I. 3 p.m.

MONDAY, MAY 12.

Surveyors' Institution.—Mr. R. F. Grantham on "The Encroachments of the Sea on some parts of the English Coast, and the Best Means of Preventing It." 8 p.m.

TUESDAY, MAY 13.

Royal Institution.—Mr. Louis Fagan on "The Art of Engraving." II. 3 p.m.

Society of Arts (Applied Art Section).—Professor W. C. Roberts-Austin, F.R.S., on "The Use of Alloys in Art Metal-Work." 8 p.m.

Institution of Civil Engineers.—(1) Further discussion on Mr. S. W. Barnaby's paper on "The Screw-Propeller." (2, time permitting) Paper on "The Keswick Water-Power Electric Light Station," by Messrs. W. P. J. Fawcett and E. W. Cowan. 8 p.m.

WEDNESDAY, MAY 14.

The Royal Society.—Conversation. 9 p.m.

Society of Arts.—Dr. J. A. Fleming, M.A., on "Professor Elihu Thomson's Electro-Magnetic Induction Experiments." 8 p.m.

THURSDAY, MAY 15.

Royal Institution.—Professor Dewar, M.A., F.R.S., on "Flame and Explosives." II. 3 p.m.

Society for the Encouragement of the Fine Arts.—Lecture by Professor Lodge.

Institution of Electrical Engineers.—8 p.m.

Society of Arts (Foreign and Colonial Section).—Mr. C. Washington Eves on "Jamaica and its Forthcoming Exhibition." 5 p.m.

Society of Arts.—Mr. Lewis F. Day on "Design Applied to Wood-Carving." III. 8 p.m.

FRIDAY, MAY 16.

Architectural Association.—(1) Election of Officers. (2) Special Business Meeting (for members only) to con-

LONDON.—For road-making and paving works, Epirus-road, Fulham, for the Vestry of Fulham. Mr. W. Sykes, New Streets Surveyor:—
 Neave & Son, Paddington £850 0 0
 Rogers, Notting Hill 760 0 0
 Nowell & Robson, Kensington 720 0 0
 Jones and Wimpy, Hammersmith 620 0 0

LONDON.—For alterations to the "White Hart," Kennington, S.E. for Mr. E. Bore, Mr. Belle, architect, S. Railway-approach, London Bridge:—
 Fritchard £878 10 0
 T. Hooper 685 0 0
 J. Seale 514 0 0

LONDON.—For alterations at No. 35, Beaumont-street, W., for Miss Slodden. Mr. T. Durran, architect:—
 Parker £495 0 0
 Bovis 403 0 0
 Edgar 488 0 0
 Altchison 430 0 0
 Clifton (accepted) 420 0 0

LONDON.—For the construction of a beer-cellar at the Cobden Club, Kensal-road, for the proprietors. Mr. J. W. Gracie, architect, Shepherd's Bush:—
 Williams & Richards £285 0 0
 Ransom & Co. 230 0 0
 R. Seed 220 0 0
 Scrafield 200 0 0
 Sweetland 194 0 0
 Oldrey (accepted) 185 0 0

LONDON.—For alterations and additions at Nos. 42 and 43, Cranbourne-street, Leicester-square, to adapt the premises for an Electric Testing Station, for the London County Council:—
 W. Buckenidge, Kensington £694 0 0
 * Accepted.

LONDON.—For alterations and additions to the General Post Office, St. Martin's-le-Grand, for H.M. Office of Works. Mr. Henry Tanner, architect:—
 W. Buckenidge, Kensington £2,340 0 0
 * Accepted.

LONDON.—For repairs and painting at London Salvage Corps Station, Commercial-road, E.:—
 John Greenwood (accepted) £376 0 0

LONDON.—For additions to 201, King-street West, Hammersmith, for Mr. C. A. Bond, Mr. William Hunt, architect, 5, York-buildings, Adelphi, W.C.:—
 J. Mears £562 0 0
 C. Wall 557 0 0
 S. Knight 510 0 0
 J. Freeman (accepted) 463 0 0

LONDON.—For sanitary improvements at 91, Lancaster-gate, Hyde Park, W. Messrs. N. S. Joseph & Smith, architects, 45, Finsbury-pavement, E.C.:—
 Phillips & Son £493 15 0
 Hearn & Co. 397 0 0
 Vane Bros. 254 0 0

NORWICH.—For erecting Bull Close-road Girls' School, for the Norwich School Board. Mr. John H. Brown, architect and surveyor, Cathedral Offices, Norwich:—
 Leggett, Yarmouth £4,440 0 0
 Fye, Norwich 3,990 0 0
 Haves, Norwich 3,890 0 0
 H. Lacey, Norwich 3,883 0 0
 Youngs, Norwich 3,883 0 0
 Wilkin, Norwich 3,809 0 0
 Seales Bros., Norwich 3,790 0 0
 Chapman & Son, Norwich 3,674 0 0
 Bennett (corrected), Norwich 3,642 0 0
 Ellis & Betts, Norwich* 3,660 0 0
 Smith & Watling, Norwich* 3,352 0 0
 * Provisionally accepted. † Withdrawn.

SEVENOAKS.—For levelling, metalling, kerbing, channeling, tar-paving, and the construction of sewers and storm-water drains, in Bayham-road, for the Sevenoaks Local Board. Mr. Jabez Mann, surveyor:—
 Freeman, Otford, Sevenoaks £1,034 0 0
 Osenton, Westerham 1,006 0 0
 Jackson, Forest Gate, E. 975 9 5
 Freeman, Swanley 808 3 11
 Porter, Lower Clapton 808 3 11
 Hulson, Crouch End, N. 829 9 9
 Hes, Wimbledon 798 6 11
 (Surveyor's estimate, £811.)
 * Accepted according to schedule of prices.

RIDDLEDOWN (Surrey).—For decorations, tile-heards, parquet-flooring, &c., at "Little Roke," Riddledown, Surrey, for Mr. P. Carle Smith:—
 Robert Eddie, Fyndale-place, Upper-street, Islington (accepted) £729 0 0
 (Forming new cellars, &c., at schedule of prices.)

SALISBURY.—For alterations and additions to the stables and coachman's cottage, Cowesfield Dean, Salisbury, for Mr. W. Lawrence, Mr. E. Carle Smith:—
 Crook & Sons, Southampton £1,347 0 0
 * Accepted. (Lowest of five invited.)

TAVISTOCK.—For additions to Kelly College, Tavistock. Mr. H. J. Snell, architect, 8, Courtenay-street, Plymouth:—
 T. Higman, Tavistock £8,734 0 0
 J. Finch, Plymouth 6,500 0 0
 J. J. Marshall, Plymouth 6,555 0 0
 G. Shellabear, Plymouth 6,270 0 0
 J. P. Berry, Plymouth 6,230 0 0
 Tozer & Son, Plymouth 5,534 0 0
 Laphorne & Goad, Plymouth 5,804 0 0
 Palk & Partridge, Plymouth 5,500 0 0
 Fethick Bros., Plymouth 5,740 0 0
 P. Blowey, Plymouth 5,650 0 0
 A. R. Debnam, Plymouth 5,640 0 0
 Reed, Blight, & Co., Lim., Plymouth 5,456 0 0

THORNTON HEATH (Surrey).—For the erection of a pair of semi-detached villa residences, for Mr. Robert Allen. Mr. Thos. Moody, architect, 35, Craven-street, W.C.:—
 Smith & Sons, Norwood £2,388 0 0
 J. W. Falkner, London 2,253 0 0
 Smith & Bull, Croydon 2,259 0 0
 G. E. Bryan, Norwood 2,154 0 0
 A. M. Deacon, Norwood 2,129 0 0
 E. J. Saunders, Croydon 2,010 0 0

TODENHAM.—For new wing and alterations at Todenham, Gloucestershire, for Sir Pery Van Notten Pole, Bart. Mr. Guy Dewber, architect, Bourton-on-the-Hill, Moreton-in-Marsh:—
 Groves, Milton-under-Wychwood £1,388 0 0
 Atwood, Brailes 1,350 0 0
 Eaton & Son, Gloucester 1,270 0 0
 Wiltshire, Swindon 1,240 0 0

(Lists of tenders for works at Camberwell and Deptford inadmissible, as sender did not enclose his name.)

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TO CORRESPONDENTS.
 F. R. M. (next week).—B. & Son (too late).—E. G. (ditto).—Not desired.—A. E. C. (we sympathize very much with you, but have repeatedly pointed out the dangers of such applications;—will consider the second case).—A. C. (no space).
 Note.—The responsibility of signed articles, and papers for 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.
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The Builder.

Vol. LVIII, No. 247.

SATURDAY, MAY 17, 1890.

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Altars in the South Aisle, Church of St. Victor, Xanten, Germany.—Drawn by Mr. H. W. Brewer	Double-Page Photo-Litho.
New Buildings for the Metropolitan Life Assurance Society.—Mr. Aston Webb and Mr. E. Ingress Bell, Architects	Double-Page Ink-Photo.
Design for Decoration of a Bedroom in a Country House, by Professor Atchison, A.R.A.	Double-Page Ink-Photo.
Chapel of St. Mary of Nazareth, Edgware.—Mr. James Brooks, Architect	Single-Page Photo-Litho.
New Organ-Case, St. John's College Chapel, Cambridge.—Mr. J. Oldrid Scott, Architect	Single-Page Photo-Litho.

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The Future of the Architectural Association.

THE meeting of the Architectural Association on Friday evening of the present week has been fixed for the discussion of the educational scheme recommended in the Report of the Special Committee appointed to inquire into the educational methods of the Association; and although this issue of the *Builder* is formally dated on the day after that, it will, of course, actually be published before the meeting, and cannot include any report of or comment on the proceedings and on the conclusions that may be arrived at. We rather desire to support beforehand the conclusions at which we hope the meeting will arrive.

The institution of examination for entry to the ranks of the Institute, and the success which has so far attended that movement, has no doubt had its influence in leading the Architectural Association to consider its position, and in suggesting the idea that the system of education by voluntary aid which has been hitherto kept up in the Association should be developed and systematised on a larger scale and with the assistance of a regular staff of salaried professors. But even without this stimulus, it is probable, as we suggested the other day, that the Association would find itself compelled before long to make some such change as that which is now suggested. Institutions which are conducted by voluntary work come naturally and almost invariably to one of two positions: either the voluntary labour flags by little and little and the institution decays; or it succeeds and enlarges its numbers and increases the complication of its working until it arrives at that stage when it is felt that the voluntary labour required to keep it going constitutes a greater task than ought fairly to be laid upon those who have their own labour to carry out for their own living. Hence voluntary effort, though it is an excellent method for the inauguration and for the earlier years of a society of this kind, must of necessity be only a temporary system: if it does not answer it comes to an end naturally; if it is successfully carried out, it creates a task beyond its own powers to cope with continuously. We look on it therefore that the Architectural Association

could not in any case have avoided the critical turning-point to which it has now come, though other circumstances combine to render the present moment a peculiarly suitable one for entering on what may be called a "new series."

It was at a meeting of the General Committee of the Association held on June 21 of last year that it was resolved "that a Sub-Committee be appointed to consider what alterations, if any, in the methods and working of the Association would improve its usefulness as an educational body"; the members appointed being Messrs. Baggallay, Collard, Farrow, Fleming, Gale, Millard, Pryce, Slater, and Stokes. The first step which the Sub-Committee took was to get a formal statement from the Institute as to whether it entirely abrogated any idea of acting as a teaching body; a question, as already observed, to which they had some difficulty in obtaining a direct answer, not because there was any doubt about the matter within the ranks of the Institute, but because there seems to exist in the official regions of the Institute a certain inability or objection to give plain answers to plain questions. As we have always maintained, the Institute was never constituted to be a teaching body, and could not become one on any scale which would be worth anything, except by entire reconstruction,—including, perhaps, even the necessity of obtaining yet another charter. The position of the Association, on the other hand, is that it was originally formed as a body for mutual help and advice, which has gradually developed into a system of what may be called mutual instruction, in which the older members teach the younger ones. This system has gradually extended into a number of classes for various branches of work in connexion with architecture, and the great step now proposed is to further organise a complete system of architectural instruction on the basis of that at present carried on, but in a more regular manner and with some important additions.

The question of funds is of course at the basis of every attempt of this kind. The first thing to be done is to engage a salaried secretary. The educational scheme proposed must immensely increase the secretarial work, which is already so heavy that we have heard that those who have undertaken it as honorary officers have said that they would never have done so had they been aware of the extent of the burden they were taking on themselves. This is only one among various increased expenses which would be

entailed in carrying out the new scheme; and as one method of meeting these the report proposes that the annual subscription should be raised from half a guinea to a guinea, for town members. We are told that this is regarded by a certain number of members as a weak point in the report, and one to which opposition is expected. In that case the opponents will be acting a very foolish part. They cannot expect to have increased burdens thrown on the funds of the Association without an increased revenue to meet them; and the plain fact is that although the subscription of half a guinea was a very suitable one in the early days of the Association, when it was only a handful of professional friends meeting for discussion, it is an almost ridiculous one now, considering the advantages which it opens to members,—young students especially; and even if raised, as proposed, to a guinea, it will still be a very low one for the advantages offered, and it may be safely said that very few professional societies in the kingdom, of any denomination, offer their members so good a guinea's worth. The aggregate increase to income will be very considerable, the individual burden very small. There are few members who can pay half-a-guinea who cannot pay a guinea without feeling the difference very much. The suggestion, we believe, that many old members who can no longer attend the meetings or take part in the work of the Association, but who keep up their half-guinea subscription for old friendship's sake, would withdraw it if raised. We do not believe a sufficient number would do so to make any material drawback to the increase of funds; we should imagine the majority of old members would be interested in seeing the Association entering on a wider sphere of usefulness, and that they would be desirous to assist in the movement; we therefore regard this as a groundless apprehension, and we hope to hear that the guinea subscription has been duly passed at the meeting.

Of course this extra half-guinea from town members will not suffice to pay the staff of teachers and lecturers. This it is proposed to provide for by special fees to be paid by those joining the classes (which will not be obligatory upon any member), the Association collecting the fees and paying the lecturer either a fixed salary or a fee in proportion to the number of students attending his classes. We may suggest that a combination of the two methods would be the best; a certain

fixed salary as a backbone, and an addition in proportion to the numbers who attend. If a teacher is entirely dependent on students' fees for his remuneration he is apt to get nervous and too anxious about pleasing his classes, and is too much at their mercy. If his remuneration is entirely independent of the numbers who attend, he has not sufficient direct stimulus to make the lectures interesting to his students.

The scheme proposed in the Report contemplates making the Architectural Association a completely-equipped educating body for the architectural profession. It is proposed that the scheme of instruction should be arranged with special reference to preparing students to pass the Institute Examinations, but (as the Report more than once emphatically points out) not by any means limiting the course of study to what is required for those examinations. The system proposed is a dual one: a system of lectures and classes on the one hand, and a studio in connexion with the Association on the other hand, at which problems of design and construction may be worked out at the drawing-board.

Two or three points on which there may be differences of opinion enter into the discussion of this suggested system. One is as to the preference to be given for teaching by lectures or by class work. The Sub-Committee issued a series of queries on this and other points to various members of the profession whose opinion they considered might be of value, and we gather from the Report that they have been to some extent guided in their conclusions by the answers to those questions. In regard to this the Report says:—

"The next points for enquiry were the desirability of teaching in classes or by lectures, and by one teacher or by a body of visitors, for each particular subject. After considering the evidence given, we are of opinion that a combination of lectures and classes is preferable to either of those methods taken singly; and also that, as a general rule, instruction in any one subject is likely to be better imparted by a single teacher; but we consider that, for advanced students, the system of Visitors is in some cases preferable."

This is, on the whole, a sound conclusion. The value of lectures consists mainly in giving a general insight into a subject, and awakening the interest of the students in it; but we do not believe that details of a subject are really well learned from lectures; a few notes as to isolated facts may be taken, but the lecturer cannot find out the special difficulties of special students as he can in a class, nor drive home some special points which require further enforcing or illustrating. We are entirely in favour of a single teacher for each subject: successive "Visitors" have different views, and cannot carry out a continuous and logical system, as one man dealing with one subject can.

Another point to which the Report directs attention is as to the desirability of establishing day classes, especially at the proposed studio. The Report says:—

"We have also given our attention to the question of the establishment of day classes, recognising that there is, at present, a strong feeling amongst many, and especially the leading members of the profession, that architects should allow their pupils additional facilities for study during office hours. We feel that, if such classes were established, attendance at them would soon be accepted by the profession as part of the ordinary work of pupils. We therefore strongly recommend that classes of this description should be established as part of the work of the Association. But, as these classes could not be made a part of the regular course, at any rate at first, we suggest that they should be a repetition of the whole, or of parts of it."

In our opinion this is rather too half-hearted a suggestion. We regard it as of the highest importance that a portion of the day should be given by architects' pupils to that kind of theoretic training in classes which they cannot have in an architect's office, and that the necessity for this will have to be recognised by architects taking pupils into their offices, whether they like it or not, though we believe the best men will be willing enough to agree to it and thereby make it practically necessary for the rest to

follow their example. The relegation of such classes to evening work entirely must reduce their usefulness very much, both because the student must be to some extent fatigued and less able to give his best mind to the work than in the daytime, and because the available time is so much reduced. The report suggests that twelve hours a week is as much evening work as can be reasonably expected from a student. It is quite as much, and more than will be got from many. Social engagements have some claim on a young man, and it is better for him not to be entirely cut off from them, which twelve hours a week evening work would pretty nearly do. Besides, there is the alternative of a student taking up the Association classes and studio work entirely for a time, going into office routine afterwards. We strongly advise the Association to take the bull by the horns in this matter, and to make day-work a part of their course at once. If their educational system is so organised and carried out as to be a success in itself, they will find no difficulty about the day-time work, we are convinced. Those architects who grudge it to their pupils will find public opinion, both within and without the borders of the profession, too strong for them.

In regard to the relation of the proposed educational course to the Institute Examination, it is proposed that the Association course should be so arranged that students who have passed the Preliminary Examination of the Royal Institute may be able to acquire the information necessary to pass the Intermediate Examination in the two years allowed as a minimum in the Institute programme; and the information for the Final Examination in another two years; but that any student so desiring should be able to extend his studies over a longer period.

The following table of studies for first-year students gives an idea of the manner in which it is proposed to lay out the work:—

lectures or classes calculated at the rate of 2s. 6d. each meeting.

This is certainly a very full programme, instruction to be given for so low a scaled fee. It is recommended that the ordinary meetings, the sessional and vacation visit the annual excursion, the *A. A. Notes*, and the "Sketch-book," should be maintained as present. This would seem a matter of course, or the Architectural Association would cease to be itself; unless we put query as to the maintenance of *A. A. Notes*, the special value of which we have no fear, rather failed to appreciate.

The proposal that the library should be available in the day-time is included, and of course on our principle that the whole thing ought to be started on a day-time basis this would follow as a matter of course; but with it comes also the necessity of a salary for a librarian. The alternative of an officer who would attend to the lending-libraries of both the Institute and the Association hardly recommends itself as practical; but there is another suggestion which may be made: why should not the lending-library of the Institute, which is chiefly for the good of students, be merged in that of the Association, on terms to be agreed upon between the two bodies? This would be much better than having two lending-libraries in the same building. The Institute would have the reference-library, and the Association the lending-library, and the work of each department would be better concentrated.

If this programme, or anything like it, is agreed to and fairly started, the Architectural Association will assume a very important position as the first and only Architectural College of this kingdom, and may have a very important effect on the future education of English architects. Nothing definite has yet been formulated for enabling country members to participate in the advantages of the proposed curriculum, except that it

Curriculum.

(The subjects required for the Institute examinations are printed throughout between inverted commas.)

FIRST YEAR.

Time allowed: 3 evenings of 3 hours each every week = 96 evenings in the Session (of 32 weeks) for study in this year's course.
One evening a week to be spent in attending Lectures and Classes, and two in the Studio.

Existing Classes of the A.A. embodied in Curriculum.	Lectures and Classes to be given on 32 evenings, each Lecture or Class lasting 1½ hour.	Studio.	Existing Classes of the A.A. embodied in Curriculum.
Lectures on History of Architecture.	12 Meetings. "The orders of Greek and Roman Architecture, their origin, development and applications." "The several varieties of Classic Ornament."	Geometrical drawing of ancient examples. One example, at least, to be drawn from actual measurements. (8 Meetings for criticism of drawings.)	Elem. Class in Design, Sec. 2.
Lectures on Construction and Elem. Class of Construction.	16 Meetings. "The nature of Ordinary Building Materials" and "The Elementary Principles of Construction." 10 Meetings. "Plane Geometry applied to Actual Work:—Projection of Solids and Development of Surfaces."	Elementary Construction. Freehand drawing.	Elem. Class in Construction.
Lectures on Theoretical and Applied Mechanics.	4 Meetings. "Elementary Physics as applicable to Building." (Mechanics.) 6 Meetings. The Rudiments of Perspective. 4 Meetings. "Mensuration." 6 Meetings. Chemistry 6 Meetings. Geology.	Plane Geometry applied to actual work. Perspective.	
Lectures on Geology.		Class for Sketching and Measuring (Saturday afternoons, as at present).	Class for Measuring and Drawing.

Other subjects added in the third and fourth years are Sanitary Science, Professional practice, Graphic Statics, Elementary Natural Philosophy (including Light, Sound, Hydrostatics, Electricity, &c.).

It is represented that the sum required to provide salaries for teachers would be raised, taking the probable number of students who would avail themselves, by a fee of five guineas a year for the lectures and classes, and five guineas a year for the studio, or ten guineas a year for the whole course. Members wishing to take up one or two subjects to be charged a fee for each individual course of

suggested that some portions of the class studies might be carried on by correspondence. But if the Association can carry out their spirited and ambitious programme, we should expect to find that one result would be that a good many country students, intending ultimately to start practice in their own neighbourhood, would come up to London temporarily to pursue their studies in the Architectural Association classes and studio. And this will be all the more likely to be so if the daytime work is made an integral part of the programme so that any man coming up for this course of

study can make the most of it in a given time. The whole educational move thus proposed for the Association is a very ambitious one, but in our opinion the more ambitious it is the more likely it is to be a success, and especially if it is laid out so as to be worth the attention of country students as a centre of architectural education for the whole kingdom. It is quite possible that it may become so: nothing short of that should be the aim.

THE TEMPLE OF DESPOINA AT LYKOSURA.

NO official report of the excavations at Lykosura, save for occasional notes in the *Δελτίον*, has yet been published. The following account we owe to the kindness of a member of the British School of Archaeology at Athens, who recently visited the site:—"The temple of Despoina at Lykosura lies high up in the mountains Tetraisi. To the north-west rises the summit of Mount Lykaon, which is connected with the earliest inhabitants of the land, and the human sacrifices to Pelagian Zeus. High above it is the Acropolis, a mass of bare rock, with parts of its walls still preserved. The village of Stala, where the excavators lived last summer, is at some distance to the north. The road, or rather mountain path, by which one reaches the temple, passes through extraordinarily grand scenery. After the crossing of the Alpheios, which is here very shallow and not so rapid as its tributary the Helisson, it winds upwards round hills and through deep gullies furrowed out by torrents and rocky slopes. The hills are covered with oaks; the 'acorn-eating men of Arcadia' (*Βαλανοφάγοι Ἀρκάδες ἀνθρώποι*) would certainly here have found abundant food to their liking. Nearly all the way up the hills are vineyards and presses, and cultivation goes on in patches between the rocks. About two hours after leaving the Alpheios one climbs up a slope, out of which trickles a fountain, and at the end of a ridge one comes upon a tree, near to which are the remains of the Chapel of St. Athanasius, which was entirely constructed out of the materials of the ancient temple. Running westward from this hill lines of foundations have been uncovered, which may be those of a stoa. Following these one reaches the Temple. It is built on a sort of platform, which was, no doubt, made, or at least widened artificially, at the side of the hill. On the north, beyond the heaps of earth thrown up by the excavators, is a steep slope downwards, and to the south the rock is seen above at a distance of about two yards from the line of wall. Immediately at the bottom is a great bank of earth. To the fall of earth from this steep slope we owe the preservation of the *Damophon* sculptures, to the importance of which attention has been already called in the *Builder*. At the back the rise is less steep, but just as evident. Thus there could be no question here of a peripteral temple, for there was no room.

The dimensions of the cella are but small. It consisted merely of an inner chamber with a pronaos and a row of columns in front,—*i.e.*, it is, technically, Doric hexastyle prostyle. All indications in the remains point to its being of a date not earlier than the fourth century B.C. The material is chiefly a local stone, rough in texture, blue-coloured with yellow veins. This is chiefly employed for the walls and floor. The columns, entablature and sculptures are of a marble which has a sparkling white grain, but when long exposed becomes a rich dark yellow on the surface. The temple is still only imperfectly cleared out, and heaps of earth lie about the floor, under some of which are buried the marbles that have not been yet transplanted to Athens.

Approaching from the east, one finds among the mass of materials that lie before the entrance two round bases, apparently *in situ*. Two steps lead up to the stoblate. Only two drums are still standing, *i.e.*, two at the south end, which were preserved from the seeker after building materials by the fall of

earth. The drum *in situ* at the south-east corner has two others close by which have evidently fallen from it. They are Doric, and just short of a meter in diameter. The pronaos behind was paved with local stone, and contained many votive bases with inscriptions, several of which remain. A doorway leads into the cella, the transverse wall on each side remaining, but better preserved to the south than to the west. The cella was paved with big, coarse red tiles, which lie for the most part in a heap in the centre. The *bathron*, as is known from the *Δελτίον*, filled almost the whole of the end of the temple. There is a space of only about 2 ft. between it and the north and south walls, and behind, certainly not more than 4 ft. The shape is peculiar: a long and lofty line, with a rectangular projection in the middle of the east side. The level of this wider centre is at present higher than that of the two sides; whether this was so originally is difficult to say. The higher level would suit the two seated and superior goddesses, in the centre, while the two accessory figures, Artemis and Anytos, would stand on a lower level at the two sides. The excavators alone could judge what the original level was; but, anyhow, the rough surface of the centre must have been covered by some smoother blocks.

At a distance of about a yard in front, and parallel with the *bathron*, runs across the temple a course of narrow blocks of the local stone, much covered by the uncleared rubbish. From a hole in the middle one of three that are visible together, one could conjecture that this served to carry a metal railing, by which, as in the case of the Zeus at Olympia, the worshippers were kept at a distance from the statues. Of the back walls there is visible a course of blocks, in which the greater part of their surface has not been dressed down to the level at the joinings, and above a projecting layer.

A curious feature of the cella is that in the south wall, quite close to the *bathron*, and facing the steep rock and the mass of fallen earth are remains of what must be called a doorway, as the side blocks seem to be certainly *in situ*. Possibly the worshippers, who came in through the pronaos, made their exit by this way, and left by the narrow passage (it must have been very narrow if it existed) running along the south side. This might be an arrangement to avoid crowding on festival occasions. The temple wall seems to stand on a single step, so far as the excavations have yet made the foundation visible. Among the *Abbris* one finds tiles of the entablature, and a corner of the pediment with an ornamental flower pattern on the cornice; but the greater part of the building material has been carried off, and only the lucky accident of the fall of the earth from the south slope has preserved for us the statues. For the finding of these every archaeologist owes a deep debt of gratitude to M. Leonardos, who carried on the excavations for the Greek Government."

Examination and Registration of Plumbers.

At the examinations of plumbers for registration, held at the Guilds Institute on Saturday last, there was a very satisfactory attendance of applicants, not only from London and the suburbs, but from Kent, Essex, Oxfordshire, Hertfordshire, Suffolk, Cambridgeshire, Salop, Berkshire, and Staffordshire. The examinations were such as to test the qualifications of the applicants in both the practical and theoretical branches of their craft, each applicant being required to execute a given amount of manual work, such as joint-making, pipe-holding, lead-laying, &c., besides answering a number of questions relating to the properties and qualities of the various materials used by plumbers, external and internal construction, sanitary arrangements, and water-supply. The examiners were Messrs. John Smeaton, J. C. Ashdown, G. Davis, J. W. Clark, C. T. Mills, and R. A. Nurse,—the last representing the United Operative Plumbers Association of Great Britain and Ireland. One-fourth of the masters and two-thirds of the operatives succeeded in passing the full examinations.

METROPOLITAN BUILDING LEGISLATION.

BY A DISTRICT SURVEYOR.

BUILDING legislation for London practically dates from 19 Charles II., cap. 3, 1667, the year after the Great Fire. That great calamity was the cause of all subsequent regulations of building, and the keynote is struck in the eloquent wording of the preamble to the Act of 1667: "Forasmuch as the City of London, being the Imperial Seat of his Majesty's Kingdom, and renowned for Trade and Commerce throughout the World, by reason of a most dreadful Fire lately happening therein, was for the most part thereof burnt down and destroyed within the Compass of a few Days, and now lies buried in its own Ruins; For the speedy Restoration whereof . . . and to the end that great and outrageous Fires (through the blessing of Almighty God), so far forth as human Providence (with Submission to the Divine Pleasure) can foresee, may be reasonably prevented and obviated for the Time to come, both by the Matter and Form of such Building; . . . Be it therefore enacted," &c., &c.

Section IV. of this Act directs the appointment by the City of one or more Surveyors to administer the Rules and Regulations, and as Sir Christopher Wren was appointed Chief Surveyor, he may fairly be claimed to be the Father of District Surveyors.

Mr. Slater, in his interesting paper lately read before the Institute, sought to prove that the time had come for new building legislation for London; complained of the insufficiency and arbitrariness of the present Building Act of 1855, and also of the way in which it is administered; and further laid down the lines upon which a new Act should be drawn. If we are to support him in this laudable effort, let us first of all endeavour to sum up our experience gained during the last 223 years. Between the years 1667 and 1855 sixteen Building Acts have been passed, and if examined *seriatim*, it will be seen that there is a tendency throughout to eliminate all those detailed regulations which Mr. Slater now wishes to re-introduce and to amplify. The Act of 1667 regulates the formation and width of streets, the "rates" (heights) of the building to be erected therein according to the widths of the streets, the sewerage of these streets and buildings, and finally "the proportions and scantlings for stories, walls, and timbers." Timbers here include girders, lintels, binding joists, joists, plates, and roof timbers, down to laths for plastering. This is certainly "detailed legislation."

Then follow the Acts of 1707, 1708, 1724, 1760, 1764, 1765 (two Acts, cap. 27 and cap. 37), 1772, 1774. The last-mentioned (14 Geo. III. c. 78) remained in force down to 1844. Truly the eighteenth century devoted great attention to the subject of building legislation.

In the present century we have the Act of 1844, which was in turn superseded by the Act of 1855, now in force throughout the Metropolitan area as defined by the Local Management Act of that year.

There were two unimportant Acts passed in 1810 and 1840, but they need not be further referred to here.

Now, if we turn to the Act of 1844, we find that it embraces and endeavours to legislate for nearly all the various matters referred to by Mr. Slater as subjects urgently needing legislative control at the present time. In short, the preamble of the Act of 1844 may be said to form a synopsis of Mr. Slater's legislative reforms of 1890. "The Improvement of Drainage, the Narrowness of Streets, the Ventilation of crowded Neighbourhoods, the use of Buildings unfit for Dwellings, the regulation of dangerous and noxious Manufactures, the diversity of practice among District Surveyors, making it expedient to provide them, under certain checks and control, a Discretion in the relaxation of the fixed Rules;" all these important matters the

Act of 1844 sets itself out to remedy and control with a complacent self-assurance worthy of the present young German Emperor himself.

But with what result? That in eleven years it was swept away, and the lean, abbreviated, unassuming Act of 1855 was substituted, an Act which has the air of a man who has come down in life, the dilapidated appearance of a "hanger-on" of police-courts. It is really an Act which gives just so much control over buildings as may insure a certain minimum of stability and the prevention of the spread of fire.

Mr. Slater says, "Both streets and buildings should be dealt with in one Act." This is clearly a mistake. The local management of London by its Vestries as constituted under the Act of 1855 is not perfect; but while this Vestry system exists (and it will not be lightly done away), the control of streets, with their cleansing, paving, lighting, and sewerage, naturally appertains to these Vestries; they only require such general control as may insure greater uniformity of system in their respective parishes. But it may be safely said that few, if any, provincial towns are better administered than any one of the London parishes; and if the comparison is made, that none of the borough municipalities do their work so economically.

With respect to building legislation proper, it is most important, as Professor Roger Smith says, that a Building Act should be definite in its rules, and as these have to be generally applicable to many classes of buildings over the whole Metropolitan area of 117 square miles, it is manifestly supremely difficult to frame such detailed regulations as may be universally workable; certainly for every ounce of detail you must allow a pound of discretion in administration, otherwise another dead-lock will ensue, as previously occurred in 1850. This can be provided against by correcting the defects in the machinery provided by the Act of 1844. No one who has had experience in administering the present Building Act would care to have thrown upon him singly that invidious "discretionary power" which Mr. Slater wishes to confer upon the District Surveyor. But the Metropolis might be divided into, say, six provinces (three on the north and three on the south side of the Thames), each province having two official referees appointed to consider any Building Act applications brought before them, assisted by the Surveyor for the District in which the building is to be erected. Such a tribunal sitting once a month could rapidly and effectively decide whether and how far any owner or builder should be allowed to depart from the strict rules of the Act, a right of appeal to a higher tribunal being reserved for those who thought the matter decided against them of sufficient importance for such appeal. With these exceptions, it would be the duty of the District Surveyor to see that the precise regulations of the Act were complied with; his hands would be greatly strengthened by the simplicity thus secured, and the desideratum of greater uniformity of practice would be attained.

But no reform or extension of building legislation will be of the slightest use unless at the same time an entirely new and competent tribunal is constituted to decide Building Act cases. Only a British Parliament could seriously relegate such cases to those Gallios, the police magistrates. Some of them so dislike administering the Act that they always decide against the District Surveyor, if possible, in order to discourage him as much as they can from appearing before them. Others appear to regard a jerry-builder as they do a cabman summoned before them by the police—that is, that the defendants in both cases are to have every possible chance of a decision being given in their favour. The magistrates do not appear to realise that the District Surveyor has no personal interest whatever in the matter at issue, and only appeals to their courts as a last resource, when all other means to amend the evil complained of have failed. This is

the secret of much of the diversity of practice among District Surveyors; it being frequently wiser to overlook faults here and there, than to take action before certain magistrates only to get an adverse decision; for that decision gets widely known in the particular district, discredits the Surveyor in his efforts to carry out his duties, and makes a bad precedent, of which other builders are only too ready to take advantage. The police magistrates are responsible for much of the jerry building which exists.

Two courts (one for each side of the Thames), each consisting of a barrister, assisted by two architects as assessors, sitting three days a week, could dispose, with practical and consistent decisions, of all Building Act and "Dangerous Structure" cases, and also of all the appeals upon special applications before referred to. One great advantage to the whole community of these double tribunals would be an immense saving of time; another would be the doing away with the necessity for all "By-Law" Regulations. Only those who have had experience in administering the existing By-Laws under the Amendment Act of 1878 can realise what a hopeless tangle they make, frequently rendering proceedings under them abortive, and consequently mischievous in their futile results.

The limitation of the height of buildings is a very difficult question, and will become more difficult in the future. The growth of the area of London has long been a subject of anxious consideration, and is an admitted evil. There is but one solution of the difficulty, and that consists in concentration. That solution is already being attempted by the erection of dwellings one above another over the same site; it is a necessary and economical consequence from the increased and increasing value of metropolitan land. How far, then, should Legislation interfere with this development of concentration, if one may be excused the paradox?

Sanitary experts, so called, say it is unhealthy to live in a street where the buildings are higher than the width of the roadway; but how much nervous disease and brain pressure are caused by the stampede of millions of Londoners from the suburbs to the business centres in the morning, and the stampede back again in the evening? To the true auditor of the Public Health Bill there is a debtor as well as a creditor side in this account.

The only sound basis of any limitation of height should be that of safe escape in case of fire; and it is a matter of regret that the Institute of Architects, as representing a body of scientific builders, should have supported any mere arbitrary limitation, instead of consulting together to provide that safety by scientific construction. In America, architects devote their talents and energies to the erection of buildings over 300 ft. high. Why should English architects be content to fetter their abilities by prohibitive legislation? Forth Bridges, Severn Tunnels, and Eiffel Towers would never be carried out if engineers were not animated by a much more independent spirit.

Finally, it must be borne in mind, as Professor Aitchison points out in his strong, common-sense, and practical "Remarks," that all these reforms and regulations will result in a question of "adequate rent," and that Mr. Slater's ideal London, "the best arranged, best built, most sanitary, and generally most magnificent city in the whole world," will be a luxury that will have to be paid for, like all the other good ideals of modern Socialism.

We are not, therefore, to hold our hands from reform, and join the "laissez faire" school, but we shall better adapt our means to our end, if we fully realise what that end will be.

PERCY HUNTER.

Board Schools, Harlesden.—Mr. J. Martin Brooks, of London, has been selected as architect for the new Board schools at Harlesden, in a limited competition.

NOTES.



COLONEL RICHI'S report to the Board of Trade on the accident at Carlisle, along with the detailed evidence which we now have for the first time, shows how delusive in such cases are the reports of evidence as published by the newspapers. Colonel Rich's report is almost contradictory of the verdict of the coroner's jury, and no one reading the detailed evidence and who can appreciate the points of it, will doubt that Colonel Rich's conclusion is in the main correct, though there may be room for difference of opinion on one or two points in it. The coroner's jury acquitted the driver of all blame, and only attacked the Company for having an unreliable brake; and we stated that on the published evidence we could see no blame attaching to the driver. Colonel Rich concludes that the accident was the driver's fault, though he mitigates his verdict by the remark that it is calculated to puzzle a driver at a critical moment that there should be two treatments of the vacuum brake, one "simple" and one "automatic," both worked by the same lever (backwards for "simple" and forwards for "automatic"); and as it appears that the breaks have to be set on each carriage for one or the other action by previous arrangement before the train is started, the recommendation that the company should as soon as possible do away with this dual system and adopt the automatic brake only certainly comes with additional force on reading this evidence. The driver, in his anxiety to do something to stop the train, pulled back the lever, which put the steam brake on the engine and "simple vacuum" on the carriages, but as the latter were set for automatic vacuum, the only effect of this was to take all brake-power off except the guard's hand-brake. But the main point of the detailed evidence is in the fact that there is a rule (as we said there ought to be) that trains must always approach terminal stations (or those which are classified with them, of which Carlisle is one) at such speed that the train could be brought to a stand at the proper place by the ordinary hand-brakes only. The driver, according to his own evidence, tested his vacuum brake at the proper place, and finding it wanting, tried to get up a vacuum and pulled the vacuum brake about in a confused endeavour to make it do something, all which time the train was getting nearer to the point of danger with little reduction of speed; had he at once abandoned it and whistled for the hand-brakes he would, if he was at the distance from the station which he states, have pulled up with them. A still more important point brought out in Col. Rich's report is as to the possible reason for the failure of the vacuum brake to act. We now learn from the evidence that two carriages were found with the wheels heated after the collision. Col. Rich considers that the driver having shut the small ejector at Shap Summit, when the train stopped, forgot to open it again. The office of this ejector is to keep up vacuum during the journey as against unavoidable leakage, and Col. Rich believes the vacuum had leaked away so far as to let down two of the blocks on the wheels sufficiently to cause friction, but not to stop the train on a falling gradient. "When the driver tested his vacuum at Wood Bank, there would be little or none in the pipe, he would feel no further check to his train than was already applied by the leaking on," and, as before said, he took off any power of working the brakes further by changing the lever to simple vacuum. There is nothing but circumstantial evidence for this view, but it accounts for the heated wheels of the two carriages mentioned, which does not seem to have been otherwise accounted for. Colonel Rich's moral as to this is that shutting off the small ejector at stations should be forbidden. It is only done, apparently, to avoid unnecessary noise from the engine while standing.

THOSE who look at the voting list for the Council of the Institute will be sufficiently surprised at one or two of the names included

in it, and there is nothing in the circular to draw attention to the fact that these persons have been forced on to the list under the powers of the by-law which admits of this kind of operation. It is for the general good, no doubt, that this power of making additions to the Council's list of nominees should exist: that it should be used to invite the suffrages of the voters for a member who has done all he can to injure the Institute, is a piece of assurance characteristic of the quarter from which it comes. It is desirable that those who wish the Institute, and the Council especially, to have the character of a society of artists and gentlemen, should not omit to record their vote for those who are likely to maintain its honour and dignity.

THE Railway Rates Inquiry is drawing to a close, the consideration of the classification being now at an end, with the exception of the hardware list. Lord Dalhousie and his colleague have not hesitated to state that, by taking the evidence of the traders and railway officials firsthand, they consider they have gained the necessary information far more satisfactorily than they would have done through the intervention of counsel. They have had direct evidence as to the nature of the traffic on the one hand, and the method of dealing with it on the other,— somewhat confusing at times, as we have before remarked, but still more to the point, and more intelligible perhaps, than if given under the direction of a legal prompter, with but a superficial acquaintance with the subject. Some traders have prolonged the inquiry by advancing claims which really appear preposterous. A representative of the glass trade, for instance, asked that plate-glass in 4-ton loads should be placed in Class B (which, it will be remembered, includes such traffic as g-iron and bricks). Lord Dalhousie naturally felt if the objector was serious in making his proposition, receiving a reply in the affirmative. Mr. Marshall Stevens has been examined at length upon his alternative scheme of classification, and he maintains that there is no reason why one scheme only, applicable to all railways in the United Kingdom, should not be submitted to Parliament. In evidencing the altered attitude of the traders to the terminals question, it may be noted that Mr. Stevens's proposal includes maximum station terminals and maximum service terminals,—the former item having previously been strenuously resisted. Another item in the proposal is for "maximum tolls," a term which has led to much misunderstanding in the past, and which might well be allowed to disappear from the new schedules possible.

THE Strand Improvement Bill came before a Select Committee of the House of Commons two days last week, and also on Monday and Thursday of the present week. The main struggle is as regards the question of "betterment," that is, whether some part of the cost shall be defrayed by a rent-charge on adjoining properties in proportion as they have benefited by the improvement. The issue of this improvement the promoters intend shall be assessed by an arbitrator. It will be more fitting to delay any expression of opinion on this subject until there has been time to consider the decision of the Committee. So far as regards the actual improvement, namely, the widening of the Strand by cutting away the south side of Holywell-street, there can be no difference of opinion as to its desirability.

THE Australasian colonies are not unanimous with regard to Mr. Goschen's tariff-reduction scheme. The Victorian Government is willing to adopt it, and New South Wales will probably concur. New Zealand, on the other hand, declines, and South Australia appears undecided. It is understood that the subject will shortly be discussed at a meeting of representatives of the Australasian colonies, when the dissentients perhaps are induced to reconsider their

decision. Mr. Hanniker Heaton's latest proposal in the way of postal reform is that the hour, as well as the date and place of collection, should be stamped on all letters passing through the post-office; and a memorial for presentation to the Postmaster-General in favour of the proposal has been largely signed in the House of Commons. This has long been done in America and elsewhere, and the additional information would doubtless often prove serviceable. If the suggestion is acted upon, it is to be hoped that the figures will be clearer than the date stamps upon railway tickets frequently are. A short time ago the return half of a ticket was presented at a station on one of the southern lines which the officials refused to pass on account of the date being indistinct,—compelling the holder to pay afresh for the return journey (the amount being subsequently recovered). Passengers are familiar enough with the warning that "change must be examined before leaving the booking-office, as mistakes cannot be afterwards rectified," but it would appear to be equally necessary for them to inspect every letter and figure on their tickets.

IN the current number of the *New Review* the Earl of Meath, sometime Chairman of the Metropolitan Public Gardens Association, discourses on "Lungs for our Great Cities," giving his impressions of the principal parks in the United States which he has recently visited. American (like English) cities are suffering from the overcrowding propensities of previous landowners, and have only recently become alive to the necessity of providing adequate breathing-spaces for their teeming populations; but the manner in which our cousins across the water are proceeding with this work, now that they feel its necessity, is somewhat different from ours. To take New York as an example: in addition to its "gardensque" Central Park, this city has recently acquired no less than five parks, of an aggregate area of nearly 4,000 acres, and at a cost of upwards of 2,000,000. These are, however, outside the city, and only at the present time are efforts being put forth to obtain open spaces in the heart of the city. For this purpose the State legislature has passed an Act "for the location, construction, and improvement of additional parks in the City of New York," whereby the Board of Street Opening and Improvement is empowered to condemn property and open as many parks below One Hundred and Fifty-fifth-street as they may think best. The Board has in consequence appropriated 2,000,000, to be expended during the next ten years in pulling down rookeries and "making air-holes in the crowded parts of the city." "It is to be hoped," says the Earl, "that our London County Council will take example from this energetic action on the part of New York. It would not be necessary for London to spend anything approaching the sum which New York is willing to find. There would be no necessity to pull down dwellings and purchase valuable land. Happily for London there are still over 200 disused burial-grounds closed to the public, and many neglected squares, in addition to a few spaces which are already laid out as gardens by private associations and individuals, who are desirous to extend their operations and to relieve the public of this heavy primary expense, if only the London Council will undertake to maintain the grounds thus laid out as gardens and playgrounds and open them to the public." As will be seen by our report on another page, the London County Council is now devoting itself to a consideration of this important question in its relation to the less-favoured portions of the metropolis.

WE presume Dr. Waldstein considers that he has on previous occasions sufficiently gauged the capacities of an afternoon Royal Institution audience, and that the first of his course of three lectures on "Recent Excavations in Greece," given last Saturday afternoon, was levelled for the assumed per-

ceptions of his hearers. This, however, is rather disappointing to those who went expecting to have a concise and connected statement of the results of recent researches, and had to listen to a demonstration of the objects of archaeological research, and a sketch of the career of Dr. Schliemann, and the means which he took to acquire languages and otherwise fit himself for his task, and an eulogy on his ability and energy, &c.; all of which (including the eulogy) is to be found in Dr. Schliemann's books. A Royal Institution audience ought not, at all events, to require to have it explained to them that the object of digging up ancient temples is not to secure curios for the archaeologist's own collection, but for the more serious end of an addition to the general stock of artistic and historic information. The value of a lecture on such a subject should be to give a connected exposition of the facts recently brought to light, for the benefit of intelligent hearers who may have been too busy to keep an eye on all the discoveries as they turned up. No one could do this better than Dr. Waldstein, if he would kindly think it worth while.

HOW much importance is attached by the Germans to good connexion by means of waterways, and easy navigation thereon, is evident if one bears in mind that, besides the long list of smaller works which outsiders scarcely hear of, a Danube-Oder Canal is being planned; that the Rhine is not only to be connected with the river Maas and the Dortmund-Ems Canal, but also with the Elbe, which latter is to have a new connexion with the Trave; and that complicated schemes are being prepared in reference to the deepening of the Rhine and Elbe, so as to make them navigable for ships of greater tonnage. Although, of course, many a plan does not receive prompt approval at the Ministry of Public Works, which latter body has lately unofficially notified that the number of these projects which are continually being handed in for consideration is far out of proportion to the financial means of the country, there is no doubt that the greater part of the projects will be taken in hand in the course of the next few years. In fact, this extension of waterways can be safely expected, all the more so if we look at the report of the meeting of the Association for the Improvement of the River and Canal Navigation in Germany,* held last month, where the president, Professor Schlichting (of the Berlin Technical College) showed that the traffic on the Oder (near Kustrin) is at present nine times greater than in 1873, on the Elbe (by Schandau) four times, and on the Rhine twice as great as on that date, 12,000,000 tons being now moved on these three rivers combined as against the 4,000,000 tons of sixteen years ago.

IN reference to the proposed building for the Prussian "Landtag," referred to on page 245 of our current volume, we are now able to state that it has been decided to erect on the sites of the present buildings of the Imperial "Reichstag" and the Prussian "Herrenhaus" two monumental buildings for each of the two "houses" (Herrenhaus and Abgeordnetenhaus) of the Landtag, and that these two buildings, each one forming a compact whole in itself, are to be connected by a third, in which room for the Chamber of Ministers will be found. It has been high time to come to some decision on the subject, considering that the project has now been some forty years under discussion, and that the plan now decided upon has for eight years been on the point of being approved of.

AT a meeting of the north-western branch of the Society of Medical Officers of Health, held in Manchester on the 9th inst., Dr. Hope, the Medical Officer of Health for Liverpool, delivered an interesting address on "Insanitary Houses and Areas, and the Methods of Dealing with them in Liverpool." The subject would be interesting enough at

* Centralverein für Hebung der Deutschen Fluss-und Kanal-Schiffahrt (some 4,000 members).

any time, but it is particularly so at a time when the London County Council has just decided to proceed on the lines adopted not very long ago by the great northern port. Such Corporations as Bolton, which have so far awakened from their lethargy as to pull down rookeries, but have not energy enough to proceed to build new and healthy houses in place of them, might well learn a lesson from Liverpool. For years the authorities of that city endeavoured to improve the sanitary condition of certain districts, and to some extent succeeded in their efforts, causing a reduction in the death-rate from 60 to 40 per 1,000; but it was felt that enough had not been done—the death-rate in these districts was still double that of the whole city. To improve further the condition of these places, two blocks of property, consisting of 650 houses, occupied by 2,537 persons, were dealt with by the Corporation. In nearly all these houses ventilation was an impossibility, and “the stagnant atmosphere was foul and noisome;” no wonder that the death-rate in these two blocks from pulmonary diseases alone equalled in ratio the death-rate of the whole city. The houses were demolished, and at a cost of 70,000*l.* the Corporation erected the Victoria Buildings to provide accommodation in their stead. “The mortality in the new buildings is about half what it was in the old.” Comment is unnecessary. It is interesting to learn that during the last ten years about 2,000 insanitary houses have been demolished in Liverpool, and 600 more are now awaiting the same fate.

THE *Athenæum* contains a passing reference to the circumstance that certain petitions and fair promises will no longer avail to save the gateway of Lincoln's Inn from the untoward fate with which it was threatened a few years ago. Commenting upon the ample resources at the Benchers' disposal,—largely due, we believe, to their recent sale of Furnival's Inn, acquired, in 1547, for 120*l.*,—our contemporary says: “Lord Grimthorpe, having pretty well destroyed everything of historical interest at St. Albans, is longing to destroy some other relic of the past, and display his incompetence as an amateur architect.” In this latter respect we are quite at one with the *Athenæum*. Yet the coming destruction which it laments forms, in fact, but the completion of the Benchers' scheme, already more than half accomplished, for an entire rebuilding of the various courts which composed their old chambers in Lincoln's Inn. These chambers were all soundly and solidly built, and a large quantity of oak,—no slight safeguard against fire,—was used in the building. So far as structural considerations are concerned, their removal is unnecessary.

THE walled park of 183 hectares (452 acres) at Elven and its castle in Brittany is offered for sale at a price of 300,000 francs. This well-preserved fortress stands near to Vannes, on the road to Ploermel, in the department of Morbihan, and has a high octagonal keep. It should be of some interest to our countrymen, inasmuch as it formed the prison-house for some while of Henry VII., when Earl of Richmond. Having sought refuge in France after the battle of Tewkesbury, and having been driven by a storm on to this coast, he was made captive by Duke Francis II., and, together with the Earl of Pembroke, was confined at Elven. In the neighbourhood are Auray, famed for its Champ des Martyrs, and a now vanished castle of King Arthur; Morbihan, or the Little sea, by some supposed to have been the Druids' chief seat; with Locmariaquer, or place of the Virgin Mary; and Carnac, renowned for its menhirs, dolmens, and other Celtic remains.

A PAMPHLET of sixty-two pages, entitled “Leaseholds and Legislation,” has recently been published by Messrs. Longmans. It is a *résumé* of the interim Report of

the Select Committee of the House of Commons upon Town Holdings. When that report was made we treated the matter very fully. This work is, however, not a mere *précis*; it prints arguments against the doctrine of leasehold enfranchisement. It is well and clearly written, and is worth perusal by any one who desires to get the report of the Committee in a convenient form.

THE French Exhibition at Earl's Court, Brompton (in the buildings and grounds occupied two years ago by the Italian Exhibition), is to be opened this Saturday, May 17. Judging from the appearance which the large Exhibition Gallery presented on Wednesday last, this part of the undertaking is not likely to be anything like ready on the opening day. The long gallery was almost empty on Wednesday; very few stands or show-cases were in position, and not many packing-cases containing exhibits had arrived. Two or three days may, of course, work wonders in this respect, but they will have to be wrought before the building can possibly present anything like an exhibition. In the grounds things seemed to be in a rather more forward condition. Passing out of the exhibition gallery, one finds that the first bridge on the left over the railway has been dubbed the “Pont de la Concorde,” which, of course, it in no way resembles. The farther railway bridge, now called the Pont Neuf, is equally unlike its namesake. The large entertainments theatre has been covered with scene-painters' architecture, and is intended to represent a portion of the Louvre. Closely adjoining this, and heedless of Paris topography, the canvas screen which was in the Italian Exhibition occupied by a view of the Forum at Rome, is now painted with a view of the Avenue des Champs Elysées, looking towards the Arc de Triomphe, which is seen terminating the vista. The buildings devoted in the Italian Exhibition to Wine and Alimentary Products are at present empty, with the exception of canvases still in progress of being painted for some parts of the Exhibition. The exteriors of these buildings are already covered with painted screens, giving them the appearance of two sides of a quadrangle of domestic buildings, with gaily striped blinds and jalousies. According to the programme, the Fine Arts section “will be exceptionally excellent. Among the contributors will be many of the best artists in France, including such names as Gerôme, Bartholdi, Barrias, Constant, Armand-Dumaresq, Anblot, Coutan, Yon, &c., &c. The section will doubtless be the most complete and representative of French Art, and several rooms in the Exhibition will be reserved for paintings from this year's two Paris Salons.” We will say more about the Exhibition later on if necessary. At present it does not show much indication of justifying the loud flourishes of trumpets which have heralded it. Whatever its success as an exhibition, it will no doubt be a popular place of *ad fresco* resort during the coming summer months.

THE collection of paintings of animal life by Madame Ronner, at the Fine Art Society's Gallery, is a very remarkable one, as far as the paintings of cats are concerned, which form the bulk of the collection. Not only is the mere imitative work of the highest class, in regard to the rendering of the creature's outer appearance, but the artist seems to have acquired a remarkable comprehension of and power of indicating the feline character. Mr. Spielmann, in an introductory note attached to the catalogue, which has the merit of being both shorter and less pretentious than many of the similar essays which preface the Fine Art Society's catalogues, remarks on the comparatively small number of animal painters who have given attention to the cat, and accounts for it partly on the ground that the animal is much less comprehensible, in regard to its feelings and its nature, than some other animals, besides having a peculiar suddenness in its move-

ments, which are very difficult to catch a fix in painting. There is perhaps another reason to be found, the difficulty of drawing an animal which, from the nature of its feline is devoid of distinctly defined outline. Frivolever causes it is certainly quite true that there are fewer good painters of cats than any other civilised animal, and Madame Ronner's painting ought to be seen, as representing a kind of artistic excellence which is rather rare.

THE set of sketches in Egypt and elsewhere in the East, by Mr. Ernest George, in the same gallery, includes a number of architectural subjects, mostly slightly but effectively sketched. Among the best are the view “Luxor,” half buried in the accumulated sediments of centuries, and with the masts of the ships seen in the harbour; “Karnac,” with spreading capitals and the hot purple shade on the columns very powerfully rendered; and “El Ghoury,” a mosque interior which an admirable example of brilliant effect, colour detail conveyed without any labour of execution.

A LETTER signed by Mr. W. B. Richmond and Mr. Somers Clarke appeared in the *Times* of Friday last week, urging that Stevens' great work, the Wellington Monument, should be removed from its miserable position in the side chapel and put where it was tended to go in the nave, and completed with the equestrian statue which Stevens designed for it. We have urged this over and over again in the strongest manner, and we are glad to see any fresh attempt made to draw public interest about it; but we imagine Messrs. Richmond and Clarke might just well talk to the winds. It is a matter which the English public mind is entirely dead and indifferent.

ARCHITECTURE AT THE ROYAL ACADEMY.—III.

1,740. “A Country Museum and Institute.” Mr. Gerald C. Horsley. We hope this is executed building, or to be executed. It is very original and picturesque design, very well suited to express the class of building named. The ground story is in plain course masonry with windows introduced in a purely utilitarian manner where wanted, and a round-arched doorway in the centre; above the string is a band of what we presume would be colour-decoration in tiles, a large symmetrical design; above this niches with seated statues serve to decorate the wall space; the building of course top-lighted. No. 1,739, a slight sketch by the same architect, shows a peculiar “rood-screen from S. Maria Maggiora, Bergamo,” with a very tall slender cross; crucifix rising over the doorway, the crucifix being shaded by what looks like a piece of embroidered cloth hanging over supports on a crucifix so as to make a semicircular hood over the figure, and a long droop at each side.

1,741. “A Reception Room.” Mr. Rok Hill. A coloured geometrical drawing showing a pleasing decorative treatment with woodwork and a warm tinted wall, probably intended for gold decoration; over the striated course are wall paintings in semicircular lunettes.

1,743. “Church of St. Luke, Richmond, Kent.” Messrs. Goldie Child & Goldie. A modern Gothic church in Early English style, chiefly noticeable for the solid and massive treatment of the junction of tower and spire, little heavy in effect, certainly.

1,747. “East Window of St. Hilda's, Darlington.” Mr. A. O. Hemming. A crucifixion subject filling three high and narrow lancet windows, designed in one plane and with good effect of colour. It would have been better, however, to have avoided the repetition made across the three windows by divisions of the subject by conventional lines; the windows might have been grouped and regard to subject without being actually connected in regard to the lines of the design. It is questionable whether this should be done across an ordinary mullion; but it certainly cannot be done with good effect across piers dividing separate lancet lights.

1,748. "Tom Tower, Christ Church, Oxford": Mr. T. L. Worthington: an effective little bit of architectural drawing in water-colour.

1,749. "A pair of Park Gates": Mr. George Aitchison, A.R.A. A design in wrought iron, of which we shall give an illustration shortly; there is a certain special character about it, as it is in general feeling of Renaissance type, but the large conventional leaves and the frames of the monogram panels are in a more free and less conventional style than the ordinary Renaissance leaf. The thin spirals contrast well with these broad leaves. The thin reposed treatment of the larger details is well indicated in the drawing. We should much like, however, to take a pair of cutters and chip off the two sprays of realistic foliage in the crowning ornament of the gate. This mixing of realistic with purely conventional elements is one of the prevalent weaknesses of wrought ironwork in the present day, and we wish Professor Aitchison had avoided sanctioning it by his example.

1,751. "Royal Yacht Club House Hunter's Quay Scotland; competitive design": Messrs. John Burnett, Son & Campbell. These are two drawings in one frame, slightly but effectively sketched in brown ink on a toned paper. No plan is given, but the design is picturesque and suitable for a yacht club-house; the rounded wing, with its open gallery under the eaves of the high roof, is a good incident in the design and gives it a good deal of its special character.

1,752. 1,753. One of these is described in the catalogue as "study for a country mansion in the manner of the eighteenth century," and the other as study for the same "in the early style of the Georgian period," both by Mr. F. W. Froug: they should have had one title, for they are front and back views of the same building. They are pretty little delicately-tinted elevations, and represent with correctness and good taste what they profess to represent; but we do not think much "study" is required to produce this kind of thing.

1,755. "Towers of Ely Cathedral": A. Needham Wilson: a good little pencil sketch.

1,756. "Design for Bronze Gates and Grille": Mr. John J. Shaw. This is hung too high to be well seen, especially considering the peculiar execution of the drawing; if the author had adopted a method of drawing that would have shown the detail more completely he would probably have got a better place for his work; all that can be said, as it is, is that the general effect appears rich and suitable to the material.

1,758. "Gamekeepers' Lodge, Sidbury, Sidmouth": Mr. Walter F. Cave. An artistic monochrome sketch of a lodge which is rather too obviously intended to be "picturesque."

1,760. "Offices, Blue Hart Court": Mr. Basil Champneys. As to general treatment this is a good and suitable bit of office architecture; the drawing, evidently made in a hurry, hardly does justice to the building or the draughtsman. The windows of the several storeys are grouped under lofty vaulted arches, down the centre line of the piers of which are fixed the rain-pouts, whether with an absolute intention to bring them into the design or not one cannot say. As such appendages are inevitable, it seems reasonable that they should be made to work into a design and not interfere with it. It is a pity that the old-fashioned and heavy brick window dressings of the Georgian era should be repeated and perpetuated as they are in this and other designs of similar proclivities. Those on the windows of the octagonal angle turret are mere excrescences, out of all proportion to the windows which they encrust.

1,764. "Design for Stained Glass": Mr. G. Parby. A triplet design with an angel in the centre compartment and a seraph in each of the side ones, which claims notice for its fine colour effect as well as a certain originality of conception in the subject. The architectural canopies are however much too heavy and solid in effect for stained-glass design, and seem to crush the other portion; at least this is the effect in the drawing.

1,766. "Design for Courts of Justice, York": Mr. Henry T. Hare. This is a well-executed water-colour drawing, and a design suitable enough in general style for Courts of Justice for a moderate-sized town. It is Elizabethan in general feeling, but with some originality of treatment; there are two projecting wings with a recessed centre kept lower, and occupied on either side of the door by two very large multi-paned windows which contribute more than anything else to the character of the design.

The balustrade line is broken by what the French call a *fronton*, a convenient word (as the French have applied it at least) for which we have no precise equivalent in English. The use of a bright blue in the shadows is intended to give a sunny effect to the drawing, we presume, but it is overdone and has rather a tricky effect, nor is there any obvious reason why some shadows should be treated this way and others not.

1,770. "Selby Abbey, from the South-east": Mr. Arnold Mitchell. This is the drawing from which the view of Selby Abbey in the New Year's number of the *Builder* was published; it is a style cleverly contrived, and which its author may be said to have invented, for suggesting a great deal of effect and contrast without heavy tinting. The wall colouring and surface are conveyed to the eye by elaborate "jointing" without interfering otherwise with the original surface of the paper, except at the upper portion of the building, where a slight Indian-ink brush tint gives the required dark effect against the sky, and enables the artist again to leave the lead roof an expanse of white, its construction only indicated by two or three lines suggesting the rolls. The ground in front of the building again is simply an exposure of white paper, contrasting with the jointed surface of the walls. A few darks touched here and there on the windows and elsewhere complete the scheme. There is a great deal of charm in this "harmony in grey and white," and a delicate sense of "values" is required to carry it out with effect; but it must be remembered that the result after all is a sketch rather than a picture, though of a highly artistic character.

1,772. "Buller's Wood Chislehurst": Mr. Ernest Newton. One ought to have a plan to appreciate this drawing, which merely represents a part of the garden side (apparently) of a house, with no indication of the meaning of the drawing. It is a remarkably good specimen of picturesque effect produced in pen line, accompanied by an apparently studious avoidance of anything that can be called architectural detail. There is no doubt a reticence in this which is expressive of home-like repose and is in good taste in a negative sense; it is a fancy with a certain school of architects at present to design houses with a studious avoidance of design, and this very negative quality gives such designs a certain recognisable and individual stamp of their own; but we regard this as little more than fancy of the moment. Those who do this will soon get tired of it, and will find out that architecture means architectural design after all, and not square chimney stacks with no finish to them.

1,774. "New Staircase, Remishaw Hall, Derbyshire": Mr. F. Moore Simpson. There appears to be some nice detail about the wall treatment of the staircase; at least the effect at a distance is good; but it is too high to be seen.

1,776. "Wrexham Church Tower": Mr. Arnold Mitchell. This is another example of admirably artistic sketching on the same principle as illustrated in the drawing of Selby Abbey, but in this case in pen line; the upper part of the tower is a little more worked upon and shaded than the rest, which is reduced nearly to an outline drawing, white against a shaded sky giving background to it. As a pictorial effect this is admirable in proportion to the means employed to give it, but the drawback is that it does not really represent the effect and expression of the tower, which is in fact a dark weather-stained mass of masonry. We also regret, in architectural drawing, the revival by so good an artist as Mr. Mitchell of the system of representing, for instance, the inner angle formed by the junction of wall and buttress by a strongly-marked vertical line drawn with a ruler. There is no "line" at such a point of junction of two planes; during the last few years the convention of representing it by a line had been tacitly abandoned by the best architectural draughtsmen, and it is a pity it should be revived.

1,778. "20, James-street Buckingham Gate": Mr. R. T. Blomfield. This is a small coloured perspective signed "inv. et del." by the architect, with a great deal of character about it both as a design and as a drawing. It is a vertical strip of London street house architecture, with a small plan in the corner; the whole is in bright red brick, which has been shown by patiently spotting on each brick with the brush, leaving whites between, instead of the easier

but more mechanical process of showing the pointing by lines in opaque white. The result is to give a special character and texture to the drawing, every part of which, the touching of the windows, the tone of the sky, shows a feeling for colour which makes the drawing a very complete whole, with a distinct effect of its own. The design is simple enough, and includes little ornament except a broad band of carved brick across the front about the springing of the stepped gable; the walls are relieved by courses of light-coloured stone, and the entrance treated as a segmental arch with alternating brick and stone voussiors. The house is set back a little from the street line, and one wall brought somewhat forward as a lintress; the front space is enclosed by some delicate wrought-iron railing. The whole is thoroughly artistic in feeling, though we do not see the logic, architecturally, of stopping the band of ornament by little engaged brick columns on brackets, which carry nothing.

FURTHER NOTES ON ACADEMY PICTURES.

A PROMINENT place in Gallery I. is assigned to Mr. Kennington's "Homeless" (24), in which the painter repeats the same class of subject as that with which he made such a success last year. This is a life-size painting of a poor outcast child apparently found fainting on the pavement of a London street by a benevolent woman. It is a pathetic picture in expression, rather marred by the prevalent dull grey tone which seems to pervade everything in the picture, and gives it a somewhat unreal effect. Among the noticeable pictures in this room is Mr. Wyllie's "Davy Jones's Locker" (81), a painting of seaweed and a big rusty anchor at the bottom of the sea, said to have been studied from the glass window of a diving-bell, a characteristic example of the trouble which painters will take nowadays in search of a new motive for a painting and in the effort to render the subject with fidelity. The fish, which are admirably painted, seem almost to glide through the water as one looks; the effort is a complete success in its way. Mr. David Murray's "The White Mill" (43) is a fine and truthful piece of landscape-painting, except in one odd oversight; the sails of the mill are so long that they would dig into the ground in turning, or rather could not possibly turn. A much finer landscape is Mr. Macartney's "Moorland" (57), a picture in broad and grand style. Mr. Oules's portrait of the "Mayor of Bradford" (74) in his robes is an exceptionally fine specimen of what may be called the class of official portrait. Mr. Seymour Lucas shows both very fine colour and a good deal of humour in "The Loving Cup" (4), a picture in which some seated figures at a table look on with various shades of satirical expression at the exchange of the cup between two ho-bred standing figures in the centre, whose "love" appears to be of a purely ceremonial cast; the principal figure is effectively relieved against a panel of crimson cloth behind the chair. Mrs. Merritt's "Love Locked Out" (32), a not very ideal Cupid leaning against a gilded door, seems to be partly suggested, in motive and scheme of colour, by some of Mr. Watt's recent Cupid pictures. A good little nude study by Mr. Godward, "A Pompeian Bath" (42) is to be noted in a corner of the room. What induced the Academy to purchase under the Chantry bequest Mr. Macbeth's painting of "The Cast Shoe" (19) we cannot understand.

Mr. Nettleship has hardly added to his reputation by his sensational and improbable picture "The Abyss" (110), an antelope leaping into a chasm with a lion perched on his back. It is impossible the animal could have taken a leap with such a savage burden on him, and we surmise that lions know better how to take care of themselves than to let their natural prey pitch them down a precipice. Mr. Abbey's "Mayday Morning" (109) appears to be a joke, and one not worth the canvas expended on it. Mr. Adrian Stokes's "Off St. Ives" (137) is to some extent a repetition of his study of breaking waves in the New Gallery, with some fishing craft added; it is a good picture, but not equal in sentiment to his beautiful work last year, the "Harbour Bar." Mr. Sokes, however, can paint sea, which cannot be affirmed of Mr. Leader, whose "Sandy Margin of the Sea" (131) is admirable as far as the study of sandhills is concerned, but very bad in the sea, which is hard and steely. Mr. F. D.

Millet's interior "How the Gossip Grew" (151) is one of his admirably-painted scenes of furniture and figures of the Georgian era; a picture totally devoid of sentiment or true pictorial effect, but which makes its mark from the thoroughness with which all the details and costumes are studied. Mr. J. Farquharson, a painter of very versatile abilities, shows himself this year as a painter of Egyptian architectural remains, "Luxor" (115) and "Karnac" (177). Among the portraits in this room is an admirable bust portrait of Mr. E. A. Waterlow, by Mr. Alma Tadema; Mr. Richmond's portrait of the present Bishop of Durham (121) is also a success among the portraits of the year.

Mr. Watts's child portrait, "Hester Fraser Tytler" (196), in Gallery III. can hardly be called a satisfactory example of his work; a little girl with very pink cheeks and hands that seem made of wool; it is eccentric altogether both in texture and colour. Mr. Briton Riviere sends a very clever little character picture under the title "Bus in Urbe" (224), a country lad with his collar scented at a street doorway, the dog desperately excited, apparently, at the sights and sounds of the street, the lad looking puzzled and *distrustful*. Mr. H. W. B. Davis's "Picardy Dunes" (212), a study of sheep in a barren undulating sandy waste, is the best work he exhibits this year, and particularly fine in colour. "The Birth of a Titan" (265), by Mr. Wylie—a large ship just launched; and "A Glimpse of Loch Katrine" and "Old Sherwood" (271, 279), both by Mr. MacWhirter, are among the small things in this room to be noticed, as also Mr. Woods's bright and effective Venetian scene, "La Promessa Sposa" (278). Mr. Burgess and Mr. Orchardson exhibit their diploma works, the former a very clever study of two priests under the title "The Freedom of the Press" (337), at which the holy fathers are much scandalised; the latter a rather washed-out looking painting of a figure of a girl walking in a breeze on "The North Foreland" (338), a picture certainly not exhibiting the artist at his best; but, as we have previously had occasion to remark, artists know better generally than to throw away their best efforts on a diploma picture. Mr. Calderon's "Hagar" (327) is a somewhat stayer-looking woman backed by a "practicable" rock also suggesting the theatre. Mr. Pettie repeats his "motive" of two or three gaily-dressed young people flouting along a country road, under the title "The World Wants Very Well Then" (302) a title the significance of which in relation to the painting is not in any sense very obvious.

Mr. Sauber's large painting "The Golden Lure" (202), a life-size nude figure, representing Ambition, borne upon what we find from the quotation is meant for a huge bubble, is a painting of the *Salon* type, effective in a sense, but by no means rising to the height of the subject. Passing to Gallery IV., we find among the most successful pictures there Mr. Calderon's portrait under the title "Lady Betty," a seated half-length of a fine young woman with the clear complexion of perfect health well represented in the face; she has fiery red hair which forms an element of colour in the picture, and a grey-furred crimson cloak; the rings on her finger, minutely shown, form a little point in the scheme; she turns round in a little point in an attitude and expression of distinction. This latter quality should go for something in painting a lady, though Mr. Sargent thinks otherwise, for in his "Portrait of a Lady" (421), so-called, he seems to have studied to avoid every appearance of dignity or refinement, to have given her face a vulgar smirk and her hands a vulgar action, bunching up in them a part of her voluminous skirt. The picture is a kind of advertisement to any lady who values a reputation for refined and ladylike manner not to allow Mr. Sargent to paint her portrait. Mr. Jacob Hood's portrait of Miss Shaw-Lefevre is refined in pose and expression but rather dingy in colour. Mr. Herkomer has rather a sensational kind of portrait of "Mrs Arthur Sassoon" (411) in a light dress, relieved against the dark, nearly black, shadow in a doorway, the architectural framework of which forms a kind of contrast of parallel vertical lines against the undulating lines of the figure. Among minor pictures in this room may be noticed "Sea Breezes" (380) by Mr. J. Olsson, a coast scene full of light and wind, only the breaking waves are not drawn at all, merely a shapeless collection of foam; "A Summer Shower" (345)

by Mr. John Brett, one of his smaller contributions; Mr. Boughton's "Puritans' First Winter in New England"; Watching for the *Fortune Relief Ship*" (392)—the pale pretty girl in Puritan costume whom we know so well may watch in vain, for no ship will sail over the sea as painted by Mr. Boughton; "North Comes the Moon" (410) by Mr. Walter F. Stocks, a pretty landscape of the romantic order; "The Haven under the Hill" (420) by Mr. Sidney S. Morrish, and "The Old Farm" (429) by Miss Florence A. Saltmer, a small landscape with a great deal of merit.

Gallery V. includes a remarkable little work by Mr. Swan, "The Piping Fisher-boy" (465), a small nude figure of a hoy lying face downwards on a rock piping to fishes in the water. There is a mingling of poetic fancy with fine execution of the figure in this little work, which gives it a peculiar interest. Mr. Leader's "Where Sea and River Meet" (458) is again a good study of sandy foreground and vegetation with a very bad sea; Mr. Leader has not a notion of painting the sea, and had better leave it alone. Mr. Brett's "Echoes of a Far-off Storm" (472) is his principal picture this year, and is in his best style of realism, but it is so nearly a repetition of the effect and composition of a painting exhibited there a few years ago that we at first regarded it as an instance of a work re-exhibited. The title accounts for the combination of a certain amount of surf on the beach and the rocks with perfect calm in the water in the shallow pools on the shore; the sky shows an indistinct line of darker tone among the clouds near the horizon, which we presume is also an indication of the distant storm; that effect taken from nature? It does not give us that impression. Mr. Albert Moore's "A Summer Night" (487) is one of the largest and most elaborate of his paintings of women who have nothing to do but look decorative; we look from a terrace under a verandah festooned with yellow flowerets, on to a twilight sea; three or four women, half nude, half draped in saffron drapery, recline or sit in indolent attitudes on couches with a delicately designed stuff; it is very harmonious in its way, but totally devoid of intellectual interest. "Mrs. McCorquodale and Children" (486) by Mr. Long, is a life-size portrait group with a great deal of bright colour, harmonious in general combination, hard in texture. Mr. Brett's "Harlyn Bay" (513) is one of those brightly-lighted warm scenes of summer sea which suggest the desire to bathe, but the possibility of doing so is perhaps even more strongly suggested by Mr. Hugh Wilkinson's "Calmday on the Coast, North Wales" (514) which hangs next to it, showing an inlet or small bay flanked by dark rocks and with a shingle beach as foreground; this is a piece of realistic painting so successful as to make one look out for what its author may produce in future. Mr. Knight's "Lengthening Shadows" (517), Mr. Herkomer's portrait of "Miss Vlasto" (502), and Mr. Sant's "Oliver Twist Walking to London" (507) are among the contents of this room; the latter a picture of considerable pathos, though unsatisfactory in colour.

In Gallery VI. is Mr. Moore's "Storm Brewing" (544), not so entirely fine as his other work of this year before mentioned, and considering there is a storm brewing the vessel in the distance seems to be carrying all canvas in a somewhat rash manner. This has for pendant a curious picture by Mr. Nowell of "Lucerne" (554), with strawberry-ice clouds which spoil what might otherwise be a good landscape. Mr. White's "Ups and Downs" (581) a subject of children see-sawing, is redeemed from commonplace as an attempt to paint the effect of an endless expanse member to have been treated before in painting. Mr. Musgrave's "Summer Seas, Cornwall" (619) is a clever echo of Mr. J. C. Flook; Mr. Meyerheim's "A Bright Day in February" (630) is one of his usual wooded scenes with cattle in a rather conventional but very pretty style; Mr. Cadogan's "Loch of the Lowes, Dunkeld" (636) seems to have been suggested by Sir John Millais' treatment of forest land in "Murthly Moss"; Mr. Cotman's "Where the Stour and Avon meet" (644) is a rather hard but presentable painting of Christ Church, Hants; and in "Benighted" (645) Mr. F. Frolich has realised a remarkable effect of moonlight.

In Gallery No. VII. Mr. Sargent again does his best to make his sitter ridiculous in his portrait of "Mrs. K." (652); we presume there

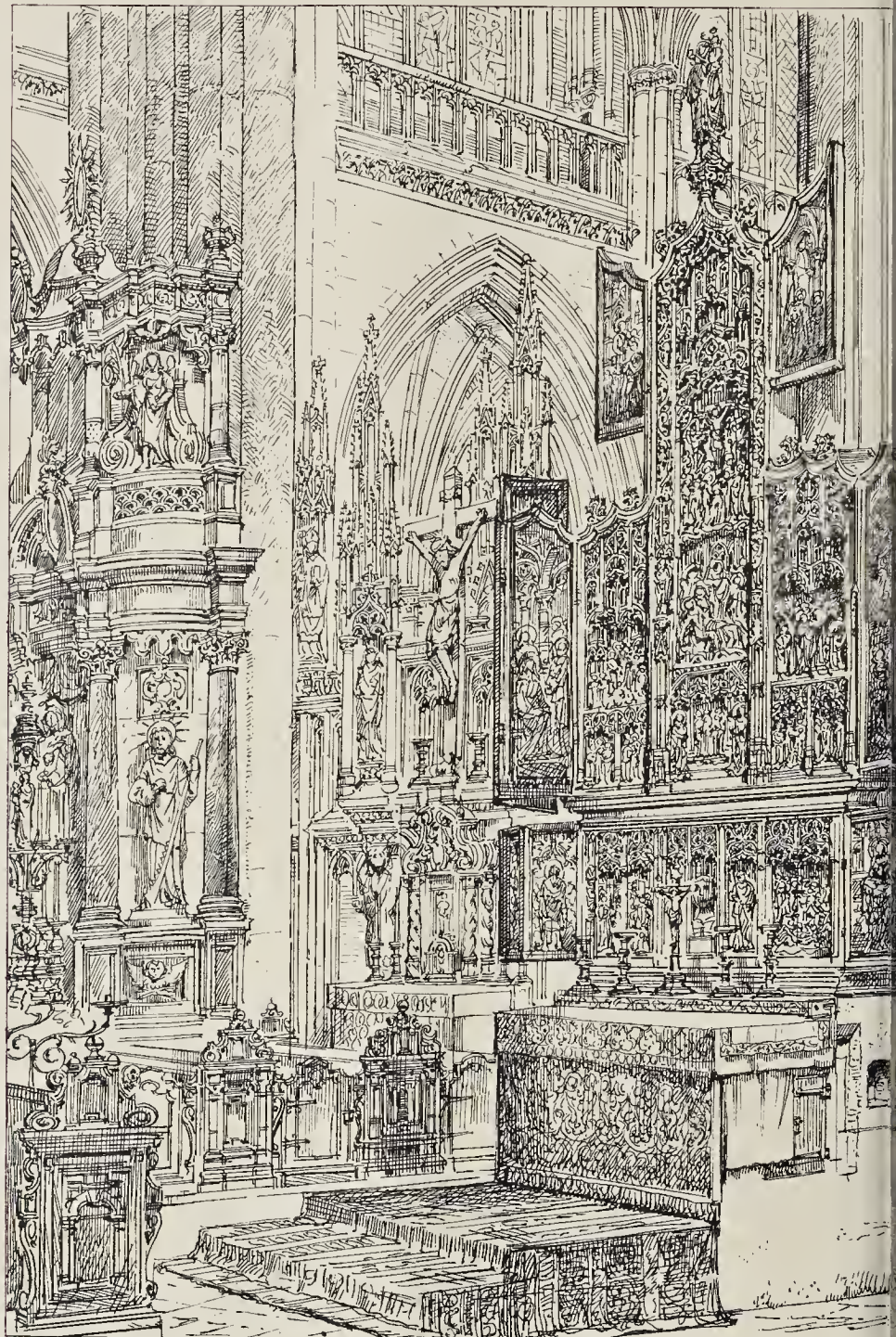
are some sitters who like being made gypsies of it is a taste which will probably not last very long. This room contains a grand mountain landscape by Mr. Johnson, "The last light" (687); a great rounded mountain, purple in the distance, shuts off most of the sky, leaving only a bright windy opening between its shoulder and the dark clouds; in the middle distance a lower hill catches a strong light. This is painted in a broad and grand style, and is both style and sentiment is one of the finest landscapes in the Exhibition. Mr. Macwhirter exhibits a large and spacious-looking view of "Mount Etna from the Greek Theatre Taormina" (708). Among other landscapes, Mr. Langlands's "Golden Autumn" (701) is a good painting, but not golden by any means in its effect—dingy autumn, rather; and Mr. Parsons's "A Bend of the Avon" (715) is an exquisite bit of river scenery. Popular subjects are represented in this Gallery by Mr. Dudley Hardy's "The Dock Strike" (671), a grey uninviting looking picture; and Mr. Geoffrey's "Ullavabo" (678) in a little boy's school, apparently a work with some character and humour but too high to be well seen.

In Gallery VIII. we may notice "Love's Stratagem" (743) by Mr. Heywood Hardy as a good painting of horses and riders, and Mr. Nohle's "By the Linn Pool" (759) as a rather powerful landscape in a very conventional style, an example of the old-fashioned practice of picture-making, rather than a representation of nature; but good of its kind. Mr. Seymour Lucas's "Mrs. Edward Greaves" (800) is a very pleasing portrait of the realistic order, bright in colour, expressive in feature, and very happily posed in its graceful standing lines of composition. In Gallery IX., devoted as usual to rather small pictures, we find Mr. Tadema's beautiful interior with a portrait figure of "Mrs. Ralph Sneyd" (900). Mr. Tadema has been trying the same experiment here which he tried so successfully in the background of a picture in the New Gallery, of repeating the same colour in decorative detail and in flowers adjoining it; in this case the elements are the red glass in the window and a group of red flowers closely adjoining it. Mr. Brett's "Mist off the Sea" (962), a comparatively small work, is one of the best of his contributions of this year.

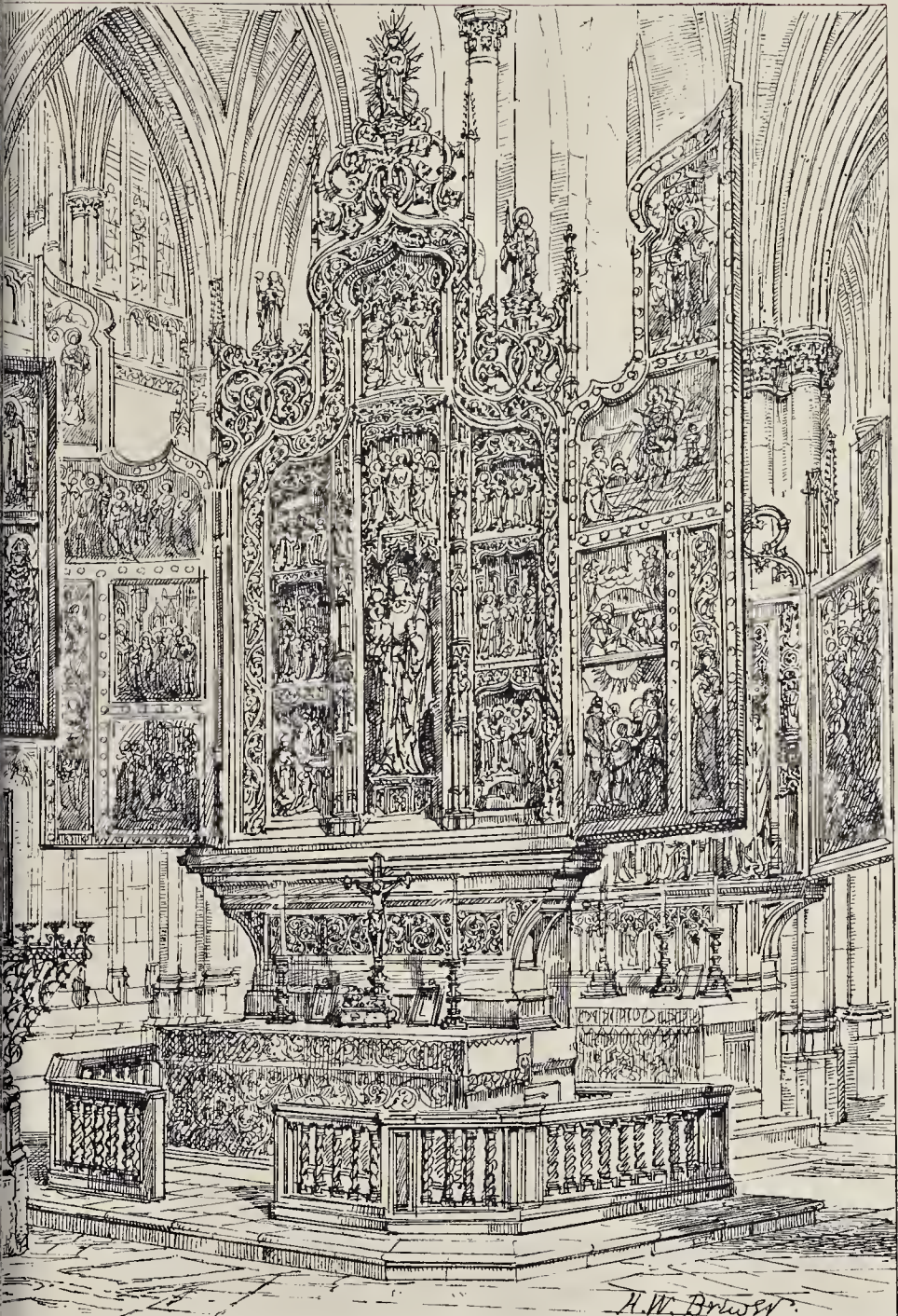
In Gallery X. it must be extremely instructive to foreign artists who are visiting the Gallery to notice the place of honour assigned to such a piece of rampant absurdity as Mr. Sidney Cooper's "Casualties in the Hunting Field" (1,004). Mr. Hacker's "Væ Victis" Sack of Morocco by the Almohades" (1,005), is merely an excuse for drawing a number of semi-nude figures lying about the floor in theatrical confusion; a scene totally unreal and only looking like a stage effect in a melodrama. Mr. Blake Wirgman's portrait of "Sir James Hannen" (1,068) is one of the best portraits of the year in character and execution.

In Gallery XI. Mr. H. S. Tuke's "Persene and Andromeda" (1,076) is another instance of the ridiculous manner in which painters will reduce a poetic legend to the most ordinary prose. This is nothing but a couple of life studies of figures with most commonplace physiognomy, worked up with the necessary accessories and given a fine name. A pretty portrait of "Miss Ness" (1,085), by Mr. Walter Horsley, and a landscape by Mr. M. Lachlan, "The Last of the Light" (1,086), should be looked at, and we pass on to an admirable landscape by Mr. David Murray, one of the best things of the year in landscape, "The Young Wheat" (1,090). This is a wide expanse of field coloured by the green shoots, and a wide expanse of sky above it, with a belt of low hilly landscape in the distance dividing them. This is a really fine work, true in effect and with that unity of feeling about it which makes a real picture in the true sense of the word. Mr. Simmons's "John Anderson my Joe" (1,089) is at least a bold and original treatment of the subject, representing a man in a waterproof pilot coat kissing his wife; his back being turned to the spectator, neither of the faces are seen, yet the sentiment intended is well conveyed. "La Conyck, Serk" (1,092) is a good landscape by Mr. W. A. Toplis. Mr. Joseph Clark's one contribution to the exhibition, "The Cup that Cheers" (1,117), representing three old dames at tea, is not one of his best works, and perhaps its place in the hanging is intended as a gentle hint to this effect. Mr. Clark's best power lies in the painting of children and young people of the rustic type; at



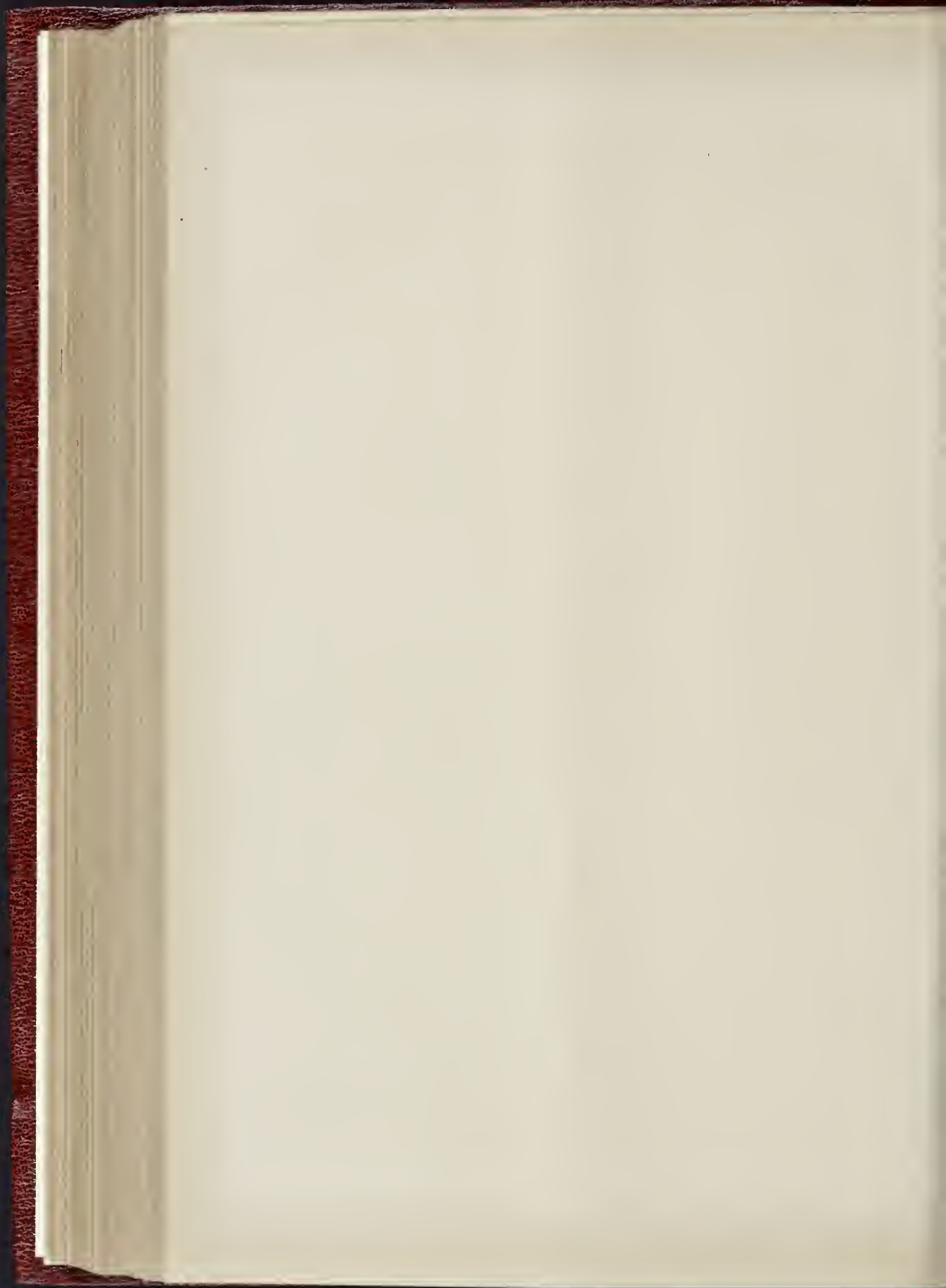


ALTARS IN THE SOUTH A



H. W. BRUSH.

PHOTO LITHO. SIMMONS & CO. 22, MARTIN LANE, CANNON ST., LONDON. E.C.



events this picture is the least interesting his that we have seen. Mr. Jacobm Hood's large painting of "The Witch's Dance" (1866) represents a naked witch standing in the centre of a rock from which fire issues, with lance of draped figures round her; the central figure is fine and well studied, and one or two of the others are remarkable in their expression, but regarded as what it is intended to be, a piece of "devilry" it is on the whole newhat tame. Of the Academy sculpture of the year we will say something on another occasion.

CLAIMS ON COVENANTS TO REPAIR.
SIR,—In your issue of May 10 you published note relative to a recent decision of the Court of Appeal as to the meaning of the words "tenantable repair." I enclose in connexion with this subject some correspondence of recent date with many of your readers. It illustrates a very common practice in London—namely, that of a demand by landlords at the end of a lease for a larger sum for dilapidations than is justly due to them. The object of the landlord is not only to obtain as much money from an outgoing tenant as it will cost him to put a lease in repair, but to obtain a sum over and above that amount, which balance goes into his pocket as cash. This is a thoroughly dishonest and reprehensible practice, but it is often successful, because many tenants scarcely know their legal liability, or are so businesslike that they are altogether in the hands of a landlord who is in the habit of making money when leases fall in. It will be observed that in the present case a demand was made the landlord for loss of use of the premises and that the house was being redecored. This demand for which in nine cases out of ten there is absolutely no foundation. There is no legal authority of any weight in support of it. The case of Woods v. Pope, which is relied on by some writers, occurred so long ago as 1835, and was in the first instance a case heard by a jury, when the plaintiff's counsel mentioned that the judge merely remarked that it was a wrong one, but that he should leave it to the jury to decide. A new trial was moved for, but was refused because the verdict was for less than £100, and because the Court were disinclined to question a decision of the jury on a matter left to them as a question of fact. There is really no sound legal ground for this contention as a general rule, though cases may occur, as where a tenant is actually prevented from entering by a man being in possession of a house, in which some damages in respect of loss of rent will be fairly due.

In the present instance the house was redecored before it was quieted by the tenant (D.), and the amount at which the tenant's surveyor placed the necessary cost of repairs he done well was 115*l.* The landlord (B.) was not aware of the amount at which the tenant's surveyor had arrived, and on the expiration of the lease sent in a demand for 10*l.* for dilapidations, and 10*l.* 10*s.* for loss of use during the time which would be occupied by the repairs. This latter charge was purely arbitrary, since the repairs when the demand for dilapidations had been sent in had not even begun. It well exemplifies the absolutely illegal manner in which such claims are made. This demand the tenant replied by sending a cheque for 104*l.* 17*s.* 6*d.* for dilapidations, and offering to pay the sum demanded for loss of use. To this the landlord A. B. replied as follows:—

"April 12, 1890.

DEAR SIR,—I have to acknowledge the receipt of your letter, enclosing an order for 104*l.* 17*s.* 6*d.*, and in reply, I have to say that I cannot accept your sum in payment for dilapidations at ———, it will not suffice to carry out the necessary repairs. I will, however, make you an offer (but it is not without prejudice to my legal rights), to accept the sum of 140*l.* as mitigated damages, and I will claim the sum of 10*l.* 10*s.* for loss of use of premises while the repairs are being executed by Fletcher on Dilapidation, page 59). If you are inclined to adopt this conditional proposal, I will ask you to appoint a properly-qualified person to act by name, Mr. ———, to go into the matter in the usual way, herewith return your order, and am, yours faithfully,
 A. B."

The reply of the tenant was as follows:—
 "April 15, 1890.
DEAR SIR,—I was not in town yesterday, and my letter of 12th inst. therefore did not come to hand till this morning. As regards your claim for loss of use, I must repeat it is inadmissible. Fletcher

on Dilapidations' is no binding authority. In each case an actual loss of a tenant's rent must be proved. In the present case no such loss can be proved; therefore the claim is invalid.

As regards the claim for dilapidations, I should be willing, for the sake of ending the matter, at once to pay you 10*l.* more, — viz., 115*l.*, — and will forward cheque for that sum should you accept this offer. If you are not willing to accept this sum, the matter must take its course, and your claim must be investigated by an official referee. — I am, yours faithfully,
 C. D."

The landlord's reply was prompt, and was as follows:—

"April 16, 1890.

DEAR SIR,—If you will send me an order, 115*l.*, as named in yours of yesterday, I will accept it, so as to settle the matter at once, although it will not pay the cost of my loss (3).—Yours faithfully,
 A. B."

This correspondence really requires no further comment; leaving the claim for rent out of notice, the landlord accepted as nearly as possible two-thirds of the sum claimed by him in the first instance. Dropping down 29*l.* at the first instance, as soon as the official referee is mentioned, he comes down another 25*l.* without any resistance whatever—merely stating, for the sake of decency, that it would not cover his loss. To use the right word, such attempts to obtain money are dishonest, and it is to be regretted that many builders and surveyors are parties to such attempts—swelling out claims simply to give their employers plunder of this kind.

LEX.

THE LAST OF OLD-SQUARE, LINCOLN'S INN.

HENRY DE LACY, the redoubtable Earl of Lincoln, died on February 5, 1811, and was buried in the St. Dunstan's Chapel, St. Paul's Cathedral, beneath the tomb which Dogdale and Weaver describe. The gateway of what had been his town house in Chancery-lane, and wherein he died, was begun in 1507, by Sir Thomas Lovel, K.G., who had received the honour of knight-banneret on the battlefield at Stoke. He became a great benefactor to an Inn of Court which, in the course of various changes, had been established here on the properties of the Bishops of Chichester and of the Earl of Lincoln. The bishops owned an estate here from the time of Ralph Nevil, in the reign of Henry 111, to about 1540. Chichester-rectors and Bishop's-court, on the western side of Chancery-lane, survive to this day.

Lovel built his gate-house with bricks and tiles made of clay taken from the adjoining Cogeharth, or William Cotterell's garden. It has no peers in London save Cardinal Morton's at Lambeth, and those of St. James's Palace, the Charter-house, and St. John's, Clerkenwell. In a "Note" of our current issue we advert to the proposed demolition of this gateway, and of some adjacent buildings of the Inn, now styled Old-buildings, or Old-square, but formerly known, in their entirety, by the names of Gatehouse, Dial, Kitchen-garden, and Garden Courts.

From a privately-printed, but incomplete, volume (1849), being an edition of William Melmoth's "Great Importance of a Religious Life," which Walpole wrongly ascribes to John Perceval, first Earl of Egmont, we extract the following particulars as to the dates of these buildings.* The kitchen (since converted into chambers), south of the old Hall, was built in the year 1557; twenty-five years later were erected some chambers over the kitchen, and over the passage which leads out of Kitchen-garden-court into Gatehouse-court. In 1602-3 Chancery Lane-row, north and south of the gate, was pulled down and rebuilt; extending respectively to the houses of Sir John Tyndal, Knight, and John Bevington. In 1608 it was ordered that the Long Gallery towards Bevington's house, and the Short Gallery, be rebuilt, as also what is now the southern side, Nos. 21-3, of Old-square. In 1609, Chancery Lane-row was to be extended by twenty chambers, having three stories above the ground floor, on a return (Nos. 7-9) facing the northern side of the chapel; and in the next year it was ordered that a third uniform block of sixteen chambers (Nos. 10-3, Dial-court) be made next westwards of the chapel.

In 1614 the "House" was to be divided into the four divisions, or courts, whose names we

have already mentioned; and in 1618 it was ordered that the chapel, its "fit model" having been committed to Inigo Jones, should stand in the "east" court. The new chapel was ready for opening on Ascension Day, 1623, a faculty having been obtained by Mr. Noy for pulling down the old one. Noy was a Master of the Bench, and the order for the faculty bears date June 19, 1623. This seems to determine certain doubts as to whether Inigo Jones's fabric occupies, or not, the site of the former chapel.

Of these chambers the greater portion, being Nos. 2 to 15, have been severally demolished within the past ten years. Some of them are replaced by two of the new blocks, erected between 1882 and 1887, after the designs of the late Sir G. G. Scott. Dial-court, including Nos. 13, together with the Council Chamber, that stood against the western wall of the chapel, was removed in the autumn of 1881, for lengthening by one bay, westwards, or 21 ft. internally, of the chapel. In the ceiling of a room at No. 13, lay an oaken beam bearing the initials "T. S." [Thomas Sanderson], with motto and date "Sans Dieu Rien, 1596." At No. 13, too, on the second and third floors, Thurloe, Solicitor-General to Charles I., and Lord Chief Justice of the Common Pleas, had chambers. It was in Dial-court, and not, as is commonly supposed, at his other chambers in this Inn—now No. 24, Old-square—that were accidentally found in the garret-ceiling, the mass of papers which Lord Somers caused to be bound in folio volumes, and which Thomas Birch edited in 1742.

Thus has it come about that of the original sets of chambers only Nos. 1 and 26, both in the gate, and Nos. 16 to 25, south of the (old) hall, now stand. The square-headed doorways, the exterior chimneys of "stock" brick, and most of the casements are comparatively modern. But a few lattices yet remain, and at No. 24 (tower staircase) and in the Chancery-lane front may be seen three or four of the mullioned windows. From some valuable particulars about the history of the "Thurloe" chambers, contained in an article by Mr. A. C. Ranyard in the *Athenaeum* of January 25, 1887, we learn that an early record of the use of distinguishing numbers for the staircases is furnished by an entry in the Lincoln's Inn manuscript "Red Books." The entry relates to the "admittance of a Mr. Hungerford to two chambers in Gatehouse-court and Chancery Lane-row, number (1)." This was in the year 1715. "No. 26" is cited under the year 1720; so we may conclude that by the latter date, which is several years anterior to the general adoption in London of numbers for postal purposes, all the staircases have the same numbers as they bear still, or did bear until, as we have shown, some of them were rebuilt. At his chambers in No. 1 staircase in the gate-house, William Murray, afterwards Lord Mansfield, began practice, removing hence, as Pope's couplet reminds us, to No. 5, King's Bench Walk, Inner Temple. Lord Hatherley, when Mr. Page Wood, had chambers at No. 25, and the late Mr. Tupper occupied a set in No. 21 soon after he was called, and during the time he wrote Part I. of his "Proverbal Philosophy." The "Thurloe" chambers are on the ground-floor of No. 24, looking out into Chancery-lane. Sir Matthew Hale tenanted the chambers over the central arch of the gateway, having previously lived in Garden-court. Mr. Spencer Perceval, who was treasurer in 1803, being then Attorney-General, had occupied chambers in Nos. 20 and 25. Amongst other celebrated men who are known to have resided here, we should not omit to mention Prynne, Speaker Lenthall, and Wentworth. Thurloe went from No. 24 to No. 13 in November, 1659, and it seems, continued there up to the day of his death. His gravestone, beneath the chapel, was inscribed:—"Here lies the body of John Thurloe (sic) Esquire, Secretary of State to the Protector Oliver Cromwell, and a Member of His Honourable Society. He died February 27, 1667." The Vice-Chancellor's two courts, which had been erected within Old-square in 1842, were pulled down in the last two months of 1883, and in March of the next year the court of Sir Lancelot Shadwell, last Vice-Chancellor of England, known to our generation as the late Vice-Chancellor Malins's Court, was demolished. It was erected in 1819, at the north-western corner of the Old Hall. The Chapel was re-opened on April 8, 1883, having been enlarged and repaired, under the direction of Mr. Salter, architect, the contractor being

* Presented to his fellow Benchers of the Inn, by C. E. Cooper, Q.C. Melmoth, born 1666, was called to the bench in 1719; buried beneath the chapel on April 14, 1743.

Mr. Longmore. To our notice of the works in our issue of April 7 of that year, we may add that the communion-table was replaced with one made out of wood from the old roof of St. Alhams Abbey.

Illustrations.

SOME CHURCHES UPON THE LOWER RHINE.—IV.

IN the aisles of the nave of St. Victor, Xanten, are a number of Early Medieval altars, six of which retain their original carved triptych retables. The two finest are close together in the south aisle; one is adorned with scenes from the Passion, and is probably a Flemish work. The wings are beautifully painted, and the whole of the architecture and groups of figures are painted and gilt. The second altar has subjects representing scenes from the life of the Blessed Virgin, but the centre statue is not of the same date as the rest of the work. Beneath the triptych is a most marvellous piece of carving representing the Tree of Jesse, almost Chinese in its extraordinary intricacy and elaboration. The whole of this reredos is of uncoloured oak, and is undoubtedly a work of the Calcar school—in fact, it bears a strong likeness to the triptychs in that church. Two of the other reredoses in the church appear to be of quite a different school, and resemble those which are to be found in some of the South German churches, such, for instance, as Moosberg, Rothenberg, Nordlügen, &c.; they consist, that is to say, of large niches filled with life-sized statues, and are far less complicated and intricate than the works of the North German and Flemish school of wood-carvers. With the exception of the six altars which we have already mentioned, all the others have rather late Renaissance reredoses,—far better, by the way, in design than one usually meets with in German churches. The altars themselves appear to be all Medieval, and form a most interesting study to an ecclesiologist; they have great aumbries cut into their southern ends, and the superaltars, where they exist, are movable features with little doors at their ends; in fact, they probably serve for retaining the candles to be used on the altar. One of these superaltars is very richly painted. The antependia or frontals are of every date, from the sixteenth century down to the present time, and many of them are splendid examples of ancient stuffs and embroidery. One of the altars has an arcaded frontal, like the high altar at Calcar; another of them bears the marks of decorative painting all over its stonework. It would, however, take us too long to enumerate the great number of objects of interest to be found in this most remarkable church, for not only is the building itself rich in every kind of furniture, but the sacristy and Chapter-house are perfect museums of Medieval art. The only features which are modern are the new stained-glass window at the west end, and the great organ-case; however good these may be in their way from a German point of view, we feel sure that every English archaeologist and architect will regret their introduction into a building which is so attractive from the genuine antiquity of all its contents.

H. W. B.

BUILDING FOR THE METROPOLITAN LIFE ASSURANCE SOCIETY.

THIS is the drawing of which we spoke at some length in our article of May 3 on Architecture at the Royal Academy. No plan is given with it, and we publish it simply as a piece of street architectural design of very refined character. The architects are Mr. Aston Webb and Mr. E. Ingress Bell.

BEDROOM IN A COUNTRY HOUSE.

THIS is the second of the two drawings under this title by Professor Aitchison which are hung at the Royal Academy. The explanation given with the publication of the other design in our last issue may be taken as applying to this also.

CHAPEL, ST. MARY OF NAZARETH, EDGWARE, N.

THE illustration is only a portion of a large work Mr. Brooks is erecting at Edgware for the Little Sisters of the Poor. The buildings con-

sist, on the east side, of several rooms for the sisters, and dormitories, with kitchens and other offices, laundry and drying-rooms. On the south side is the Mother Superior's sitting-room, dormitory, and reception-rooms, also the refectory. On the west side are the hospitals for incurables. On the north is the chapel. The enclosure within the several buildings is a large burial-ground, with a cloister on each of the four sides.

The chapel is groined throughout, and has a large choir for the sisters, with an ambulatory on the north, south, and east end of choir. Over this is the triforium gallery, the triforium and clearstory, the height to apex of groining being about 76 ft. On the south side of the choir is the Lady Chapel; on the north are two chapels and vestry; west of the choir come the transepts, with a double cloister on the south side leading to the burial-ground. The nave is without aisles; the ambulatory of the choir is carried through transepts and forms a kind of bridge connecting the triforium of the nave with that round the choir. At the west end is a tribune for the patients in the upper wards when attending service. The materials are red bricks and Ancaster stone. The interior of the chapel is wholly lined with stone ashlar. A part only of these buildings has been erected, and other portions are now in progress. The architect is Mr. James Brooks.

ORGAN CASE, ST. JOHN'S COLLEGE CHAPEL, CAMBRIDGE.

THE organ in St. John's College Chapel at Cambridge was built by Messrs. Hill & Son several years since,—at the time the chapel was rebuilt. The case was then omitted for want of funds. A new design for this has lately been made by Mr. J. Oldrid Scott, and executed, at a cost of about 700*l.*, by Mr. Thompson, of Peterborough. It is admirably carried out, the carved panels and other similar features being especially well executed. The cost has been defrayed by a College subscription.

COMPETITIONS.

Board Schools, Bromley.—The Bromley School Board recently invited a limited number of architects to compete for their new schools at Raglan-road for 700 children. We are now informed that on the award of their reference, Mr. R. Norman Shaw, R.A., the design of Mr. Charles Bell has been adopted, and the works will be commenced at once.

Germany.—A "preliminary" competition for a "Rheinvinz" monument in memory of the deceased Emperor William I., for which twenty-five designs were sent in, has been won by Messrs. Jacobs & Welling (of Düsseldorf). The winners, who have chosen for their site the far-famed "Drachenfels" of the Rhine, have placed the monument on the summit of this rocky height, and faced it with a magnificent scheme of terraces and cascades and have backed it with a Doric hall of monumental proportions.

The Chancery-lane "Safe Deposit."—The quinquennial anniversary of the Chancery-lane Safe Deposit was celebrated on the 7th inst., and the occasion witnessed the opening of the new extension by Alderman Sir R. N. Fowler, Bart., M.P. The accommodation added to the existing 5,750 safes consists of 250 new strong-rooms, intended for deed-boxes, &c., and two additional large strongholds for deposits, covering an area of 20,000 sq. ft.; these were designed principally to meet the requirements of solicitors and trustees who had the care of valuable deeds and other documents. The strong-rooms are fitted with the electric Light, and were arranged under the superintendence of the well-known firm of Milner, limited.

The A. A. Surveying Class.—This month will prove whether the members of the Architectural Association really desire the class for the study of land surveying and levelling to form a portion of their programme, or to be discontinued. The class started well eight years ago, but of late years has fallen off, an indication apparently that the younger members of the Association prefer the study of art to science. Full particulars are announced in the Brown Book. Names of those members desirous of joining should be sent to the Honorary Secretary of the Class, Mr. S. H. White, 7, Church-road, Brixton, S.W.

ON THE PLANNING AND CONSTRUCTION OF HOSPITALS.*

HAVING settled the dimensions of the ward, the next step is to place the beds and set out the windows. In some of the plans shown you will see that the beds are arranged in pairs with one window to every two beds. This plan of coupling the beds has many disadvantages. In the first place, each bed is unduly near one of its neighbours, instead of being placed in the centre of its own air-space; secondly, the ventilation cannot be so perfect as when each bed has a window each side of it; and, lastly, the beds are necessarily so close on one side to the windows that much inconvenience arises therefrom in the shape of draughts and cold currents of air from the condensing surface of the glass. Each bed, then, should occupy the centre of its own air-space, and should be between two windows.

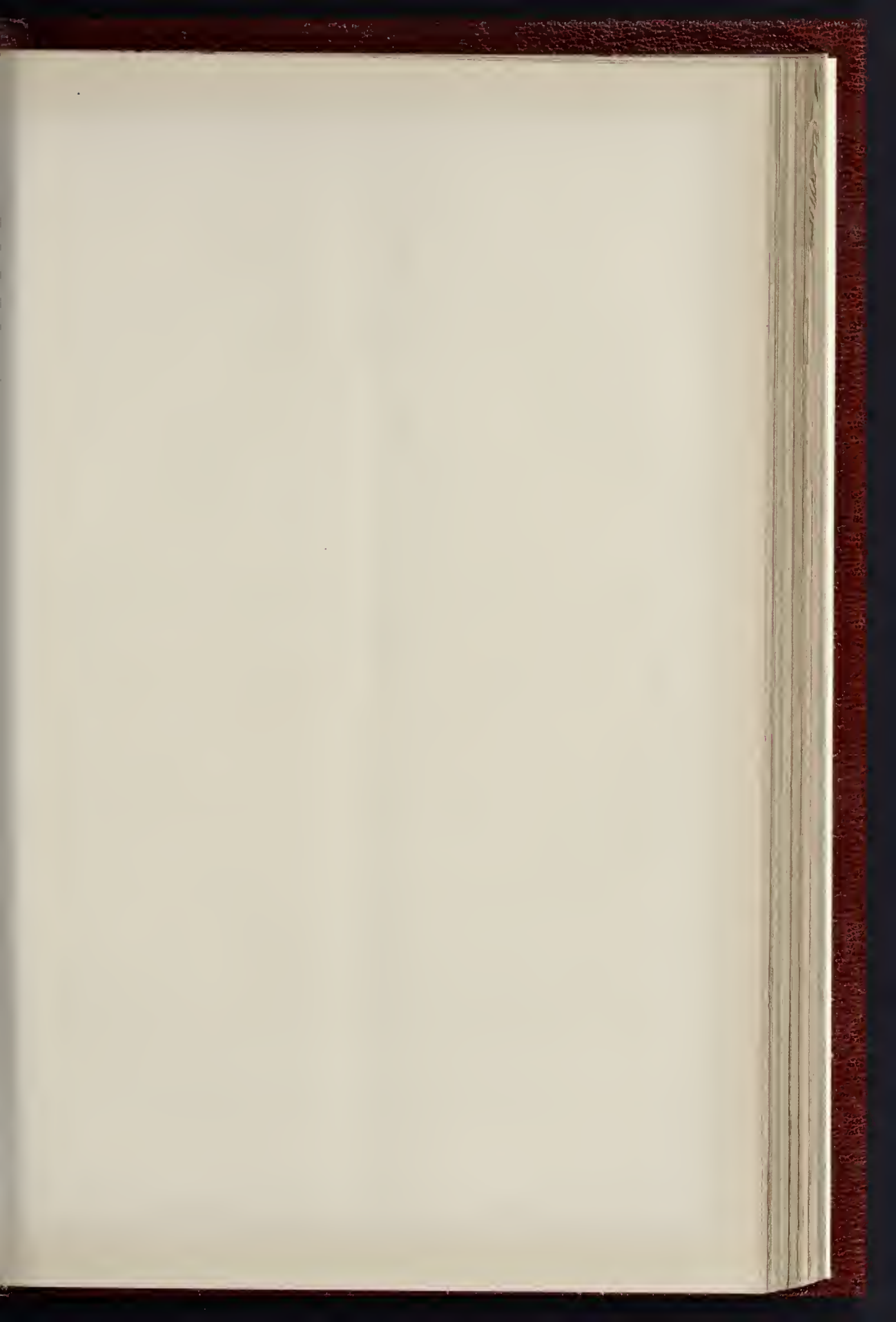
There is one more point to be observed in the arrangement of beds and windows. You will notice that in the wards at the Great Northern Hospital a small window is, in each case, interposed between the end beds, and the end walls, and the length of the ward is increased by the space necessary to get this window in. The reason for this is that it has been observed that when, as is usually the case, the end bed stands in a corner with a window on one side only, that particular bed has acquired a bad reputation as one in which cases have not fared as well as they ought; and the interposition of a window between it and the end wall has had the effect of correcting this bad tendency.

There are certain necessary rooms and offices which must be attached to the wards, and form a part of the pavilion. These consist of a ward-scuttler (or "duty-room," as it is the fashion to call it), a small larder for keeping food, cupboards for the ward linen and for patients' clothes, bath-room, water-closets, sink-room, and lavatory. To these may be added a small ward, or perhaps two, for one or two beds for special cases. The ward scuttler should be immediately adjoining the ward, and is used for washing the crockery used for patients' meals, for making poultices, warming beef-tea, and for the minor processes of food preparation usually done near the ward. It should contain a sink, a small dresser, and plate-rack, and a small cooking-range. Of the cupboards it needs only to be said that they should be well lugged enough, and that they should be well lighted and ventilated. If small wards are required, they should be placed at the entrance end of the ward, and a separate water-closet and slop-sink provided for their use.

The water-closets are usually placed at the further end of the ward. In a long ward there is no doubt some inconvenience in this arrangement, but it is, I think, more than counterbalanced by the interference with light and ventilation that would ensue if the closets were projected out at one side of the ward,—the only alternative to the end position. The water-closets must be separated from the ward by a lobby having windows on each side and doors at either end, in order that there may be no communication of air between the closets and the ward. In order to promote the free passage of air around the building, it is desirable to restrict the height of this lobby to just sufficient to give head-room, and to leave the space between the roof of one lobby and the floor of the one above free and open. The sink-room should be in the same building as the closets, and should be large enough to hold a slop-sink, a sink for washing utensils, and a sufficient storage of vessels not in immediate use. The bath-room must be large enough to hold a bath so placed that only one end is against the wall; and large enough to admit of a patient being wheeled in and lifted into the bath.

As regards details of construction, the first and last thing to be thought of in designing a ward is cleanliness. Everything that favours the accumulation of dust or dirt must be studiously avoided. All avoidable corners, all ledges or recesses, all quirks and unnecessary mouldings, are things not to be tolerated within the ward-pavilion. Floors should be as solid as concrete and solid wood-blocks can make them. The ideal wall surface for a ward has yet to be discovered. Parian cement has proved a costly failure, and glazed bricks or tiles not only have

* Continued from p. 339, ante, being the concluding portion of a paper by Mr. Keith D. Young, F.R.C.S., read on the 2nd inst., before the Architectural Association.



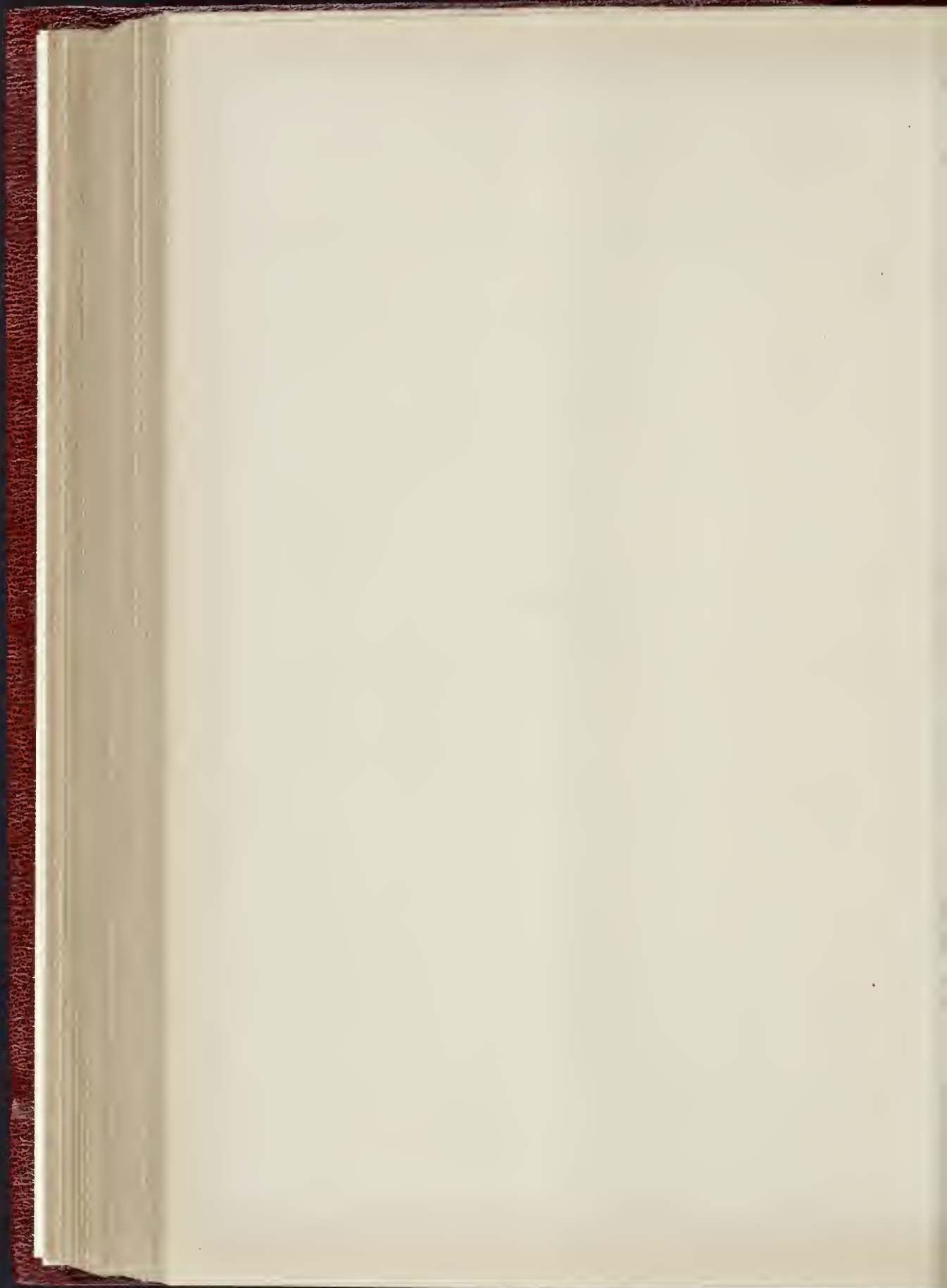


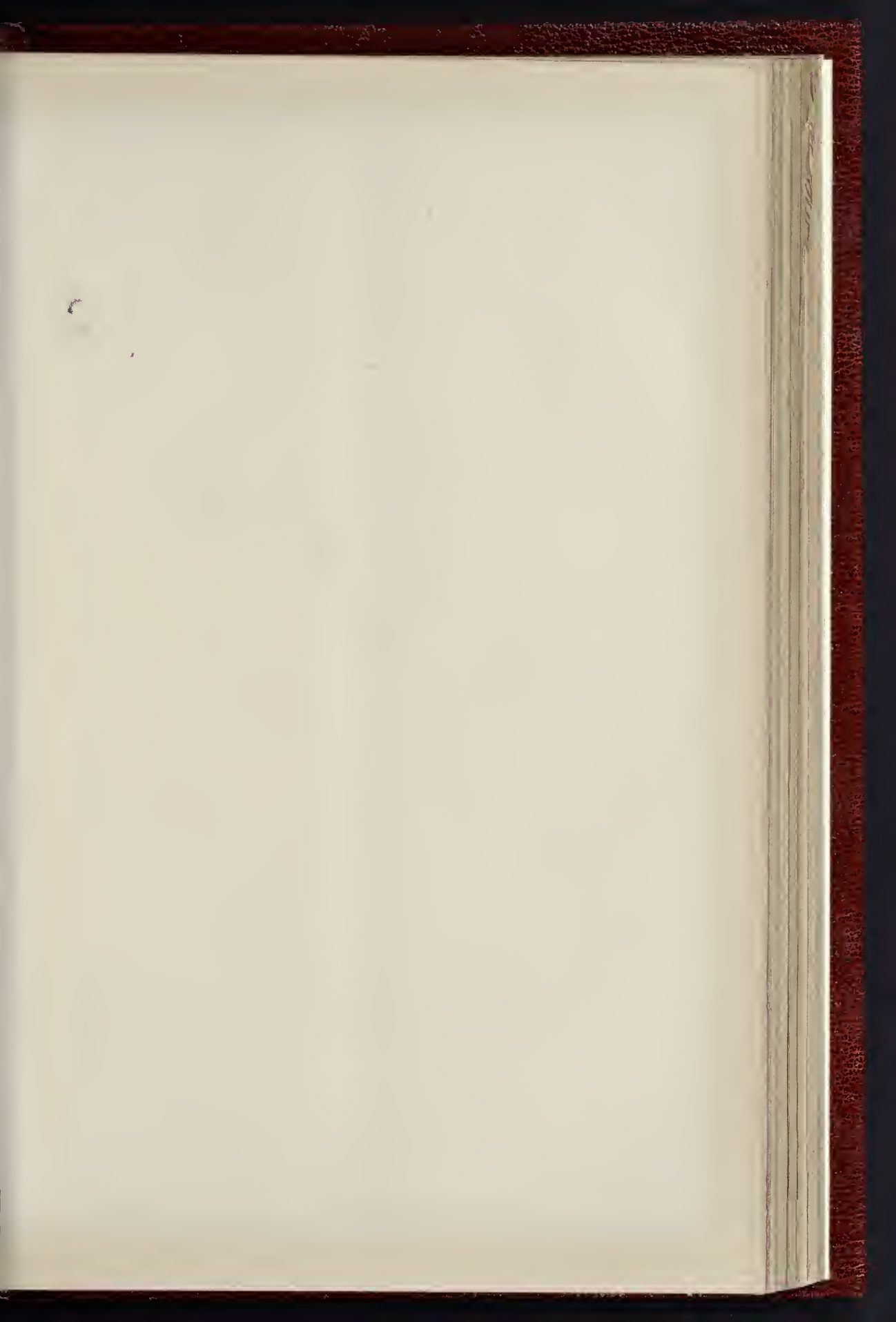
No. 1716 Royal Academy Exhibition. 1890.

BEDROOM IN A COUNTRY



THE BUILT UP PART OF THE WALLING LAY. JULY 1890.





THE BUILDER. MAY 17, 1890



MRS. JAMES BROOKS
Architect in Charge
25 Broadway St.
New York

Chapel of
St. Mary Magdalen
New York

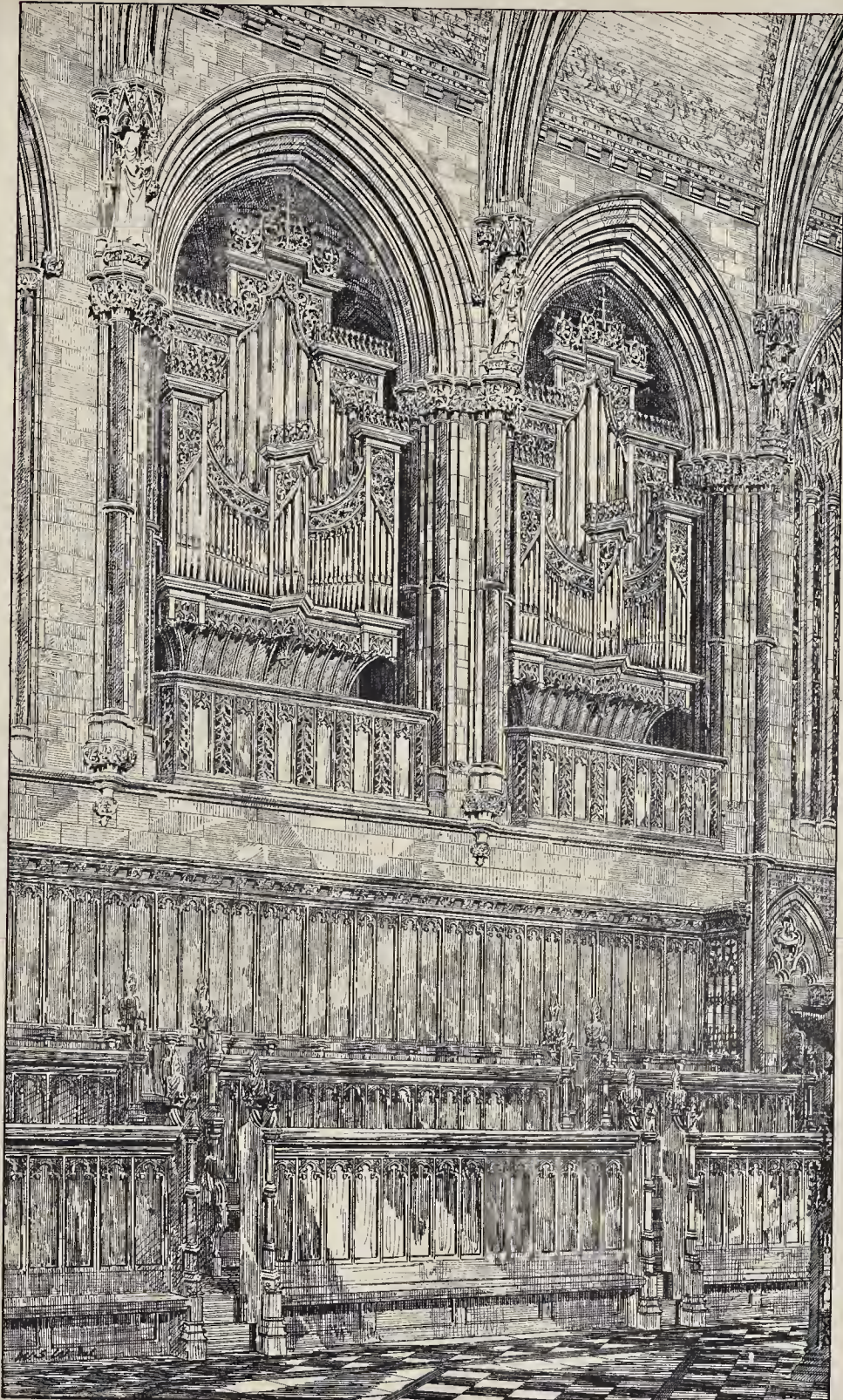
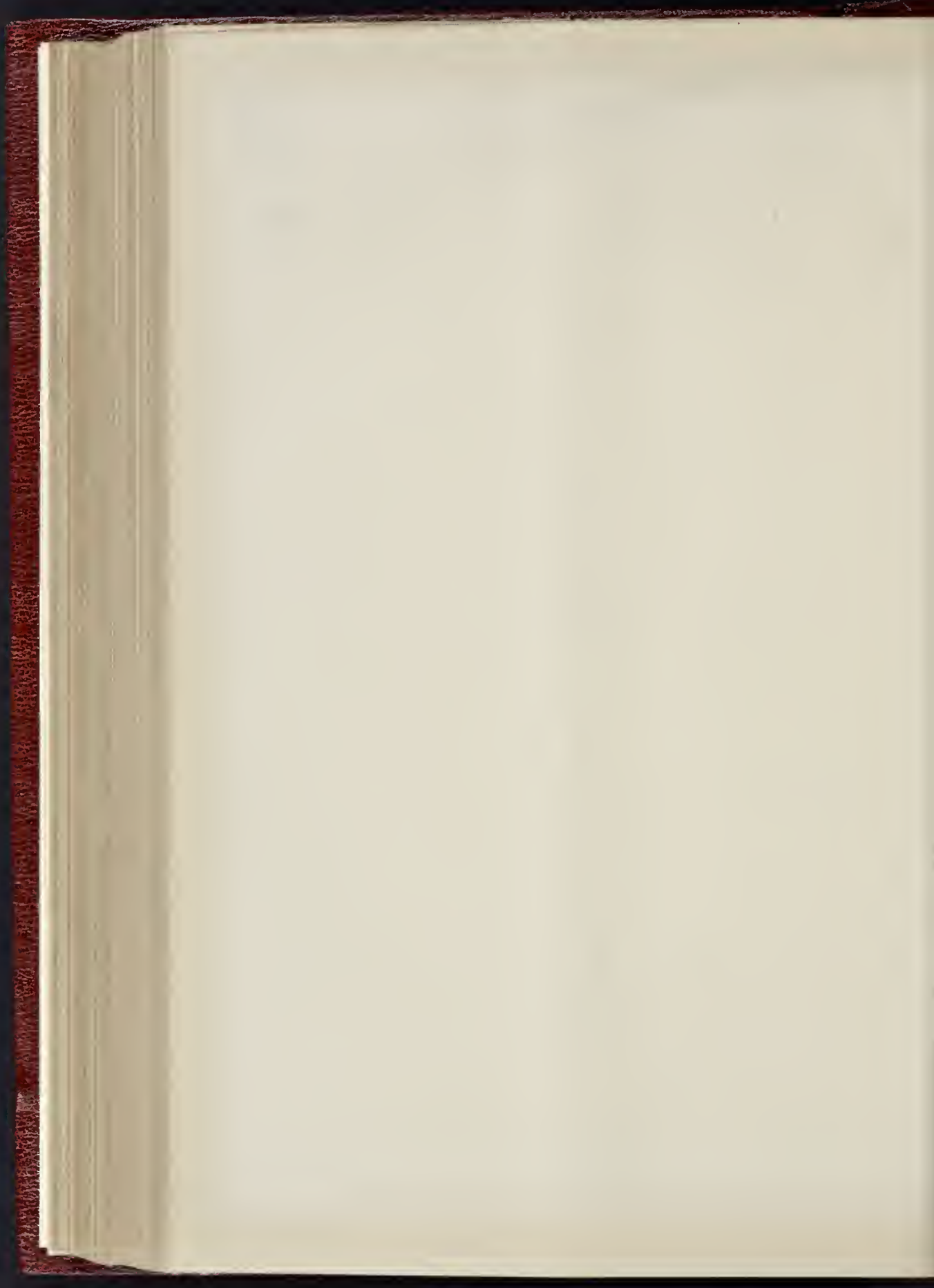


PHOTO LITHO "SHRAGLE & CO. 27, HASTING LANE, CANNON ST. LONDON E.C.

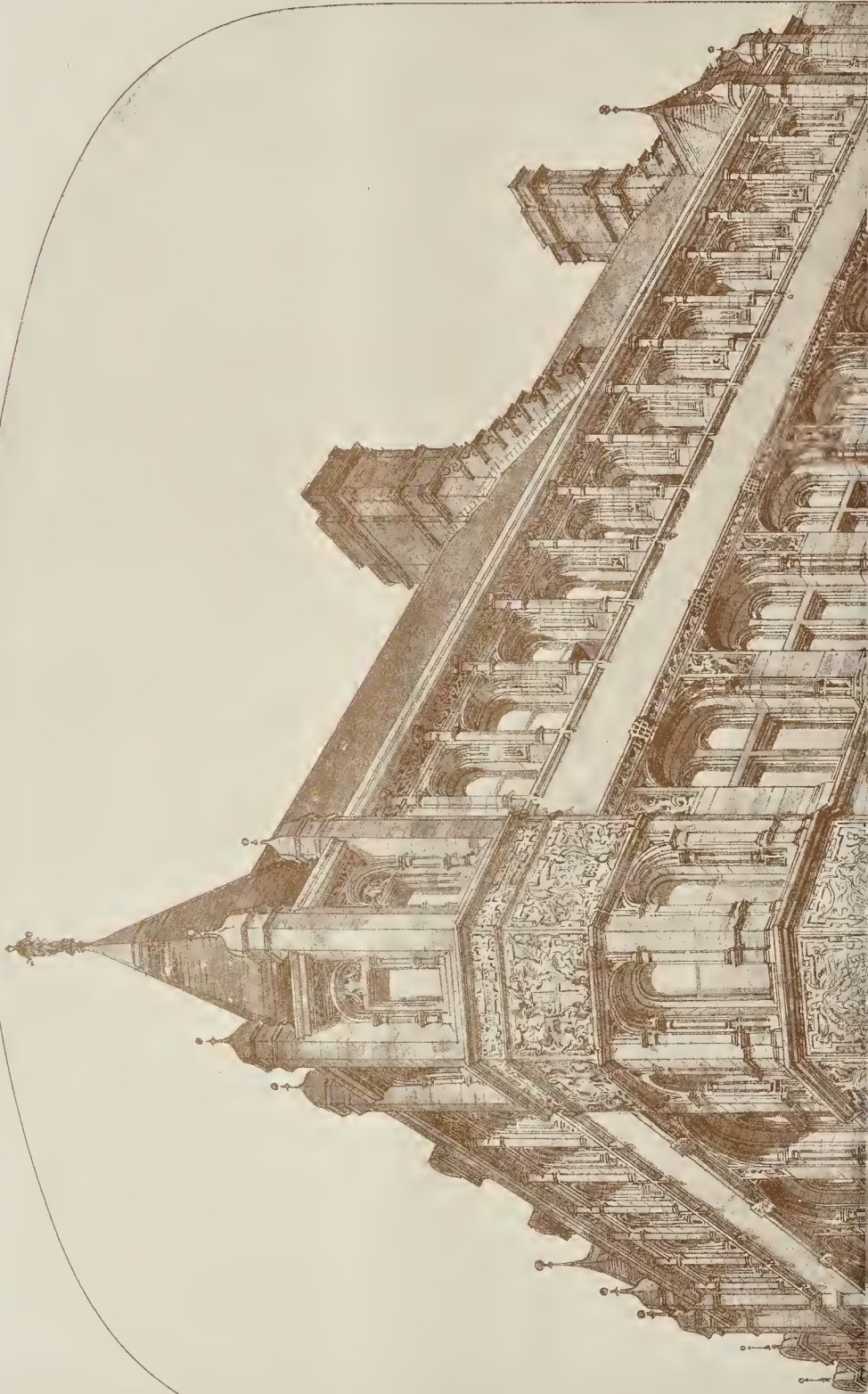
NEW ORGAN CASE, ST. JOHN'S COLLEGE CHAPEL, CAMBRIDGE.

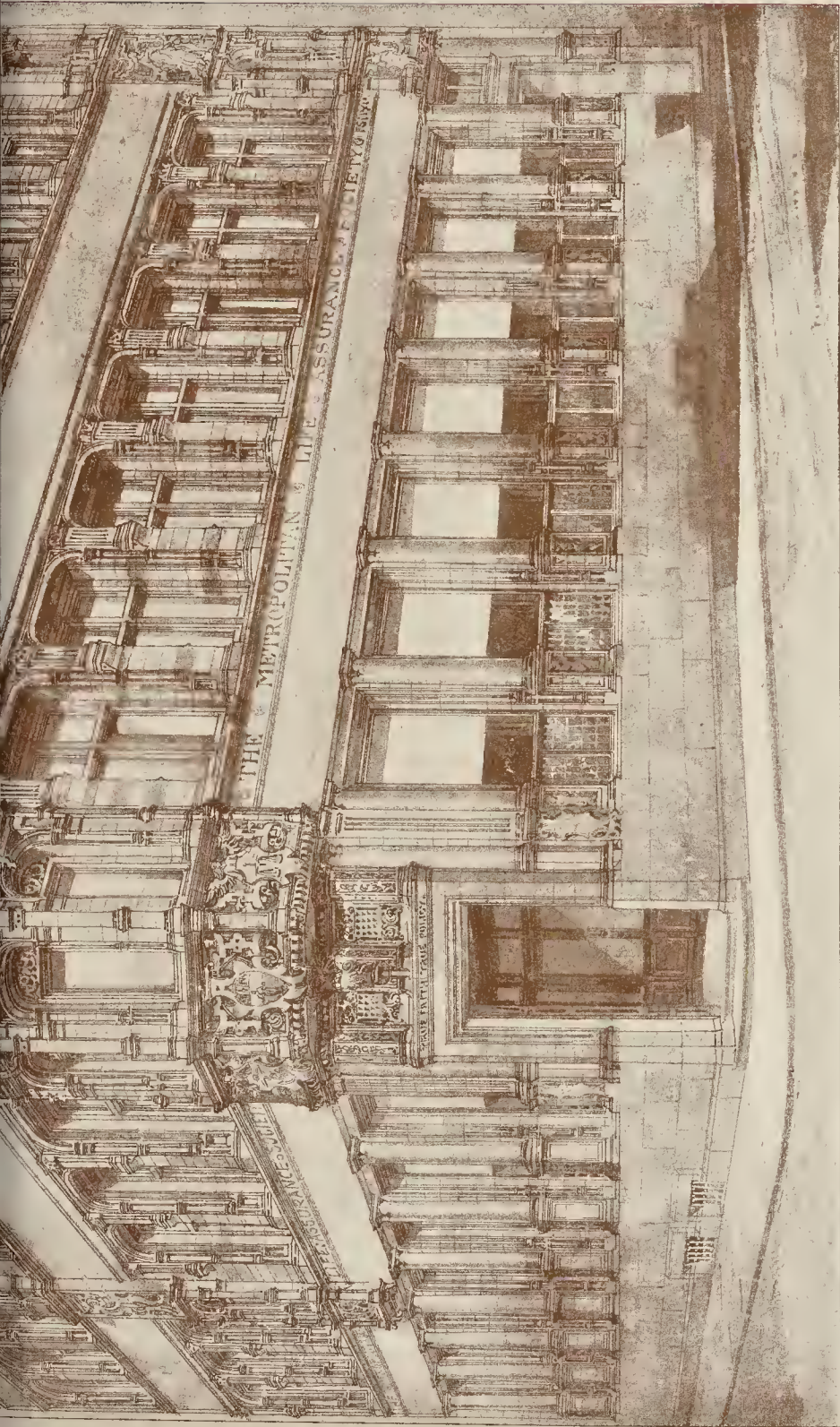
MR. J. OLDRID SCOTT, F.R.I.B.A., ARCHITECT.





THE BUILDER, MAY 17, 1890.





THE PHOTO BRUNNEN & CO. 22, MARTINS LANE, LONDON, E.C.

NEW BUILDINGS FOR THE METROPOLITAN LIFE ASSURANCE SOCIETY.

MR. ASTON WEBB, F.R.I.B.A., AND MR. E. INGRESS BELL, F.R.I.B.A., ARCHITECTS.

No. 1793 Royal Academy Exhibition, 1890.



many joints, but cannot be had of sufficiently true a surface to prevent altogether the lodgment of dust. In France the ward-walls are usually finished with what is called "stuc," which is neither more nor less than some kind of cement painted and varnished. I think myself that there is much to be said in favour of the plan adopted at the Middlesex Hospital. Most, if not all, of the wards were many years ago covered with Parian cement, the surface of which was polished. This proved to be by no means the impervious surface that was expected, and eventually the lower surface of all the walls was covered with a painted and varnished dado, and the space above distempered. Every year each ward is in turn emptied, the distemper cleaned off down to the bare cement, and the walls and ceilings re-coloured. One obvious advantage is that each ward gets a thorough and systematic cleansing at regular intervals, which is probably the best safeguard against septic disease.

The ventilation of a ward is, of course, a matter of the highest importance, for upon its efficiency and thoroughness the health of the patients mainly depends. Ventilation is commonly divided into two classes, natural, and forced or artificial ventilation, the one being accomplished by the aid of open windows and the ordinary fireplaces, the other by the aid of aspirating fans or exhaust furnaces, or a combination of the two. It is impossible for me to enter into the complex details of artificial ventilation within the limits of this paper—nor is there, I think, any great advantage to be gained by doing so. There is, I think, a little doubt that in England the most suitable form of ventilation is the most simple. Opposite windows assisted by the extracting power of open fireplaces supply all that is required, where properly handled, to keep the atmosphere sufficiently diluted. With our humid atmosphere and comparatively equable climate, where the changes of temperature are seldom either rapid or great, there are very few days in the year when ventilation by open windows cannot be resorted to. In America, on the other hand, the changes of temperature are so sudden and excessive and the atmosphere so deficient in moisture, that mechanical ventilation would seem to be a necessity.

The best form of window for a ward is, I think, the double-hung sash, with a hopper-light above. The lower sash should have the deep bottom rail and sill-board, and the hopper should have glazed cheeks at the side, to give the entering air an upward current, and to prevent down-draughts. It is desirable, also, to have some means of admitting air at the floor-level under each bed.

Before we leave the ward-pavilion, I will just refer to the mode in which in many hospitals abroad the wards are raised above the ground upon piers, and the space thus obtained left open for the free circulation of air. The plan is a further development of the pavilion system, by isolating the ward from the ground, and preventing the stagnation of air around the building. We have adopted this plan at the Great Northern Hospital, but in this instance there are additional reasons in the matter of levels and light and air which rendered it almost a matter of necessity.

We now come to the operation-room, which I have not mentioned as a special department, as it is an essential part of the ward or in-patient department. In large hospitals with medical schools attached the operation-room becomes a theatre, with its tiers of benches for students. Where no school exists it should be a room of sufficient size to hold the table, with room all round it for the operating surgeons and their assistants and nurses. Its aspect should be north, and it should have a top-light and a vertical light, and means should be provided for shutting-off entirely either light at will. Everything in the operation-room should be made as aseptic and impervious as possible, and floor, walls, and ceiling should be capable of being washed down with a hose-pipe.

The new operation-room at Chartist Hospital, built in 1886, is a detached building fifty yards distant from the hospital, and with no covered communication between the two. Inside the room everything is formed of washable materials; the surfaces of floors, walls, and ceiling are of cement, the window-frames are of iron, the table and shelves are of glass, and the operation-table itself is of zinc.

At the Derbyshire General Infirmary we have recently rearranged the operation-room, with

the object of rendering it as aseptic and washable as possible. The walls are lined up to a height of about 7 ft. with marble, the vertical and horizontal angles being rounded to a radius of 6 in. The floor is of Mischiati mosaic, laid to a fall with a specially-made fitting of gun-metal, closing the aperture to an open pipe leading out to a gully. The walls above the marble lining are painted and varnished. The sashes, skylight, and doors are all of iron, and every part is flush, no projections of any kind being allowed. The sinks and lavatory-basins are of porcelain, and the tops of plate-glass. The advantage of using glass is that it can be seen at a glance whether the *under* side is clean. All pipes, the lavatory-tops, and the shelf for instruments, are kept clear from the wall, so that no corners are formed.

Adjoining the operation-room should be a room for the surgeons, in which the instrument-case should stand, and at least one room for the administration of anaesthetics. The position of the operation-room should not be too far removed from the wards; at the same time, care must be taken to isolate it from all possible communication with the ward air. It must also be remembered that the operation-room should be quiet, and kept free from disturbing sounds from without.

In many large hospitals there are, besides the large general operation theatre, smaller operation-rooms used for special purposes,—about which it is only necessary to remark that for operations on the eye a vertical light is an absolute necessity, and that for all purposes a north light is the most valuable.

The mortuary and *post-mortem* room must, as I have before remarked, be placed in an absolutely detached building; and must also be at a sufficient distance from the wards to put any chance of contamination of the air of the latter beyond the range of possibility.

Here, again, scrupulous cleanliness is all-important, and every part must be made easily washable. Cleanliness in the *post-mortem* room is of vital importance for the sake of those who have to work there, and I think as much care should be taken to make it washable and aseptic as if it were an operation-room.

The out-patient department is really a separate institution, and except for the convenience of having a dispensary common to both in and out-patients there is really no advantage in having both departments in one group of buildings. It is, of course, also the fact that the out-patient department is the source from whence many of the in-patients are drawn; but this fact certainly does not necessitate the very close proximity between the two departments. The fact is that very serious evils have occurred in the past through the intimate intercommunication existing between out-patients' departments and the wards, and there can be no doubt that the more distinct the two are kept the better for the patients in the wards.

I am unwilling to lay undue stress upon my own work; but in order to illustrate this part of my subject, I must once again refer to the Great Northern Central Hospital,* the out-patient department of which is a one-story building wholly detached from the rest of the hospital. There are two entrances, one for male and other for female patients. These each open into a small waiting-room for new patients, the two rooms being separated by the office for registration. These waiting-rooms and the office open into the large central hall, at the further end of which are grouped the four consulting-rooms, with their small rooms attached for special examination of patients, and a dark room for ophthalmoscopic work. All these rooms open into a corridor which leads to the dispensary waiting-room. The grouping of the consulting-rooms at the end of the waiting-hall rather than at each side, and the arrangement of the corridor at the back, are planned with a view to prevent patients retracing their steps, or, as far as possible, crossing each other. The closets for each sex are entirely outside the building. The dispensary serves for both in and the out-patient department, and as by far the heaviest part of its work is concerned with the latter, it must be placed with reference to it rather than to the former.

One of the most important things to observe in a hospital dispensary is to make it small enough. The work has to be done at such pressure that it is important to reduce as far as possible the labour involved in doing it. A room where the dispenser could reach all

the bottles he requires by simply stretching out his arm without moving his feet would, if it could be made, be an ideal dispensary.

We have now, I think, travelled over every part of the hospital, and considered in as full detail as the time at our disposal warrants, most of the arrangements upon which the health and comfort of the patients depend. Some things I have not touched upon. I have said nothing, for example, of drains, because there is nothing that has to be said of a hospital drain that does not equally apply to the drain of any other building intended for habitation. Neither have I said anything about circular wards, because I wished to confine myself to well-ascertained principles, and to avoid anything of a controversial nature. That circular wards are, within certain limits, as efficient, and, under certain conditions of site, superior to rectangular wards I am convinced, but the main principle involved has yet to be decided by the test of time—a test which will be applied in the new Royal Infirmary at Liverpool, now approaching completion from the designs of Mr. Waterhouse.*

Let me conclude by urging those of you who care to follow up this, to me, most interesting of all studies which fall to the lot of our profession, to learn well the lessons which the experience of the past has to teach us; and above all to study the matter, not from books, but from the hospitals themselves. The most valuable lessons that can be had are those which are got only by careful observation of the daily life of a hospital, and by noting how, by thoughtful care for this or that detail, the great and unceasing work of keeping a hospital clean can be helped and simplified.

The Chairman (Mr. Leonard Stokes, President), having invited discussion,

Mr. F. T. Baggally, in moving a vote of thanks to the author of the paper, said that Mr. Young had made the subject so entirely his own that his paper was especially valuable to them.

Mr. A. O. Collard said he had much pleasure in seconding Mr. Baggally's proposition, for Mr. Young had evidently taken great pains in placing the results of his valuable experience before them. He had spoken of the horrors of the old Hôtel Dieu, which were terrible to think of; but he had also been extremely kind in not calling attention to some of the older hospitals which we had in London, which were in many respects examples of what hospitals ought not to be. Several of our existing hospital buildings would require the expenditure of a large amount of money to put them into proper condition, and it was greatly to be regretted that their defects were not more widely known and more exposed to public criticism than they were. He (the speaker) noticed that in the isolation ward of the London Fever Hospital, Liverpool-road, the walls were of glazed bricks or tiles. He should like to know how alternations of temperature affected the surface of the tiles,—whether they did not frequently become streaming with wet in the shape of condensed moisture; and, if so, what was the effect upon the patients? Mr. Young, in giving them the maximum and minimum limits of cubical space, did not refer to the regulations issued by the Local Government Board. Those regulations were based upon the information provided by doctors and the Board's own professional architectural adviser, and they seemed to be very nearly a mean between the two extremes. They were very useful. Mr. Young had spoken so strongly upon the advantages of natural ventilation whenever it could be obtained that it was not necessary to say more upon that point. Mr. Young had very truly remarked that the subject of hospital planning must be studied, not only from books, but from the actual buildings themselves.

Professor McHardy, of King's College Hospital, in an amusing speech, said that Mr. Young, in his capacity of architect, was one of the best friends of the sick poor which Europe

* Amongst other hospitals with circular wards, we may mention the following, which have been described and illustrated in the *Builder* for the dates mentioned, viz.:—Civil Hospital, Antwerp (July 7, 1883). The "Miller" Memorial Hospital, Greenwich, erected as a memorial to the late Canon Miller, the founder of "Hospital Sunday;" a description and plan of the building, showing circular ward, were published in the *Builder* for Aug. 23, 1884. Hospital for Seaforth Cavalry Barracks, designed by Major-General Sir Andrew Clarke, R.E. (Nov. 15, 1884). Hospital of one story, with circular wards, for Egypt, designed by the Viscountess Strangford (Jan. 3, 1885). Design for a Military Hospital for a hot climate, by Sir Andrew Clarke and Mr. E. Ingress Bell (May 9, 1885). The Great Northern Central Hospital, Messrs. Young & Hill, architects (Dec. 25, 1886).—Ed.

* See plan published in the *Builder* for Dec. 25, 1886.—Ed.

possessed. He (the speaker) congratulated the architectural profession upon the advance which had taken place in the study of hospital planning during the last quarter of a century. Some twenty-five years ago there was opened the Poplar and Stepney Sick Asylum, which to the speaker's notion was the first really creditably-planned and arranged hospital for the sick poor of this country. Since then great advances had been made, and although he (the speaker) had been studying the question and writing upon it for many years, he had now given up writing on the subject, because he found that architects such as Mr. Young were able to teach him. He quite agreed with Mr. Young as to the importance of avoiding all mouldings, or quirks, or whatever they might be called, which would collect dust and dirt; for cleanliness and facilities for cleanliness were most essential conditions for successful nursing. Mr. Young had very well said that the nurses' quarters should be right away from the hospital wherever possible. While it was all very well and very proper to provide all that was necessary for the comfort of the patients, many of whom were hopelessly diseased and incurable, it was not desirable, nor was it necessary, that the nurses should be entirely sacrificed to the patients. It was a melancholy fact that the death-rate of nurses was just double that of any other class of women in the kingdom, and it was eminently desirable that their quarters should be right away from the hospitals whenever possible—i.e., in separate buildings, and not in the buildings where the hospital wards were situate. The nurses must no longer be stowed away in unwarmed and unventilated garrets, or in places where a man would not think of stabling his horse. It was also desirable that they should remember, as Mr. Young had pointed out, that every bed in the ward should have a window on each side of it. It had been noticed that a bed placed at the end or corner of a ward, with a window on only one side of it, was not so favourable in position for the recovery of the patient as a bed with a window on each side of it. The mortality in these end or corner beds had been found to be greater than in the others. Another important point for architects to remember was to insert clear glass panels in all cupboard doors, so that the interiors of the cupboards could be readily inspected. Some women, even hospital nurses, were very untidy, and he had known them make cupboards with opaque doors serve as receptacles for all kinds of filth. In regard to the heating appliances of hospitals, it was necessary to provide sufficient heating-power to meet the necessities of old and infirm patients in the very extreme of cold weather. It would not always be necessary to utilise the heating-power to its full capacity, or anything like it, but it should be so arranged as to afford the means of increasing or decreasing the heating-power, as might be necessary from day to day. As to the regulations of the Local Government Board they were all very well, but he urged architects not to be led by the Local Government Board, but to lead it. The Local Government Board, between the cross fires of opposing interests, was perhaps rather too prone to compromise matters, and compromises were not always satisfactory. Moreover, there was about the Local Government Board, as about all other Government departments, a great deal too much red tape.

Mr. P. Gordon Smith, Architect to the Local Government Board, who was called upon by the Chairman to address the meeting, said that he did not know that he could add anything of practical value to what Mr. Young had so well told them in his paper. He was a little surprised to hear the last remark of Professor McHardy, because as far as he (the speaker) was concerned, he was always only too eager to avoid the entanglements of red tape.

The chairman, in closing the discussion, said they could not be too thankful to Mr. Young for his paper. There was one point, however, upon which he should like to ask a question. Mr. Young had spoken of the desirability of keeping the out-patients' department as distinct as possible from the in-patients' department, with a view partly to prevent any infection being brought into the hospital. But he should like to ask what special precautions, if any, could be taken to prevent out-patients themselves from communicating infectious diseases to each other? He then put the vote of thanks to the meeting, which was carried by acclamation.

Mr. Young in briefly replying, said that no special means of preventing the communication

of infectious diseases from one out-patient to another could be taken beyond the precautionary measures which were taken at one or two hospitals he knew, where the nurse or other official in charge of the out-patients' department exercised all possible vigilance, and at once isolated all patients whose symptoms appeared to be those of infectious disease. As a matter of fact, the form in which infectious disease was most frequently detected in the out-patients' waiting-rooms was scarlatina. The nurse or nurses in charge of the out-patients' waiting-room consequently kept a vigilant eye upon all children, and isolated them in a separate room provided for the purpose until the doctor could see them. Where that system had been adopted it had been found to be very successful.

The meeting was then brought to a close.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.

The third annual meeting of this society was held at the School of Art last Tuesday night, Mr. C. J. Innocent, Vice-President, occupied the chair, in the absence of Mr. F. Fowler, the President, who wrote expressing regret that he was indisposed. There was a good attendance of members.

The report of the Secretary, and the Treasurer's statement of accounts, were read, and showed that the Society now consisted of 44 Fellows, 24 Associates, and 6 Students, and that the balance in hand is 557.

The report stated that an invitation had been received last July from the Royal Institute of British Architects to hold the first Preliminary Examination in conjunction with the Institute and the allied societies. Seven candidates had presented themselves and passed, and had been registered as Probationers of the Royal Institute of British Architects, and their names published in the Institute Calendar for the current year. The Council gave a guinea book-prize, and remitted the examination fee in each case to signalise the importance of the inauguration of a series of examinations for the rising generation of architects. Interesting papers had been read on "Engineering Surveying for Railways and Waterworks," by Mr. W. H. Lancashire; "Old English Ironwork," by Mr. H. Longden; "Elementary Notes on the Mouldings of English Medieval Architecture," by Mr. J. B. Mitchell-Withers; "The Valuation of Property," by the President; "Municipal and Sanitary Engineering," by Mr. C. F. Wike, Borough Surveyor; and "The Present State of Questions relating to Quantities," by Mr. T. M. Rickman, of London.

The Council has also supplied information to the Standing Practice Committee of the Royal Institute of British Architects, having received a communication from the Hon. Secretaries, on the general practice relating to quantities in the Sheffield district. The Council has had under careful consideration certain suggestions to accompany the By-laws of the Sheffield Town Council as to new streets, buildings, and plans of the same.

The need of an independent meeting-room and room for the use of the Library was urged upon the members.

The report and balance-sheet were adopted, on the motion of the chairman, seconded by Mr. Gibbs, and supported by Mr. Smith. A ballot then took place, and Mr. W. Farrington was unanimously elected an Associate.

The meeting next proceeded to ballot for the election of Officers and Council for the coming year, Messrs. W. C. Fenton and C. Gibson acting as scrutineers. The following were elected for the season 1890-91:—President, Mr. F. Fowler; Vice-President, Mr. C. J. Innocent; Treasurer, Mr. J. B. Mitchell-Withers; Hon. Secretary, Mr. C. Hadfield. Council: Messrs. T. J. Flockton, E. M. Gibbs, W. F. Hemsoll, W. H. Lancashire, and W. C. Fenton.

The meeting had under consideration "detailed suggestions and particulars relating to the formation and construction of new streets, buildings, &c.," which it is understood will be considered at the next meeting of the Town Council; and as it appeared to the members some of these suggestions would involve considerable expense and trouble to the building public, and might well be modified without interfering with the objects aimed at, it was resolved to memorialise the Town Council on the subject.

THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

AT the monthly meeting of this Association, held on the 3rd inst. at Carpenters' Hall, with Mr. H. Alexander in the chair, a paper on "The Drainage of Buildings and its Relation to Health" was read by the Deputy-Inspector of Nuisances of Bristol, Mr. Thomas Lowther. The existence of so many systems of drainage, and the great diversity in opinion among experts, made it, in the lecturer's opinion, highly necessary that "public officers" administering the laws of health should be thoroughly acquainted with the correct principles upon which the drainage of buildings should be carried out. Even where such work was entrusted to professional sanitary engineers, satisfactory results were not always obtained, for generally some local plumber or builder, possessing perhaps but little knowledge of this particular branch of sanitary work was called upon to do it. House-drainage properly carried out was the completion of a perfect system of sewerage. A town might be possessed of otherwise perfect drainage, but health would not be greatly improved if house drains were left in their old dilapidated state. The serious danger incurred by individuals continually inhaling foul gases from defective drains would not be endured but for hygienic and physiological ignorance. Drains in former times were vast in volume, and in them the velocity of passing sewage was so reduced as to lead to a rapid deposit of solid matter. They were thus converted into cesspools that produced gas laid on to the houses as completely as coal-gas could be from a company's mains. Unfortunately in modern houses a similar state of things too often still prevailed. Drainage systems were divisible into four classes, viz., the ordinary, sectional, manhole chamber, and iron connecting pipe systems. In the first, where no means for inspecting drains below ground were provided, and where it was impossible to tell in case of a stoppage where to look for it, and expensive excavations had often to be resorted to. In such systems fresh air inlets should be carried up above the main roof. To assist ventilation, powerful exhaust cowls should always be fixed on outlet vent-pipes to assist circulation. In systems like those of Hellyer, Banner, Buchan, and others, belonging to the "sectional" class, intercepting-traps were placed at the foot of each soil-pipe, and the air inlets being generally fixed right over them all portions were separately ventilated. Such a system was subject to serious defects, and in the lecturer's opinion it should not be applied to private dwellings, but should be confined to infirmaries and similar institutions, particularly infectious hospitals. He would advise the use of lead traps and connecting pieces with wiped lead joints. In any good system the only joint in a house would be that connecting water-closets with a soil pipe outside. The lecturer had for many years practised the "Manhole Chamber system," to which he gave a preference, as did nearly all advanced sanitarians now. In this class drains were laid out in straight lines from manhole to manhole, these being constructed with intercepting traps at angles and at other necessary points. Good workmanship in constructing such drains must be insisted on, and if either stoneware or cast-iron pipes were used, they should be truly laid in a uniform gradient. Stoneware pipes should further be laid on beds of concrete, their numerous joints being particularly liable to get started by vibration resulting from heavy traffic in adjacent streets. In the Scott-Moncrieff system, iron pipes were used in connexion with manhole chambers, fitted in this system with cast-iron manhole frames. Cast-iron pipes, which had been in partial use many years, possessed many advantages, but they were costly, were liable to interior fouling, and a fear was expressed with regard to the Moncrieff frames that unless inspections were frequent, the bolts would become immovable, and thus render this system useless. On account of its simplicity and other advantages, the lecturer considered the manhole system better than any previously brought forward, whether in conjunction with cast-iron or stoneware pipes. Among intercepting traps, Winsor's, Rogers Field's, Crapper's, and Buchan's were described as fairly good, Winsor's 4 ft. by 6 ft. taper traps being thought particularly worthy of mention. Damp sites were, in conclusion, touched upon,—diphtheria, consumption, and other preventable diseases being in

Mr. Lowther's opinion, very frequently induced by constantly breathing air charged with watery particles. Such sites should be carefully prepared by effectual drainage, distinct (if possible) from the house-drains, and the whole site should be concreted.

A discussion followed. Mr. Legg, the secretary, in moving the usual vote of thanks, expressed satisfaction that the vital question of codifying the sanitary regulations of the Metropolis was being considered by the London County Council. A uniform code would add to the number of Inspectors in the Metropolis, the 111 at present in office having a population of 45,000 per man, on the average, to look after. Mr. Fairbaird seconded the motion, which was supported by Messrs. Hills, Tidman, Richards, Perry, Grant, and others, besides the Chairman, by whom the discussion was brought to a close. The vote of thanks having been unanimously accorded, was briefly acknowledged by Mr. Lowther.

THE LONDON COUNTY COUNCIL.

The ordinary weekly meeting of this Council was held on Tuesday last in the County Hall, Spring-gardens, Lord Rosebery in the chair.

Parks and Open Spaces.—The following adjourned report of the Parks and Open Spaces Committee came up for further consideration:—

“Early in 1889 the Council was asked by the Metropolitan Public Gardens Association to undertake the maintenance of certain gardens and playgrounds, mostly of small size, in various parts of London, which the Association had laid out at a cost of 4,277. It is contrary to the rule of the Association to maintain grounds; but they obtain the necessary funds and lay out, either as gardens or as playgrounds, spaces in the poorest and most crowded districts of London; and then, having proved by a short period of maintenance the value of such places for recreative purposes, ask the local authorities to maintain them. Unfortunately, the places being generally situate in poor neighbourhoods, the local bodies themselves frequently do not feel justified in adding to their expenses, having regard to the fact that their ratepayers are already taxed for the maintenance of the large parks, into many of which they are debarred by distance from entering. The Association have, therefore, as regards the places to which we at present refer, applied to the Council for aid. We have given the subject careful consideration under every aspect. We first of all invited the local authorities to maintain the places or to contribute to their maintenance. The comparatively wealthy parishes of Hamstead and Islington have agreed to maintain in the one case Haverstock-hill playground, and in the other, Barnsbury and Edward-square-gardens. These three places are therefore not included in the list. As regards Red Lion-square garden, the Holborn District Board has agreed to contribute £52 annually for its maintenance, and the Whitechapel District Board, which already maintains one recreation ground of its own, has promised £50 a year towards the keeping up of the Winthrop-street playground. The other places being situate in parishes where the rates are already heavy, and the ratepayers mostly poor—viz, Mile-End, Bethnal-green, Ratcliff, Shadwell, Limehouse, and Rotherhithe, the local authorities have, whilst acknowledging the value of the places, expressed their inability to maintain or contribute. We should take this opportunity of stating, as the result of several visits paid to the places named, that we quite agree with the local bodies as to the value of them for recreation, and we also consider that the mere size of a place has nothing whatever to do with its value in this respect. Indeed, in the crowded parts of Eastern London, large open spaces cannot now be obtained. We would also remark that, maintained as part of a general system, these gardens and playgrounds can be more economically kept up by a central authority, which as a special gardening staff, than by a local body which, although possessing roadmen and servants of that class, has no skilled gardening staff. We consider, however, that the wealthier parishes should specially contribute to the Council's expenses in the matter. It is with great regret, therefore, that we have to mention the refusal of the Vestry of St. Martin-in-the-Fields, after more than one application made by us, to either maintain or in any way assist in the maintenance of the parish buryard as a recreation ground, or of

a disused burial-ground in Russell-court, Drury-lane, which is within their district. With regard to this latter place, we feel its value so much for the poor children of the congested neighbourhood where it is, that we have included it in the list; but, as regards St. Martin's Churchyard, we are not prepared to move. As regards the annual cost of maintaining the places which we recommend the Council to take over, we may state that it will probably be about £1,020. We would remind the Council that the taking over of these grounds does not bind it to assume the charge of every other place which may be laid out under similar circumstances, nor even to maintain the places here mentioned one hour longer than they are found to be of public utility. Having placed the Council in possession of the facts, we recommend:—

“That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, the Council do undertake, at an estimated cost of £1,020 a year, the future maintenance of the following places:—

	Area.	Estimated cost for wages.
1. Red Lion-square-garden, Holborn.....	1a. 2r.	£28
2. Winthrop-street-playground, Whitechapel.....	0a. 2r.	30
3. St. Dunsion's Churchyard, Stepney, garden.....	7a. 0r.	142
4. Limehouse Churchyard-garden.....	3a. 0r.	111
5. Holy Trinity Churchyard, Tredegar-square, Bow.....	1a. 1r.	50
6. Carlton-square-garden, Mile-end.....	0a. 3r.	50
7. St. Paul's Churchyard, Rotherhithe, garden.....	0a. 3r.	50
8. Spuffield-playground, Elm-month-street, Clerkenwell.....	2a. 0r.	50
9. Drury-lane-playground, Russell-court.....	0a. 1r.	50
10. St. Paul's Churchyard, High-street, Shadwell, garden.....	1a. 0r.	50
11. St. Bartholomew's Churchyard, Bethnal-green, garden.....	1a. 0r.	50
Materials.....		149
		£1,020

These recommendations led to a long discussion, several amendments being moved, and ultimately the further consideration of the subject was again adjourned.

The Strand Improvement.—Mr. Charles Harrison, chairman of the Parliamentary Committee, presented the report of that Committee, of which the following was the first paragraph:—“The Strand Improvement Bill came before the hybrid Committee of the House of Commons on the 8th inst., when the Council's case was opened by Mr. Pope, Q.C., and the chairman of your Committee was partly examined as a witness. The deposited plan showed that the width of the Strand after the widening opposite Norfolk-street would be 100 ft., and that the north line of the new street would be a little south of the eastern end of Holywell-street, with limits of deviation up to Wych-street in a triangular form. The Chairman of the Committee of the House desired counsel for the Council to state on the following morning what land out of that comprised in the present limits of deviation was required by the Council for the line of street. After consultation with the Valuer and Engineer, we concurred in their views, and were of opinion that the plan, as explained by them, would be the best plan to adopt, by which in effect the whole of the site of Holywell-street would remain as part of the site or addition to the new street, and that the narrow strip of land (about 3,000 superficial feet) south of Holywell-street, between that street and the line of the new street, should be added to the width of the new street,—thus making the street, immediately opposite Norfolk-street, about 120 ft. wide. It was explained that the adoption of this would avoid having to acquire trade and other premises on the north side of Holywell-street, and that certain houses facing Wych-street, within the limits of deviation and on the east and west of Newcastle-street at the northern or Wych-street end, would not be available for the purposes of occupation; but as we were advised that the value of the premises foreoccupied was about equal to the cost of their acquisition, we resolved that Mr. Pope, Q.C., should be authorised to state to the Select Committee the limits to which the amount of land to be taken for the improvement could be confined according to the plan discussed before us, and that copies

of such plan should be prepared and placed before the Committee of the House.”

This led to a somewhat acrimonious discussion, in the course of which Mr. Harrison was blamed by some members for the course he had taken; other members defended his action; while others, steering clear of personal references, said it would be regrettable if the Council did not get power to acquire the north side of Holywell-street, inasmuch as it would perhaps stand for years as an eyesore to what would otherwise be a great improvement.

The Water Companies and their Charges.—The Parliamentary Committee also reported as follows:—

“As instructed by the Council on the 6th inst., we have again considered the terms of the petition which we then recommended should be presented to the House of Commons, with a view to measures being taken to restrain the Water Companies from increasing their charges in consequence of increases of assessment due to the quinquennial valuations. On further deliberation we are of opinion that the petition should be confined strictly to the effect, which, in the absence of measures of restraint, the valuations must have on the power of the companies to increase their charges, and we recommend:—

- 1. That we be authorised to prepare a petition in the following terms or to the following effect:—
- (1) That it is inequitable to the ratepayers of the Metropolis, and prejudicial to any future acquisition of the water supply by a municipal body, that the charges of the water companies should be increased merely by reason of any increase in the quinquennial valuation of property in the County of London.
- (2) That your petitioners, therefore, pray your Honorable House to take such measures as shall restrain the power of the water companies of the Metropolis to make an increased charge merely by reason of any increase in the quinquennial valuation of property in the County of London.”

These recommendations were unanimously agreed to, and after the transaction of other business the Council adjourned.

NEW STREETS OBSTRUCTED BY GATES OR BARRIERS:

DAW & SON v. THE LONDON COUNTY COUNCIL.

An important question was raised in this case (heard a few days ago in the Queen's Bench Division of the High Court of Justice, before Lord Coleridge and Mr. Justice Mathew) between the building owners of a new street and the London County Council, as representing the Metropolitan Board of Works upon the statutory enactments in the Metropolitan Local Government Acts, which prohibit the new streets from being closed at either end by gates or otherwise. This is contrary to the common law, which allows owners to make a partial dedication of new streets or ways, and hence on many great horse estates in the Metropolis there are bars put up to be closed now and then in order to prevent unlimited public rights of passage from being created. Hence the first of the Acts in question (18 and 19 Vict., c. 135) contained a clause exempting existing bars, but the latter Act (25 & 26 Vict., c. 98) provided that no existing road, passage, or way should be hereafter laid out unless 40 ft. in width, and unless open at both ends, and that any road, passage, or way hereafter laid out should be deemed to be a “new street” and subject to the by-laws made on the subject; and one of the by-laws is that “every new street shall (unless the Board otherwise consent in writing) have at the least two entrances of the full width of the street, and shall be open from the ground upwards.” The question was now raised whether, under these enactments, the builders of a new street or place with homes on both sides can make it private by putting up gates at both ends, so as to prevent unrestricted traffic, and restrict the use of the way or passage of the street to the residents. The question had arisen in the present case under the following circumstances:—

The appellants were a firm of builders, of Palace-gate, Kensington, and are the owners of an estate called the Shaftesbury-road Estate on the Bayswater-road. For more than eighty years previously the estate consisted of a private house and grounds, and they proposed to open a passage through from the Bayswater-road to the Moscow-road, with houses on each side, called Torwood-gardens, but with gates at each end. In order that access might be obtained to the street, gateways were made in the old wall at the Moscow-road end, and gates were placed in the gateways, which have so remained ever since, and have been locked for a time every night. There were also archways at the Bayswater-road end, between which the builders proposed to hang gates for the purpose of forming a barrier across, and excluding the public from the use of the street. The street had been thus formed and laid out without the sanction of the Metropolitan Board of Works. It was proved that the gates at the Moscow-road end of the street, known as Torwood-gardens, were kept locked at night.

It appeared that on May 23, 1889, the builders were summoned and convicted upon the complaint of the Council for that they in March last year, at Torwood-gardens, did unlawfully form or lay out a road, or passage, or way for building on a street, in breach of the by-law. Shortly after the builders had been so convicted they caused the brickwork between the pier and the arches over the footway to be removed, and there was nothing but piers left standing on the street in a line with the building line in the Bayswater-road, and between the piers there was less than 40 ft. The gates, however, were kept up, and in December the builders were summoned again for a continuing breach of the by-law—that is, for keeping the passage not open at both ends.

The magistrate considered and found as a fact that the new passage was a "new street" within the Act, and that the gates at each end of Torwood Gardens were kept locked at night, and that the police were in the habit of patrolling the said street. It was contended for the builders that they had not continued the offence of which they had been convicted, and that the street, being in all respects a private road for the use of the occupiers of the houses erected on the estate, and not having been dedicated to or used by the public, it was not formed "or laid out for building as a street, or for the purpose of carriage traffic, or for the purpose of foot traffic only" within the meaning of section 93 of 25 and 26 Vict. c. 120, and that the County Council had no power to interfere to prevent the builders from placing barriers or gates across the road for the purpose of excluding the public from using it. The Magistrate thought otherwise, and convicted, and the builders appealed.

Mr. Forbes, Q.C. (with Mr. Cunningham Glen) appeared for the appellants, the builders, and contended that there was no violation of the Act.

Mr. Avory argued for the County Council in support of the conviction.

The Court came to the conclusion on the 5th inst. that the magistrate was right, and that the conviction must be upheld.

Lord Coleridge, in giving judgment, said two points had been argued—whether the passage was a new street within the by-law and the enactment, and whether there had been a continuing offence within the Act, though perhaps only the latter question was really raised. As to the first point, however—whether this was a new street within the enactment—he thought it was. The enactment had been the subject of judicial decision in "The Metropolitan Board v. Stead" (3 Q. B. D.) where it was held that "or" ought to be read "and." He knew the place in question at Bayswater, and the owners thought they would build houses upon it, with access from the roads at each end. They desired to have the advantage of communication with those roads, and yet to keep it private. But if it was used so as to make it part of the great system of roads and highways all round, it must be subject to the rules and laws which bound all other owners of property so laid out, in consideration of various advantages obtained at the public expense—drainage, sewerage, &c. If the owners thus acquired the advantages of the place being part of the metropolis, they must pay the price, one part of which was that the new street must be made 40 ft. wide, and that it must be made a thoroughfare, and open to the public at both ends; the Board, however, having the power under special circumstances of granting exemption from these obligations. The owners here, however, desired to have the advantages without the accompanying burdens. They obtained, indeed, the assent of the Board to the making of the street on the condition of their fulfilling those obligations, and then they had not fulfilled them. That would not do; and even without authority he should have held that the effect of the enactment was that no passage-way should be made into a carriage-road unless open at both ends. But it appeared that the passage was left less than 40 ft. wide, and with gates at both ends. That was done without the consent of the Board or Council, and it could not legally be done. Then there had been surely a "continuing offence" within the Act, as the gates were kept up. The Magistrate, therefore, was right on both points, and the conviction was right, and must be upheld.

Mr. Justice Mathew concurred, and observed that otherwise the building-owner might always free himself from the obligations of the Act. The offence was keeping the passage obstructed by the piers and gates, and the offence was continued by keeping up these obstructions.

Appeal accordingly dismissed.

Snowdon.—As many of our readers will be aware, Sir Edward Watkin some time ago purchased a big slice of Snowdon, extending from Llyn Dinas in the valley to the summit of Snowdon. We are now informed that Mr. Thomas Roberts, C.E., of Portmadoc, is designing several "buildings and improvements" for Sir Edward, including a chalet on one of the spurs of Snowdon, which will command the grandest scenery in North Wales.

Election of a new Royal Academician.—Mr. Hubert Herkomer, A.R.A., was on Tuesday evening elected a full Academician.

BOUNDARIES TO FOOTPATHS.

Str.—A public footpath runs between two hedges whose branches project into and obstruct the full and free use of footpath. What is the limit of ownership of the abutting land with respect to the hedges, *i.e.*, how far may the hedge legally project over the footpath beyond the roots? and, supposing a wall were erected instead of hedge, could it legally occupy a frontage line beyond the centre of hedge? If so, how far beyond? LONSDALE.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—XX.

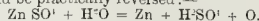
SECONDARY CELLS.

EVERY common form of voltaic cell is that invented by Smee. A sheet of platinised silver is placed between two of zinc, and immersed in dilute sulphuric acid. When the poles are joined a current flows from zinc to platinum within the cell, the zinc is dissolved as sulphate of zinc, while hydrogen is liberated at the platinised plate and bubbles up out of the liquid. The chemical reactions are shown by the equation—



When the liquid is exhausted it must be removed and replaced by fresh acid solution. After a time the zinc plates are destroyed and must also be renewed. Such is the action of a simple type of primary cell.

If, however, instead of drawing off the exhausted acid solution, a current from some external source be sent through the cell from platinum to zinc, the above chemical reaction would be practically reversed:—



The zinc is recovered from the sulphate of zinc and deposited on the zinc plate, water is decomposed to supply the necessary hydrogen to form sulphuric acid, and the oxygen thus liberated rises from the platinum plate.

The cell is now in its original state, and can again furnish current. A Smee's cell which has been recharged in this latter way is a secondary cell. The only thing lost during the two operations is water, hydrogen during discharge, oxygen during charge; water must, therefore, be added from time to time, but, if water happened to be an expensive product, the two gases could be collected and re-formed into water by ignition.

The only essential difference between a primary and secondary cell consists, not in any detail of construction, nor in the chemical reactions which go on within it when giving current, but simply in the method of recharging. If a Smee's cell is used as a secondary cell, the zinc eventually becomes rotten and tumbles to pieces owing to its deposition being uneven over the surface of the plate.

A few only of the primary cells in common use can be used as secondary cells, and secondary cells of commercial value cannot, in practice, be charged as primary cells.

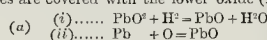
Secondary cells are frequently called "accumulators" or "storage cells"; they do not, however, "accumulate" or "store" electricity during the operation of charging, for as many coulombs come out from the negative terminal as go in at the positive. The coulombs lose potential, and the energy thus lost is left in the cell as chemical separation; what, therefore, is stored is chemical energy ready to reappear as electrical energy when required.

The materials hitherto found of most use for the construction of secondary cells are spongy lead and lead salts, with dilute sulphuric acid as the exciting fluid.

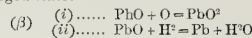
The lead secondary cell invented by Gaston Planté in 1860 has been modified by successive inventors until it has assumed the form of the cells in use at the present day.

If a current of sufficient strength be sent between two lead plates immersed in dilute sulphuric acid, water is decomposed; hydrogen is liberated at the negative plate and escapes into the air; oxygen is deposited on the positive plate, and attaching it covers it with a thin brown coating of peroxide of lead (PbO_2); this film of peroxide protects the lead beneath it from any further action, and oxygen bubbles up freely from the surface of the plate. The current must now be reversed, when the peroxide will be reduced to spongy lead and the former negative plate covered with peroxide, the object of the reversal being to form spongy lead and so increase the surface of the negative plate. The plates may now be joined; they will act as

a voltaic cell, and produce a current until both plates are covered with the lower oxide (PbO)



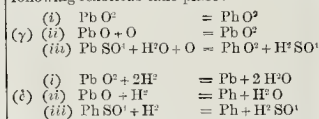
water, during discharge, oxidising the negative plate, and replacing the oxygen it has lost from that on the positive plate. In the above and following reactions there may be, and indeed probably are, certain intermediate reactions; the equations only give the final results, which are all that really concern us. As soon as the plates are exhausted a current may be sent through them in a direction opposite from that of the current they have furnished; after a time the plates will be found to have resumed their fully-charged state:—



Apart from local action, the equations for which are given below, the processes of charge (β) and discharge (α) can be repeated over and over again. It will be found, however, that the capacity of such a cell is so exceedingly small that practically it is of little value. Planté increased the capacity of his cells by leaving them fully charged for a time, sufficient to allow extensive local action between the peroxide and the lead plate to which it is attached, the cell being reversed after each period of repose, so as to make the quantity of lead actually acted upon equal for both plates. These operations, called "forming the cell," in some cases occupied many months, and the consequent expense rendered the commercial success of a Planté secondary battery out of the question.

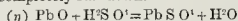
The history of the development of the lead cell from the time of Planté to the present day is most interesting, but we must omit any account of the intermediate steps, and at once proceed to the description of the modern cell.

A mixture of lead oxides is mixed into a paste with dilute sulphuric acid, a certain amount of lead sulphate (PbSO_4) being formed during the process, the ingredients entering into the mixture in various proportions. The paste is pressed into the square holes of a grid, cast from a not easily oxidisable alloy of lead. The plates are put in the charging cell, when the following reactions take place:—



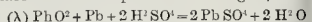
the mixtures on the positive and negative plates are converted into pellets of lead peroxide and spongy lead respectively, the holes being made of such a shape that they will not easily fall out. The liquid extends throughout the mass, which can therefore be acted upon at every point, and plates formed, the capacity of which becomes, in a few hours, greater than that of Planté's plates that have taken months to form.

The chemical reactions of discharge and charge have already been given (α i, ii) (β i, ii). Local action, however, cannot be overlooked, and is most disastrous when the cells have completely run down.



Sulphuric acid is taken from the liquid, and the plates become coated with insoluble sulphate of lead which has low conducting power. On recharging, this sulphate is destroyed with some difficulty (γ i, ii, iii), and may have permanently injured the plates.

A cell should always be left fully charged, if possible; practically nothing happens at the negative plate, and although some action takes place between the peroxide and its grid,



the acid can only be renewed from the mass of the liquid by slow percolation, and the sulphate formed tends to stop further action.

The common size of grid is about 10 in. b. 10 in. l., the thickness of plate varying somewhat, but not exceeding $\frac{1}{4}$ in. Cells contain from seven to thirty-one such plates, according to the storage capacity required, placed alternately positive and negative and connected abreast into these two groups, so that each plate exposes about 200 square inches of surface, while separated from a plate of opposite kind by the thickness only of thin strips of insulator. The internal resistance of a cell is therefore, as low as a thousandth of an ohm

or less, and if it be short-circuited it will discharge at the enormous rate of over a thousand amperes, the actual rate depending, of course, upon the size and number of the plates. This power of yielding an enormous current must not be supposed to be a peculiar property of the lead secondary cell, for if any of the common forms of primary cell, which do not polarise, were given an equal area of plate and the opposite plates placed equally near one another it would give similar results.

A secondary battery is a most valuable adjunct to a continuous current dynamo-machine, but its use is limited by its liability to rapid decay, unless placed in the hands of a skilled attendant, though much may be done by automatic arrangements. Under favourable circumstances a good battery will last for years, but, unless carefully looked after for the positive plates bulge, the grids are damaged, and the pellets fall out, while, if left uncharged for any length of time, an entire set of cells may be completely ruined.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

7,592, Plasterers' Lath. A. J. Hogan. This invention consists in bevelling each edge of the lath the reverse way, so that when the plaster is applied it will form a dovetail-shape key, each lath being also a dovetail shape.

8,230, Improved Wind-guard for Chimneys. K. Edge.

According to this invention, a funnel-shaped piece, with the bell upwards, is placed upon the top of the chimney-pot, and allowed to be moved sideways, so as to prevent the wind catching the smoke, and inducing up-draught.

8,511, Compounds for Bricks, Tiles, &c. E. Bussy.

According to this specification, bricks, tiles, architectural ornaments, &c., are made of a peculiar combination of common yellow and calcareous clay, and a white enameled surface is gained by using these clays in combination with metallic oxides in adjusted proportions.

9,103, Ventilating Rooms and Baths, &c. D. P. Menzies.

This invention proposes to force a jet of steam into a ventilating shaft, so as to cause an up-draught and to carry off foul or impure air.

13,957, Artificial Stone. B. Bertelmeier.

In making artificial stone, the cement, sand, &c., are, according to this invention, exhausted by means of an air pump, and mixed with air exhausted water. This exhaustion renders the mass homogeneous, and improves the quality of the product.

19,246, Hearths of Fireplaces. J. Wilson.

To prevent fires from over-heating, a cast-iron cantilever is, by this invention, laid across the wall below each jamb, according to the size of fireplace. A front plate is also fixed and bolted, a false-bottom is fitted below this, and the space filled up to the top of the metals with concrete. Tiles are laid over, if wished.

2,619, Flooring. J. Schultz and E. Hopf, Hamburg.

According to this invention, on a concrete layer or boarding are fastened two or more layers of carton-pierre, or roofing paper, by means of mastic cement or pitch. After the layers of carton-pierre have been pressed firmly together, by the application of rollers or other means of giving pressure, the surface of the upper layer is covered with mastic cement or pitch, and then with rough slabs or artificial stones. The combined use of slabs and carton-pierre is the main point of the invention.

NEW APPLICATIONS FOR PATENTS.

April 23.—6,413, W. Junge, Saws.—6,423, J. Kaye, Door-indicator.—6,429, J. T. and J. Kiare, Baker's Oven.—6,461, W. Jones, Chimney-cowl.

April 29.—6,548, W. and H. Stephens, Appliances for Forcing Drains, Water-closets, &c.—6,578, W. Thompson, Construction of Buildings.—6,586, W. Pavey, Water-venter for Cisterns.

April 30.—6,616, T. Hughes, Door-closer.—6,619, J. Dart, Fastenings for Doors.—6,637, C. Edwards, Manufacture of Bricks.

May 1.—6,720, G. Clarke, Setting Saws.—6,818, B. and W. Thompson & Sons, Ventilating Rooms, &c.—6,783, T. Tyerman, Window-fastenings.—6,784, A. Smith, Bolts for Doors, Windows, &c.—6,806, W. Thompson, Paints, Varnishes, &c.

May 3.—8,344, O. Gray, Drain and Sewer-trap.—6,845, G. Drake, Combination Chimney-top.—6,848, B. and W. Thompson & Sons, Valveless Siphon-flushing Cisterns of Water-closets.—6,850, F. Perry and H. Foskett, Water Pigment.—6,856, G. Higham, Portland Cement.—6,856, H. Take, Metal-plates used in the Manufacture of Bricks, Tiles, &c.—6,880, M. Hollinger, Construction of Wall for Buildings.—6,892, J. Süddler, Fitting Windows, Doors, &c., rendering them air and water-tight.

PROVISIONAL SPECIFICATIONS ACCEPTED.

3,266, B. Towinson and J. Dixon, Horizontal Saving Machines.—3,592, C. Darrah, Water-waste Preventing Cisterns for Water-closets, &c.—4,363, J. Pullan and others, Brickmaking and Pressing Machines.—4,373, A. Molloy, Chimney-pots.—4,579, A. Harris, Drain-pipes, &c.—4,785, A. Stalker and T. Davy, Valves for Water-closets.—5,082, J. Watkins, Hinglo, or Restener.—5,104, H. Lever, Sash Fastener.—5,105, H. Lever, Fastening for Window Sashes.—5,565, J. Benson, Ventilating Rooms and Buildings.—5,719, W. Taylor, Manufacture of Cement.—5,807, W. Odlin, Square Bevel and Set Mitre.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months. 9,011, J. Downes, Chimney Top for Preventing Down Draught.—10,000, S. Deards, Glass Roofs and Skylights.—1,185, C. Hunter, Extracting Cowl.—4,783, S. Groff, Screw-nail.

RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

May 2.—By G. B. SMALLPEICE (at Woking). Maybury-hill, Woking—E. cottage and garden, r. £7 10s. 5/0. May 5.—By BENNINGFIELD, TIDY & CO. Watford.—Beach Lodge and 6 acres, u.t. 10yrs., g.r. £41 9s. 8d. By VAUGHAN & CO. Wandsworth—2, Ashen-villas, l. 505. By DRIVER & PERFECT. Holloway—5, 7, and 9, Fakenham-st., u.t. 67 yrs., g.r. £19 10s. 6/0. Shepherd's Bush—14, Macfarlane-rd., u.t. 84 yrs., g.r. £4 10s. r. £36. By W. SUTHERLAND. Dorset sq.—31a and 32, Edward-st., u.t. 30 yrs., g.r. £14 11s. 6/0. By BUCKLAND & SONS. Notting-hill—20, 22, and 24, St. Lawrence-road, u.t. 73 yrs., g.r. £24 1/0. 1,145. Walthamston.—Ruggles Cottage, l., r. £16 12s. P. house in Sherr Hall-st. 280.

By E. MILLARD. Hackney—46 and 48, Weymouth-rd., l., r. £73 p.a. Tottenham, Willoughby PK.—"Beulah House," l. 405. "Amersham Lodge," l. 405. Hoxton—l.g.r. of £48 p.a., u.t. 31 yrs. 1,000.

By GIDDY & GIDDY. Cheesnut, near—"The l. house "Paradise," and 34 acres 800.

By E. WOOD. Peckham—129, 131, and 133, Gordon-rd., u.t. 76 yrs., g.r. £14 10s. 6/0. Leyton Manor-rd.—"Kauri Villa," u.t. 90 yrs., g.r. £8, r. £24. Lewisham—55, Eversley-rd., u.t. 67 yrs., g.r. £4, r. £24. 250.

By ROGERS, CHAPMAN, & THOMAS. Enfield—"The residence "Carlton House" 1,239. An enclosure of l. land, 3a. 0r. 23p. 1,430. An enclosure of g. land, 1a. 0r. 33p. and lodge. St. Luke's—l.g.r. of £4, with reversion in 22 yrs. Golden-lane—l.g.r. of £40 p.a., with reversion in 82 yrs. £2 yrs. of £90 p.a., with reversion in 81 yrs. 1,100. 1,970.

May 7.—By WALTON & CO. Hyde PK.—70, Gloucester-ter., u.t. 48 yrs., g.r. £2, r. £210. 2,905. 76 and 102, Gloucester-ter., u.t. 48 yrs., g.r. £14, r. £360. 5,050.

By H. GRIFFIN. Clapham—70 and 72, Park-rd., l., r. £90 p.a. 1,260. 91 and 93, Park-rd., l., r. £95 p.a. 400. Crescent-rd.—l.g.r. of £20 5s., with reversion in 59 yrs. 211. Park-cres.—l.g.r. of £8, with reversion in 60 yrs. 400.

By F. JOLLY & CO. Wandsworth—4, Salscott-rd., l. 211. Bethnal-green—72 and 74, Cyprus-rd., u.t. 12 yrs., g.r. £4, r. £98 10s. 185. Commercial-rd., 4—44 to 50 (even), Harding-st., u.t. 14 yrs., g.r. £14 50 to 62 (even), Harding-st., u.t. 14 yrs., g.r. £14 414.

May 8.—By GLOVER & HARRISON. Fulwell—1 to 4, Coburg-villas, l., r. £22 5s. 650.

By C. C. & T. MOORE. Bow—177 to 183 (odd), Campbell-rd., u.t. 73 yrs., g.r. £7 10s. 1,900. Beuchard Hill and 2, Falby, u.t. 48 yrs., g.r. Victoria-pk.—22, 23, and 25, Morpeth-rd., u.t. 36 yrs., g.r. £12 18s., r. £79 4s. 440. Old Ford—68, 60 and 62, Milton-rd., u.t. 60 yrs., g.r. £2, r. £78. 500. Mile End—123, St. Dunstan-rd., u.t. 73 yrs., g.r. £3 3s., r. £34 16s. 295. 49, White Horse-lane, l. 295.

By E. SIMMONS. West Ham—15 and 16, Park-rd., l., r. £11 5s., g.r. £7, r. £38. 580. Peckham—59, 61, and 63, Bell's Garden-rd., and 1 to 23 (odd), Goldsmith-rd., u.t. 47 yrs., g.r. £6, r. £282 18s. 2,280.

By FAREBROTHER, ELMS, & CO. Fleet-st.—No. 190, l., area 1,200 ft. 12,500. Abbots Langley, Hutton Bridge Wharf, a cottage and 2 1/2 acres, l. 2,400.

By NEWSON & HINDING. Canbury—19, Schoube, u.t. 32 yrs., g.r. £5, r. £28. 205. Highbury—32, Horsell-rd., u.t. 90 yrs., g.r. £7 10s., r. £40. 350.

By WORSFOLD & HAYWARD (at Dover). Dover—4, 17, 25, 34, and 35, Tower Hamlets-st., l. 2,556. 1, Echebert-rd., l. 566. Three plots of f. land 550.

May 9.—By PROCKETT & VENABLES. Hornsey-lane—97, Cheventon-rd., l. 790. Stockwell—63 & 62, Santon-rd., u.t. 85 yrs., g.r. £12, r. £90. 490.

By J. T. WOOLLEY. Sandown, I.W.—"The Residence "Shaltheorpe," g.r. £15 790.

By W. HALL. Stamford-hill—67, Daleview-rd., u.t. 80 yrs., g.r. £6, r. £31 4s. 200.

By WINCH & SONS. Hawkhurst, Kent—"The Residence "Pixhall," and 252s. 3r. 10p., l. 4,500.

F. W. GLAZIER. South Lambeth-rd.—l.g.r. of £57 p.a., with reversion in 77 yrs. 1,230. f.g.r. of £15 10s. p.a., with reversion in 77 yrs. 404. Westminster—65, Vincent-sq., u.t. 15 yrs., no g.r., r. £45, and the reversionary interest in the lease of 604 260.

By E. WOOD. Upper Clapton—1 to 7 (odd), Inver-rd., u.t. 89 yrs., g.r. £20 700. 17 and 19, Inver-rd., u.t. 89 yrs., g.r. £10, r. £37 4s. 350. Willesden—12, Bolton-rd., l., r. £30 400. East Dulwich—3, Ardley-ter., u.t. 85 yrs., g.r. £5, r. £33 10s. 67c.

[Contracts used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; y. for years; a. for street; r. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

MEETINGS.

SATURDAY, MAY 17. Royal Institution.—Dr. Charles Waldstein on "Recent Excavations in Greece." 11. 3 p.m. St. Paul's Ecological Society.—Visit to the Church of St. Peter-ad-Vincula and the Chapel of St. John in the Tower. Association of Municipal and Sanitary Engineers and Surveyors.—Midland Counties' District Meeting at Hereford.

MONDAY, MAY 19. Royal Institute of British Architects.—Mr. Frank Granger, M.A. Lect., on "German Technical Museums." 3 p.m. Victoria Institute.—Mr. W. N. Whitley, G.E., on "Flint Implements and the Antiquity of Man." 8 p.m.

TUESDAY, MAY 20. Royal Institution.—Mr. Louis Fagnon on "The Art of Engraving." 11. 3 p.m. Institution of Civil Engineers.—Messrs. Fawcett and Cowan on "The Keswick Water-Power Electric Light Station." 8 p.m. Society of Arts (Foreign and Colonial Section).—Mr. Lasenby Liberty on "The Industrial Arts of Japan." 5 p.m. Royal Society of Antiquaries of Ireland.—Ordinary General Meeting to be held in the Town Hall, Kilkenny, when nine papers will be submitted, including (a) "The Christian Abbey of Killeoley Co. Tipperary," by the Rev. W. Healy; (b) "Record of the Great Famine in Ireland," by Mr. John M. Thunders; (c) "Some Remarks on the Seal of the Dean and Chapter of St. Patrick's Cathedral, Dublin," by Mr. John Vincombe.

WEDNESDAY, MAY 21. The Auctioneers' Institute (Cannon-street Hotel).—Ordinary General Meeting. 3 p.m.—Annual Dinner, Cannon-street Hotel. 5 p.m. Royal Meteorological Society.—Three papers will be read. 7 p.m. Society of Arts.—Mr. J. G. Gordon on "The Manneman Process for making Seamless Tubes." 8 p.m. British Archaeological Association.—(1) Mr. W. J. Davis on "An Early Inscribed Altar Slab at Sheepcote." (2) Mr. E. P. Loftus Brock, F.S.A., on "Recently Discovered Saxon Architecture at Stevington Church, Beds." 8 p.m. Committee for Testing Smoke-Preventing Appliances.—Meeting at the Mansion House. 3 p.m.

THURSDAY, MAY 22. Architectural Association, Lyric Club.—Exhibition of Drawings, &c. (Ladies Night). 9 p.m. Royal Institution.—Professor Dewar, M.A., F.R.S., on "Flame and Explosives." 11. 3 p.m. Institution of Electrical Engineers.—8 p.m.

SATURDAY, MAY 24. Royal Institution.—Dr. Charles Waldstein on "Recent Excavations in Greece." 11. 3 p.m. Association of Public Sanitary Inspectors.—Fifth Annual Provincial meeting to be held at Leamington, when the President, Sir Edwin Chadwick, K.C.B., will deliver an address. Edinburgh Architectural Association.—Visit to Bridge Castle and Torphichen Church.

The Royal South London Ophthalmic Hospital.—The Prince of Wales has intimated his intention of laying the foundation-stone of the new building for the Royal South London Ophthalmic Hospital at St. George's-circus, Southwark, in July.

Miscellaneous.

Liverpool Engineering Society.—The fourteenth and concluding meeting of the present session of this Society was held on Wednesday evening, May 7, at the Royal Institution, Colquhoun-street, Mr. Henry H. West, M. Inst. C.E., President, in the chair. The ballot for officers for the ensuing session resulted in the election of Mr. F. Hadleston, Assoc.-M. Inst. C.E., as President; Messrs John T. Woode and James Morgan, as Vice-Presidents; Mr. J. H. T. Turner, B.Sc., Assoc.-M. Inst. C.E., as hon. secretary; Mr. O. S. Pilkington, Assoc.-M. Inst. C.E., as hon. treasurer; and Mr. J. A. Brodie, Assoc.-M. Inst. C.E., as hon. librarian. Mr. Henry H. West, the retiring president, in announcing the result of the ballot to the meeting, congratulated the members upon the growth and vigour of the Society. There were now 190 members of all classes on the books, and the income for the past financial year had amounted to 150*l*. Being in this strong financial position, the Council had felt justified in making a new departure in the past session by printing and issuing the papers read to members prior to the date of the discussion of the papers. The result had been to add greatly to the interest and value of the discussions, and the Council felt that the result justified the additional outlay involved. The forthcoming volume of the Society's proceedings was now in proof, and would shortly be issued to members. The importance of the Society was considered to warrant the presence of the President of the Institution of Civil Engineers, among other guests, at the annual dinner held in January last. Mr. West then announced that arrangements would be made for excursions during the summer to the Thirlmere Aqueduct, Manchester Ship Canal Works, Menai Straits, North Bridge and Edinburgh Exhibition, Liverpool Overhead Railway Works, and the Lancashire & Yorkshire Railway Works at Horwich. The adjourned discussion upon Mr. Thomas L. Miller's paper, entitled "The Efficiency of Gas Engineers," concluded the business.

The English Iron Trade.—For the last three weeks the English iron market has displayed a steadily downward tendency, and the volume of business transacted has been on a correspondingly dwindling scale. The reports received during that time with regard to pig-iron have been very discouraging, and the fall in prices has been marked. No. 3 Cleveland pig was pretty steady at 45*s*. 6*d*. until this week, when it has dropped 2*s*. 6*d*. a ton, and is now quoted 43*s*. to 43*s*. 6*d*. Glasgow warrants have run their usual course of fluctuation since we last wrote, but they are at the end of the present week not much below what they were three weeks ago. Scotch makers' iron, on the contrary, shows declines varying from 6*d*. to 3*s*. 6*d*. per ton. Although makers of Bessemer pig in the north-west are nominally but 3*s*. lower (00*s*, compared with 63*s*.), the fact appears to be that they are quoting down to hematite warrant prices, which are from 53*s*. 6*d*. to 54*s*. In other districts the rates now quoted are proportionately lower. Old materials may be had 5*s*. a ton cheaper, while spiegelisen registers a similar decline. The demand for finished iron and steel has not revived, and lower values are the rule. For manufactured iron from 5*s*. up to 20*s*. less per ton is now accepted. In steel, similar reductions in price have been made. Tin-plates have given way to the extent of but 6*d*. a box, but they are now firmer. Shipbuilders have still cause to complain of the absence of new orders, while engineers are booking but little fresh work.—Iron.

The North Sea-Baltic Canal.—We are now able to state on good authority that the number of cubic metres of ground which have to be moved before the completion of the canal is 8,000,000, and that the work will take five and a-half years. Up to date some 11,000,000 cubic metres have been removed, the present state of affairs permitting a movement of about 1,000,000 metres a month, which figure will, however, advance to one and a-half to two millions as soon as "full work" is being done. It may be of interest to know that the construction of the locks on the canal will alone require 130,000 cubic metres of "beton." The total of the estimate shows a figure not much under 8,000,000.

The Surveyors' Institution.—The Annual Dinner of this Institution is fixed for Monday, June 2, at the Holborn Restaurant.

Proposed National School of Forestry.

—On the 9th inst., a deputation from the Associated Chambers of Commerce waited upon Mr. Chaplin (with whom was Sir James Caird) at the offices of the Board of Agriculture, in St. James's-square, for the purpose of urging upon him the desirability of establishing a National School of Forestry.—Col. Hill, M.P., introduced the deputation, and addressed Mr. Chaplin, said those who were with him desired to point out that the most growing of timber as an industry might be most usefully extended in this country, especially in view of the timber supply from abroad becoming more and more diminished. They recommended therefore that her Majesty's Government should establish a National School of Forestry, which would be an encouragement not only to the planting of Crown lands with trees, but would also induce private landowners to utilise ground which was at present of little or no service in the same direction.—Mr. G. Harper next spoke, and said he had received letters approving of the objects of the deputation from Lord Basing, official Verderer of the New Forest, Sir Edward Lechmere, and other gentlemen. He further pointed out that with the exception of Spain this was the only country of any position that did not possess a National School of Forestry. England was the greatest timber-buying nation in the world, and at present imported annually something like 13,000,000*l*. worth of that commodity. There was a vast acreage of land now lying waste in this country which might, were the proper instruction forthcoming, be used for timber-growing, and practically enable it to produce all the timber it required. Mr. Chaplin said there could be no doubt of the growing interest and importance of the question under discussion. The purport of the remarks he had heard seemed to be that his department should establish a National School of Forestry. He desired, however, to point out that the Act under which that department was instituted provided only for its inspecting and reporting upon schools which provided education either upon agriculture or upon forestry. So far as he could see, his department had no power to institute a school, but he would consider the matter very carefully with a view to seeing if he could recommend such a course to the Government.

Camden Park Estate, Chislehurst.—This historic property, including Camden-place and a finely-timbered park of about 125 acres, fronting the common, will be sold at the Mart, in the course of next month, for building purposes. The house was built by the antiquarian, Camden, who died there in 1623. It gave a title to Charles Pratt, who, on July 16, 1765, being then Chief Justice of the Common Pleas, was elevated Lord Camden, and as Lord Chancellor was advanced Earl Camden. He sold it to a Mr. Lushington, who sold it to Mr. Bonar, who, with his wife, was murdered here by a footman in 1813. It then passed into the occupancy of Prince Esterhazy, the Austrian Ambassador. Camden-place is better known, perhaps, as the home for some years of the late Emperor Napoleon III. and his Consort. He died here on January 9, 1873. His remains (since removed to Farnborough) were buried in St. Mary's Catholic Church, in a side chapel built by the Empress, after the designs of Mr. H. Clutton, architect. Their son, the Prince Imperial, was buried in that same chapel, on July 12, 1879. The late Mr. N. W. Strode lent the house to the royal exiles. The furniture, &c., including some valuable Flemish tapestry, was sold in June last. Chislehurst village was the birthplace of Sir Francis Walsingham and of Sir Nicholas Bacon, Lord Keeper.

Association of Municipal and Sanitary Engineers and Surveyors.—The following gentlemen, having satisfied the examiners at the examination held in London on the 18th and 19th ult., have been granted certificates of competency by the Council of the Association, viz., Messrs. J. H. Catchpole, Hendon; L. Gibbs, Walsall; J. E. Miller, Durlam; and J. W. Wood, Rochdale. The next examination will be held in London on October 3 and 4.

Surveyorship, Burton-on-Trent.—Mr. J. E. Swindlehurst, Assoc.-Mem. Inst. C.E., Engineer and Surveyor to the Rawtenstall Local Board District, and late Deputy Borough Engineer of Barrow-in-Furness, was last week elected by the Council to the office of Borough Engineer and Surveyor of Burton-on-Trent, at a salary of 400*l*. per annum, with a horse and trap provided by the Corporation. There were 107 candidates for the appointment.

The Erosion of our Coast-line.—On Monday evening last, at the Surveyors' Institution, London, Mr. R. F. Grantham, M. Inst. C.E., read a paper entitled, "The Encroachment of the Sea on some parts of the English Coast, and the best means of arresting it." After bringing forward evidence to show the rate of erosion on several parts of the coast, the paper referred to various works for defending the coast-line from encroachment, and described a system of groyning which was stated to have been successful for the past twelve years at Shoreham, Sussex, in protecting some land lying below the level of high-water of the tides, and in driving high-water mark further seawards. The paper suggested that in some instances where shingle travelled along the coast, inasmuch as groynes were necessary to protect sea-walls, the sea-walls might be omitted, and only groynes erected, and thus a substantial saving in the first cost of protection might be effected.

PRICES CURRENT OF MATERIALS.

TIMBER.		£.	s.	d.	£.	s.	d.
Greenheart, B.G.	..... ton	6	10	0	7	10	0
Teak, E.I.	..... load	11	0	0	14	0	0
Sesquiu, U.S.	..... foot cube	0	2	3	0	3	0
Ash, Canada	.....	3	0	0	4	10	0
Birch	.....	3	0	0	5	0	0
Elm	.....	3	10	0	4	15	0
Fr. Dantale, &c.	.....	1	15	0	3	10	0
Oak	.....	2	10	0	4	10	0
Canada	.....	5	10	0	6	10	0
Pine, Canada red	.....	2	10	0	3	10	0
" "	yellow	2	0	0	5	5	0
Lath, Dantale	.....	5	0	0	0	0	0
St. Petersburg	.....	5	0	0	0	0	0
Waincoat, Riga, &c.	..... log	0	0	0	0	0	0
Deals, Finland, 2nd and 1st std.	.....	7	10	0	10	0	0
" "	4th and 3rd	7	0	0	7	10	0
Riga	.....	6	0	0	8	10	0
St. Petersburg, 1st yellow	.....	9	10	0	14	0	0
" "	2nd	7	10	0	9	0	0
" "	white	6	10	0	10	0	0
Swedish	.....	7	0	0	15	10	0
White Sea	.....	8	0	0	17	0	0
Canada, Pine, 1st	.....	7	10	0	9	0	0
" "	2nd	10	0	0	16	10	0
" "	3rd, &c.	7	0	0	10	0	0
" "	Spruce, 1st	8	15	0	11	0	0
" "	2nd	7	10	0	10	0	0
New Brunswick, &c.	.....	6	0	0	8	0	0
Battens, all kinds	.....	5	0	0	16	0	0
Flooring Boards, sq. 1 in., pre- pared, first	.....	0	10	0	0	14	0
Second	.....	0	8	0	10	6	0
Other qualities	.....	0	8	0	7	9	0
Ceare, Cuba	..... foot	0	4	0	0	44	0
Honduras, &c.	.....	8	0	0	10	0	0
Mahogany, Cuba	.....	0	4	0	0	6	0
St. Domingo, cargo average	.....	0	5	0	0	6	0
Mexican	.....	0	4	0	0	5	0
Tobacco	.....	10	5	0	20	0	0
Honduras	.....	0	5	0	0	6	0
Box, Turkey	..... ton	4	0	0	13	0	0
Rocha, Rio	.....	14	0	0	20	0	0
Bahia	.....	23	0	0	18	0	0
Satin, St. Domingo	..... foot	0	6	0	1	3	0
Porto Rico	.....	0	9	0	1	3	0
Walnut, Italian	.....	0	4	0	0	7	0

METALS.		£.	s.	d.	£.	s.	d.
IRON—Bar, Welsh, in London	..... ton	6	17	6	8	0	0
" "	at works in Wales	6	10	0	7	0	0
" "	Staffordshire, in London	8	0	0	8	10	0
COPPER—British, cast and ingot	.....	56	0	0	57	6	0
Best selected	.....	58	10	0	59	10	0
Shrove, strong	.....	0	0	0	0	0	0
Chili, bars	.....	53	0	0	0	0	0
YELLOW METAL	..... lb.	0	5	0	5	0	0
LEAD—Pig, Spanish	..... ton	12	7	6	13	0	0
English, com. brands	.....	13	2	6	0	0	0
Sheet, English, 3 lbs. per square foot and upwards	.....	15	0	0	0	0	0
TIN—	.....	15	10	0	0	0	0
Suaita	.....	95	0	0	0	0	0
Australian	.....	95	0	0	0	0	0
English Ingots	.....	98	0	0	0	0	0

OILS.		£.	s.	d.	£.	s.	d.
Linsed	..... ton	24	0	0	24	5	0
Cocunut, Ceylon	.....	29	0	0	0	0	0
Cocunut, Ceylon	.....	25	0	0	0	0	0
Palma, Lagos	.....	25	0	0	25	15	0
Rapeseed, English pale	.....	32	10	0	0	0	0
" "	brown	31	0	0	0	0	0
Cottonseed, refined	.....	32	0	0	0	0	0
Tallow and Oleine	.....	21	0	0	40	0	0
Lubricating, U.S.	.....	5	10	0	6	0	0
" "	refined	7	0	0	12	0	0
TAR—3 Lockholm	..... barrel	1	3	6	0	0	0
Archangel	.....	0	16	9	0	0	0

TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

ARNOLD (Notds).—For improvements in Wood-street and West-street, Arnold, for the Arnold Local Board of Health. Messrs. F. Jackson & Son, engineers, Nottingham.		£.	s.	d.
Holms Bros.	.....	2	263	0
W. Gordon	.....	250	19	0
A. Wylie	.....	245	0	0
John Greaves	.....	235	6	0
John Holmes	.....	231	17	7
John Hawley & Son, Ilkeston	.....	211	17	4

* Accepted.

CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

Table with columns: Nature of Work or Materials, By whom Required, Architect, Surveyor, or Engineer, Tenders to be delivered, Pags. Includes entries for Rectory, Sewers, Schools, and various building works.

PUBLIC APPOINTMENTS.

Table with columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Includes entries for Inspector of Pavements, Temporary Surveyor's Assistant, and Borough Surveyor.

BRIDGELETT (North Wales).—For the erection of the Hatfield estate, for Sir Ward Watkins, Bart. (owner providing timber and site). Mr. Thomas Roberts, Assoc.-M.Inst. C.E., architect.

BRISTOL.—For new building for the "Volunteer" in, Horfield, near Bristol, for Messrs. D. Sykes & Co., limited. Mr. John Bevan, architect, 4, Unity-street, Hodge-green, Bristol.

BRISTOL.—For alterations and additions to St. Paul's School, Bristol. Mr. John Bevan, architect, 4, Unity-street, Hodge-green, Bristol.

BRISTOL.—For alterations and additions to St. Paul's School, Bristol. Mr. John Bevan, architect, 4, Unity-street, Hodge-green, Bristol.

FARNBOROUGH.—For rebuilding the "Cambridge" road, Farnborough Havens (recently destroyed by fire), for Messrs. C. Hammett & Co., Mr. Stanley Parker, architect.

CARDIFF.—For alterations to and enlargement of the "Royal Hotel" Cardiff, for the Directors of the Cardiff Royal Hotel Company, Limited. Quantities by the architect, Mr. J. P. Jones, 27, Park-street, Cardiff.

HUMBERSTONE (Leicester).—For the making up of ten roads in New Humberstone, for the Billesdon Union Rural Sanitary Authority. Mr. William F. Auld, surveyor, 57, Green-lane, North Evington.

HUMBERSTONE (Leicester).—For the construction of surface water-drains, connections, &c., for the Billesdon Union Rural Sanitary Authority. Mr. J. B. Everard, M. Inst. C.E., Engineer, 6, Millstone-lane, Leicester.

LONDON.—For the erection of a school, &c., to provide accommodation for 500 children on the site in Ancona-road, Plumstead, for the School Board for London. Mr. T. J. Bailey, architect.

LONDON.—For the enlargement of the Hatfield-street School, Stanford-street, Blackfriars, by 120 places, and for providing a covered playground for boys underneath the new portion of the building, for the School Board for London. Mr. T. J. Bailey, architect.

LONDON.—For the enlargement of the Hatfield-street School, Stanford-street, Blackfriars, by 120 places, and for providing a covered playground for boys underneath the new portion of the building, for the School Board for London. Mr. T. J. Bailey, architect.

LONDON.—For works at No. 73, Bateman-street, Soho. Mr. H. Huntly-Gordon, architect.

LONDON.—For alterations, repairs, &c., to No. 71, Lancaster-gate, W. Mr. W. Jacobm Gibson, architect, 36, Great James-street, Bedford-row, W.C.

LONDON.—For the erection of a new wing to "The Mansion" Hospital, for Mr. Alexander Gray. Mr. James Neale, F.S.A., architect, 10, Bloomsbury-square, London, W.C.

LONDON.—For the construction of new roads, drainage, &c., for the extension of Kensal Green Cemetery, London. Mr. F. A. K. Willey, architect and surveyor, 66, Indegate-park, &c.

LONDON.—For the erection of a new American organ factory at Camden-place, N.W., for Messrs. A. & E. Humphreys. Mr. E. Stone, architect, 19, Berners-road, Wood Green, N.

LONDON.—For sundry painting and distempereing works, &c., at Chelsea Barracks, for H.M. War Department.

LONDON.—For alterations, repairs, &c., to No. 13, Devonshire-terrace, Hyde Park, W. Mr. W. Jacobm Gibson, architect, 36, Great James-street, Bedford-row, W.C.

LONDON.—For alterations and repairs at No. 65, Watling-street, for the purpose of forming offices for Messrs. Langton & Son, architects. Mr. Walter J. Ebbetts, architect, Savoy House, No. 115, Strand, W.C.

LONDON.—For alterations and additions to Atlas Works, Hackney Wick, for Messrs. Brooke, Simpson, & Spiller, limited.

LONDON.—For the erection of five warehouses, with a floor-space of 93,000 ft., for Mr. J. T. Morton, under the superintendence of Mr. W. E. Eve, 10, Union-court, E.C.

LONDON.—For sundry repairs, painting, &c., at 12, Southold-road, Upper Clapton. Mr. M. Bradbeer, architect.

LONDON.—For supply works at the Licensed Victuallers Schools, Kennington. Mr. Geo. Treacher, architect:—
Walker Bros. £347 0 0
B. Cook 323 0 0
Crabtree 320 0 0

NEWBURY (Berks).—For additions and alterations to Dean Wood, near Newbury, for Mr. H. T. Cairne. Mr. W. E. Mills, architect, 61, Cannon-street, E.C.:—
Maidie & Harper, Croydon £3,520 0 0
W. P. Adey, Newbury 8,775 0 0
Lascelles & Co., London 8,660 0 0
Bottrill & Son, Reading 7,859 0 0
Farnell & Son, Rugby 7,774 0 0
J. S. Kimberley, Banbury 7,497 0 0

READING.—For the erection of a house at Prospect Park, Reading, for Mr. O. Philbrick. Messrs. Newman & Newman, architects, 51, Tooley-street, London-bridge. Quantities by Mr. G. Fleetwood:—
J. A. Hunt, London £4,216 0 0
J. K. Coleman, London 3,548 0 0
Collier & Catley, Reading 3,304 0 0
Higgs & Sons, Reading 3,513 0 0
Balaam Bros., London 3,509 0 0
Bottrill & Son, Reading 3,483 10 0

READING.—For new "Thames-side Hotel," Caversham, for Mr. H. Dunlop. Mr. Geo. W. Webb, architect, Market-place-chambers, Reading:—
Strong Bros., Reading £3,410 0 0
Silver & Sons, Maidenhead 3,285 0 0
Collier & Catley, Reading 3,269 0 0
G. S. Lewis, Reading 3,225 0 0
G. Wernham, Reading 3,190 0 0
G. Seale, Reading 3,168 0 0
J. H. Margetts, Reading 3,097 0 0
Bottrill & Son, Reading 3,075 0 0
Kingsley, Oxford 2,984 0 0
Higgs & Sons, Reading 2,999 0 0
W. H. Simonds 2,992 0 0

READING.—For new stables, &c., Colley-avenue, for Mr. J. N. Pocock. Mr. Geo. W. Webb, architect, Reading:—
Collier & Catley £398 0 0
Higgs & Sons (accepted) 389 0 0
Searle 375 0 0
G. Lewis 356 0 0
Margetts 360 0 0
Bottrill & Son 360 0 0
[All of Reading.]

SANDHURST.—For bakehouse, stables, &c., for Mr. F. Parkes. Mr. Geo. W. Webb, architect, Reading:—
G. Seale, Reading (accepted) £144 0 0

SOUTHBOROUGH.—For levelling, paving, &c., the roofs on the Holden Park Estate, for the Southborough Local Board. Mr. W. Harner, surveyor:—
Bottrill & Co., London £4,406 0 0
Thomas Adams, Kingsland 3,842 13 0
John Jarvis, Tunbridge Wells 3,651 14 1
Edward Bennett, Tunbridge 3,208 15 0
Strange & Sons, Tunbridge Wells 3,261 15 0
B. & W. Hes, Wimbledon 3,175 18 3
William Gillett, Bilsborough 3,154 13 0
A. W. & J. Porter, Lower Clapham 3,107 7 1

TOTTENHAM.—For alterations and additions to offices at the Lager Beer Brewery, Tottenham. Mr. Charles Dunck, architect:—
Deduct for Bath stone. Net.
Nightingale £1,650 £25 £1,625
Harris & Wardrop 1,374 57 1,431
Greenwood 1,647 34 1,681
Oentry 1,630 28 1,658
Ashby & Homer 1,609 29 1,580
J. Morter 1,629 51 1,578
Chappel 1,559 34 1,525
Laurence & Son 1,526 48 1,478
Shurmer 1,395 45 1,350
J. Currow 1,240 — 1,240

WALTHAMSTOW.—For new organ-chamber, and decorating at Wood-street Chapel, Walthamstow. Mr. A. Goodchild, architect:—
Booley & Son £230 0 0
W. Shurmer 198 0 0
S. Howe 183 15 0
E. Fuller 172 13 3
E. Good 170 2 11
S. J. Scott 126 0 0
Barrett & Power (accepted) 121 5 0
J. A. Reed 115 9 11
C. E. Penn 114 12 6

WALTHAMSTOW.—For new pulpit and reseating at Wood-street Chapel, Walthamstow. Mr. A. Goodchild, architect:—
J. A. Reed £357 11 2
W. Shurmer 330 0 0
E. Fuller 325 10 0
Lascelles 302 0 0
G. M. Hammer 282 15 0
E. Ood 264 4 6
S. J. Scott 263 8 0
Barrett & Power (accepted) 198 18 6

WHITCHURCH.—For additions to Hawthorne Cottage for Mr. H. B. Blandy. Mr. Geo. W. Webb, architect, Reading:—
G. Lewis, Reading (accepted) £200 0 0

WOKINGHAM.—For the erection of a house, for Capt. Gregory. Mr. W. Ravenscroft, architect, Reading:—
Bottrill & Son £3,357 0 0
[No Competition.]

WREAYSBURY.—For addition to the "Old Ferry House," for Mr. H. Glave. Mr. G. W. Webb, architect, Reading:—
S. Roberts, Colnbrook £325 0 0
J. A. Baker, Staines (accepted) 281 0 0

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TO CORRESPONDENTS.
E. S. R.—G. F. M. A letter of that kind should be addressed to a daily paper, not to a technical journal. It may give some information there; it can give none to our readers.—S. (you give no information as to the present construction of ceiling and floor, which might have enabled us to say what could be done. If it is an ordinary jointed floor, hollow between ceiling and floor boards. A filling of slag wool could be put in by taking up the boards; that would probably have the desired effect.—E. & S. (four weeks).—F. R. F. (thanks).—C. H.—T. C.—H. Y. & C. (next week).—J. H. (ditto).—E. S. (ditto).—Several titles of new crowded out this week.
All statements of facts, lists of tenders, &c. must be accompanied by the names and addresses 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 between correspondents, 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. LVIII. No. 2488.

SATURDAY, MAY 24, 1896.

ILLUSTRATIONS.

Sheffield Municipal Buildings Competition: Design submitted by Messrs. Mitchell & Butler	Double-Page Ink Photo.
Design for Proposed Church House, Westminster.—By Messrs. J. T. Mickelthwait and Somers Clarke Architects	Double-Page Ink-Photo.
New Front to Premises, 40, Wigmore-street.—Mr. T. E. Collcutt, F.R.I.B.A., Architect	Double-Page Photo-Litho.
House at Northwood.—Mr. R. A. Briggs, Architect	Single-Page Photo-Litho.
House at Hampstead.—Mr. R. A. Briggs, Architect	Single-Page Photo-Litho.
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The Two Salons at Paris.



THE "Salon Meissonier" has certainly not eclipsed the old Salon. It has this advantage, that its two principal galleries contain a very large proportion of really good pictures and but a small proportion of indifferent ones, and that cannot be said of any room in the old Salon. But though the vast collection at the Palais Nationale undoubtedly includes a great many paintings that are uninteresting and some that are vulgar, the actual amount of striking and powerful works collected is nevertheless, as before observed, a most remarkable testimony to the vitality of French painting: and the collection of sculpture in the central hall is a splendid one. In this latter branch of art the division in the Salon has not operated at all, the new Salon containing hardly any sculpture; as indeed could hardly be expected that sculptors would turn their backs on a site with such exceptional advantages in regard to space and light as the central court of the Palais National, to send their works to a comparatively narrow gallery with an unsatisfactory light. Accordingly, while the weakening of the old Salon in the department of painting is not very marked, the department of sculpture is in full force and has seldom been more and more interesting than in the present year.

In the vestibule hangs M. Martin's enormous painting representing the visit of the President of the Republic to Agen, one of the class of realistic paintings executed in flat tints and in very raw colour, which have become a feature of French decorative painting (so-called) of late, but which are in fact neither pictorial nor decorative in the true sense. Two paintings which are decorative in the true sense find place here; M. Michel-Lançon's decorative composition representing "France," "Force," "Paix," "Industrie moderne couronnée par le Génie du Progrès," and all the rest of it, and on the other side M. Matte's "Saint Vladimir et Sainte Olga aux Pieds de la Vierge"; both in semicircular lunettes, the former representing under the latter ecclesiastical decorative work; the former the best drawn, the latter

the richer in colour. Among the smaller works relegated to the vestibule and not of much importance, M. Chas. Landelle's "Fleurs de France," a half-length of a young woman leaning over a window-sill on which red white and blue flowers are shown, is worth mention not only as a very pretty work but as one which seems to be regarded as one of the popular successes of the exhibition, from the number of photographs of it going about. In the central large gallery (XII.) opening out of the vestibule, hangs opposite the door the leading work of the year in point of size and ambitious aim, M. Munkacsy's huge painting for the ceiling of the Art Museum at Vienna—a huge mistake. It is a ceiling-painting on the old fallacious *de sotto in sù* principle, in which we look up a staircase surrounded by a dome through which the sky is seen: all the figures and balustrades, &c., being seen as foreshortened from below. The subject is an allegory of the Italian Renaissance, and includes portrait figures of some of the great painters of the Renaissance, prominent among whom is Titian instructing another artist in painting from the nude figure who forms the salient point of the composition. Over all, under the eye of the dome, hovers a winged figure, the genius of the Renaissance. Hung vertically, the picture of course looks absurd; when fixed in its proper position it will no doubt show a certain power and largeness of conception of a not very refined order; but as a ceiling decoration it is heavy in effect without being rich in colour, besides the radical error of this method of designing ceiling decoration. Viennese taste, however, will not prove exacting in regard to these little matters. Another central work in this gallery is M. Jules Lefehvre's "Lady Godiva," one of those works in which a whole street of houses is painted full-size, with Godiva's horse in the foreground, led by a female attendant whose dark robes and brunette complexion serve as a foil to the blonde figure of the lady seated sideways on the horse. This attempt to realise the whole scenic surroundings of the story is worth something in its way, whether worth such an immense area of canvas may be another question; and what should be the central interest of the picture, the expression of Godiva, is a failure; a stubborn resolution seems to be what is intended, but there is a suspicion of coquetry mixed with it which is fatal to the sentiment of the story. The other centre places are occupied by M.

Lehoux' "Christ Accueillant les Ouvriers de la Miséricorde" (one of a series), a decorative picture in a fresco-like style and with an alarming preponderance of blue in the shadows, and a figure of Christ rather theatrical in attitude; and M. H. L. Lévy's allegorical painting of the City of Paris offering to Liberty the sacrifice of her children slain in the cause. This is a confused mass of figures not well made out, though with a fine energy of action about the foreground figure of "Paris." The other large room (XXI) at the west end contains the other works which are on such a scale as to require a great space to be seen, but none of them have merit or interest at all proportionate to their size; M. Biesbroeck's "Launching of the Argo" is an immense picture showing the fore part of the ship in side elevation and a number of men hauling at her with considerable vigour and variety of action, but the picture is essentially an academical study of nude figures in action. M. Poujol's painting of Dante seeing Paolo and Francesca in the circle of sinners is powerful as a representation of Dante's lurid conception of the mass of spirits swept away in a storm, but none of the figures are of interest separately, nor can those of Paolo and Francesca be readily disentangled from the mass. M. le Quesne's "The Legend Kerdeck" is a picture of a man enticed into the sea by (to borrow an expression of Daudet's) "a whole marmalade" of nymphs, who writhe and tumble about in the usual way. On another wall is Benjamin-Constant's picture of "Deethoven—le sonate au clair de lune," a melodramatic representation of the composer surrounded by a party of his friends and playing in a room lighted only by moonlight; rather striking as a piece of effect, but another instance of the absurd ignorance of painters as to the subjects they select, the whole story of the composition of the sonata by moonlight being a mere invention, and the title of "Moonlight Sonata" having only risen out of the passing fancy of some critic whose phrase hit the popular taste; but anything to make a sensational picture! A large decorative painting in the same room by M. Dupain, for the ceiling of a picture gallery in a private house—"Le Commerce apporte la Paix et l'Abondance aux Arts et à l'Industrie," has considerable merit as a decorative composition, and is refined in style and colour.

The principal contribution of M. Bouguereau, who is in a sense the leader of the

old Salon, is a painting of "The Holy Women at the Sepulchre" in Room XVI,* a perfect example of the ordinary type of biblical picture carried to its highest point of execution; the three women stand looking into the door of the tomb, which is lighted within from the radiance shed by the angel, a very commonplace angel indeed, but the faces of the three women have a sweet languid pathos about them, and their full dark draperies are beautifully disposed and drawn; in short, this is a perfect type of the art of learned and refined mediocrity. Of this serious class of subject, such as is included under the terms of religious or historical painting, there is not much in the Salon. In French exhibitions the place of historical painting is now mainly occupied by what may be called "life-size genre," and a great mistake, as to scale, much of this is. Among the few historical pictures is M. Gide's "Galileo Explaining his Discoveries to the Venetian Senate," (Salle XIII.) a very well-studied little picture of a subject which would have borne a larger scale. On the other hand we have immense paintings representing two or three rustics sitting at a cottage door, or something of that kind; good enough in their way, but containing no quality or sentiment that could not as well have been shown or expressed on a small scale. In this respect English painters show more common sense than many of the French; they have more perception of the proportion between scale and subject. No doubt they are under a wholesome practical restriction in this respect, for if they painted on the scale of the French *genre* pictures they could get hung nowhere for want of room. Among the pictures which come under the class of historical paintings, or figure subjects other than *genre*, are such as the large picture by M. René Gilbert, the starting of a balloon during the siege of Paris (Salle XIX.), a class of paintings the object of which seems to be to record in a life-size painting the plain facts of the incident, without any attempt at a pictorial composition. Here again there seems no gain whatever from the size of the painting; it is simply painted up to Salon scale, to ensure its being seen. M. Hardie's "Bénédiction de la Mer" (XV.), a comparatively small picture illustrating a rather favourite subject with French painters, is a good work, as also another church subject, not of the present day, M. Méliès's "Procession de Pénitents en Espagne dans le XVII. Siècle" (V.). The penitents, girt with sheets and bare to the waist, and with variously stolid expressions, come down the steps of a church between two parties of clerics.

Then there is M. Vibert's scene from the "Malade Imaginaire" (XVI.), a delightful piece of humour in its contrast (perhaps a trifle overdrawn) between the rubicund face of the *malade* and the serious countenance of the doctor; as far as the execution of the work is concerned the artist has done better than this, but it is a real piece of comedy. M. Pierrey's "Le Nuit de Noël" (VI.) is another of the large "religious" pictures for which there seems to be a certain demand still; an attempt at a moonlight effect contrasting with the supernatural light from inside the manger or shed; it is rather a sensational performance. M. Richemont's "La Rêve" (VIII.) is a scene from Zola's novel under that name, curious in colour and texture but expressive. M. Scherrer's "Duval d'Esprémil" (XIV.) is a life-size historical painting of the old school, and of no little force and power; the scene is at the moment when d'Esprémil was brought into the Corps de Garde at the Palais Royal after being half-killed by the mob; his wife hangs over him, and he says to his friend Pétion, the Mayor of Paris, "I too, Pétion, have been an idol of the people;" the point of the scene, powerfully portrayed, lies in that sentence and its application. M. Van den Bos

* We will give the number of the room in which each picture is to be found in the course of these remarks; the number of the picture it is little use to give, as it may be anywhere, but the rooms at least are numbered consecutively.

picture of "L'Héritier" (XVI.), perhaps in reality a couple of portraits, is a most striking picture of a lady with a noble and proud action laying her hand on the head of her boy; a very unusual work. So certainly is Mr. Veber's "St. Sébastien" (XXII.), bound to a tree and with a pagan public making faces at him, a treatment of the subject which seems rather like a bad joke, on which disproportioned canvas has been expended.

Among figure subjects not *genre* must also be counted the numerous nude studies always found at the Salon, generally well executed, sometimes poetic and refined, sometimes prosaic and commonplace, sometimes unhappily coarse and vulgar. In this category are some of the best pictures of the year however. Highest in the scale certainly are M. Benner's "Soir d'Été" (XXVIII.), a woman lying on the grass, and his "Dans la Grotte Verte" (XXVI.), a lovely nymph upright in the half light of a cavern; for M. Benner does not merely paint nudity, but grace and sentiment of pose and countenance; there is a poetry in his figures and in the tender dreamy expression of their faces which belongs entirely to the region of ideal painting and is quite out of the category of "life studies." M. Boyé has made a fine kind of bravura picture in his "Hippodamie" (XXVIII.), a naked woman bringing two great horses to drink; and Mr. Comerre's "Bain d'Alhambra" (XXIII.) is a splendid work of its kind—a highly decorative Moorish interior in which all the architectural details are shown with the greatest force and brilliancy, forming a background to the figure of a white woman, just emerged from the bath and with her back to the spectator, and a dark Moorish woman seated on the floor. M. Deully's "Après la pêche" (XXVII.) is a work rising to more than mere nude painting, as also M. N. A. Laurens's "Nocturne" (IX.), showing two women seated in the moonlight, beautifully composed as a group, their bodies blanched in the white moonlight, and listening to music from a third more shadowy figure in the rear. M. Ménard's "A la Tombée du Jour" (V.) is an idyll of rosy-inted figures in the evening light amid a rich arcadian scene. To go from the poetic to the realistic one may turn to M. Mousset's "La Toilette" in the same gallery, an admirably-painted picture at all events, and in which the "French matron" seems to take great interest; the "Figure Nue" of M. Doucet (XXIII.) is still better painted, and as a mere piece of painting is a truly remarkable work, it is a real living and breathing body with the life blood throbbing in it, though sensuous enough in sentiment (or want of sentiment). Among others that are out of the commonplace are M. Benjamin Constant's splendidly-painted "Victrix" (XX.) with its sumptuous accessories; M. Edouard's "Odalisque" (XXIII.); M. Hodebert's prettily-composed "Rêve d'Azur" (XXIII.), a young girl seated in a most graceful attitude by the sea with her back to the spectator; M. Georges Landelle's "Libellule" (XIX.) a pretty fancy of a flying woman's figure with dragon-flies' wings; M. Peel's "Après le Bain" (IV.) two dear little urchins warming themselves before the fire; M. L. Perrault's "Venus" (VIII.) with a poetic quotation from De Musset, but the poetry is all in the quotation, the figure is a very good life study, and that is all; and M. Emile Renard's "Le Sommeil" (VI.) another child-picture of a little girl asleep, a lovely little thing hot in feeling and execution, and which is one of the complete successes of this year's Salon.

Of the pictures included under the general term of *genre* there are of course an immense number, and it is only possible to mention a few of the best examples. M. Bisson's life-size group, "Après l'Opération" (XX.) is one of the best of those medical subjects the French have taken to of late years. The principal figures are no doubt portraits, that of the doctor who sits feeling the pulse of the patient is remarkable for its expression of intellect and sympathy. The same painter's "La Cigale" (XVIII.), a half-

length of a cloaked young woman with a lute amid falling snow, is a pretty fancy and one of the popular pictures of the year. A head of this class of pictures, however is certainly the "Pêcheur" (VIII.) of M. Tattagrain, a painter whose remarkable talent is far too little known on this side of the Channel, and who has usually devoted himself to large historical subjects. This year he confines himself to this one painting of an old fisherman standing in the shallow water of the Bay of Authie, lifting a net from the water. The old man's face is a perfect study of character, his weather-stained hat and accoutrements are painted with the greatest truth, the brightly-lighted stretch of sea-water behind makes an effective background to the figure. M. Blayn's "Repas du Soir" (XVIII.) is one of the best specimens of the "rustic group" class of subject. Another very original and pleasing work is M. Boquet's "La Prière," where a company of young girls in blue blouses kneel about on the floor joining in the prayer read by a "sister" from the desk. There is a touching and simple feeling about this work, which is totally without affectation. The "Enfant Malade" of M. Bosch-Reitz (XVI.), where an old woman watches by the side of a cradle, betrays in its feeling and treatment the Dutch nationality of the painter, a tone nevertheless of M. Bouguereau and Tony Robert-Fleury. M. Brisport's "La Bouteille de Champagne" (XVI.) opened for a company for whom this is a great event, and M. Brunet's "La Chanson de la Mariée" (XXII.) are pictures that suggest a comparison with the works of M. Stanhope Forbes; and though they are not truly pictorial in treatment, our English artist is superior in regard to the individuality and character of the figures taken separately. "Idées Noires" (XX.) one of the pictures purchased by the "Société des Amis des Arts" is a pathetic representation of a solitary artist brooding in the half-light of a littered studio, the pictures turned with their faces to the wall. There is a pathetic power too in "L'Océan" (XIV.) by M. Durang, illustrating some lines from Victor Hugo. M. Gelhay's "Chez le Juge d'Instruction" (XV.) is a clever study of that peculiarly French institution for tripping-up suspected criminals in a private examination. M. V. G. Gilbert's "La Valse" (XIX.) is a brilliantly-painted little ball scene in fashionable life, which may be paired off with a brilliant regatta picture by M. Gueldry (XVII.) in which the boats are well drawn as well as the people, which does not always happen in regatta pictures. M. J. P. Haug's "Un Jour de Fête" in the same room is a brightly-painted little Normandy interior. M. Lucien Simon's little size painting, "Chez le Pharmacien" (XIV.), another surgical scene, this time in a chemist's shop, a clever work far too large in scale for its subject. Better than this, of the same type is M. Laurent-Gsell's interior of a chemist's laboratory at the "Faculté de Médecine," a lesson to students by Dr. Thierry. "Voisins" (IX.) M. Lohrichon depicts the friendship of two small children. M. Marec's "La Veillée" (VII.) has the honour of having been purchased by the State; it is, however, only a clever piece of lamp-light effect. Marre's large painting, "L'Offrande Dimanche," in the same room, labelled with the sub-title "Pour les Ames en Purgatoire" is a painting of a more serious type, in which the point consists in the totally stolid and indifferent faces of the worshippers from whom the alms for this solemn end are collected; it is cold and hard in colour, in which we have termed the "fresco-like" manner which is affected by some French painters present, but it is a picture full of meaning and character. M. Moreau de Tours's "Fascinés de la Charité, 1889" (V.) is another medical subject, representing an experiment on the nervous system of patients in a hospital by Dr. Luys; this is one of the most carefully-studied works in the exhibition; every figure tells its own tale. The "Pauvre Enfant" (III.) of M. Pelez, the painter of old and miseries, is a masterpiece in its way, painting of a miserable little *gamin* who

apparently hurt his knee by a fall; the figure, tinted with painful realism, is sharply relieved against a nearly white wall surface; there are no accessories of any kind to draw the eye from the one figure. There is perhaps certain affectation of being pathetic in this, but it is a remarkable work nevertheless. Picard's "Repos du Soir" (III.) is another of the immense life-size groups of rustics whose figures have no special interest or character, and which, well enough painted, take up space out of all proportion to their interest. M. Roger's "La Fête de la Patronne," in the same room, equally large in scale, has more point and interest, partly from its peculiar manner of execution in half-tints, giving the effect of a flood of light in which tails are lost; but it is after all a gigantic etch rather than a picture.

Among works of pure idealism may be mentioned M. Henner's beautiful female head titled "Mélancolie" (XIII.), M. Jacquet's "L'Araignée" (XXV.), a woman catching flies with a net shown in the shape of a spider's web—an odd fancy which seems to have been rather a success; M. Luminais's "Rapt" (IX.), a powerful picture of a man on horseback carrying off a woman dragged to the horse behind him, the horse is seen shortened; and Madame Luminais's ethereal figure "Le Rêve de Psyche" (III.), a very poetic nude figure rising from her couch as if endeavouring to follow some figure flying over her on wings, which one just sees receding—this is one of the nude pictures of the intellectual type, a purely poetic creation; and M. Maignan's "La Naissance de la Perle" (II.) a brilliant but rather absurd fancy.

The most important of M. Gérôme's contributions of this year may be classed under animal paintings; it is entitled "La Bursuite" (XV.), and shows a tract of sandy desert under a glaring sun, with some pelopians in the distance, and in the foreground a lion in full chase of them; the lion in the middle of a bound, his shadow striking a great blue patch on the sand beneath. The picture is a small one, but the lion seems quite as striking and impressive as this vigorous action as if he were painted life-size.—A lesson to many contemporary French painters who think that the way to power is to paint on an immense scale. The artist's other work, "Abreuvoir," in the same gallery, a scene of camels and Arabs at a watering-pond, is not of equal interest, but his sloping lion will not be readily forgotten. Among animal paintings of the ordinary type Hermann-Léon has a capital dog-picture, "Chenil; ceux qu'on n'enlève pas" (III.), and M. Alfred Parisé's "Le Sucre à l'oeuf" (VI.) is a very good horse-study; a foal is held up in his father's arms to give a taste of sugar to a considerate and sober sire; there is a popular element in the picture, which will probably be largely reproduced in engraving.

Military pictures are nothing like so numerous as they used to be, but M. Detaille is one splendid one, "En Batterie" (XXIII.), a life-size (which is unusual with him); representing a troop of artillery advancing at a gallop, the prominent figure, which really makes the picture, being that of the officer at the head of the troop, who gallops into the foreground with his sword extended, a splendid figure, full of military honour. M. Boutigny's "Dernière Faction" (XVI.) is an outpost scene in an occupied place, a sentry lying dead on his back, and an officer examining the distance with a field-glass; the situation is told with great reality. Flameng's "L'Armée Française Marche à Amsterdam" (XII.), a last-century scene, a capital little painting somewhat inspired Meissonier.

Portraits are tolerably numerous, but they are rather remarkable for solid execution in for any special power of treatment or effect. The French in general make little effort to produce the pictorial kind of portraits on which English painters especially pride themselves,—carefully arranged "harmonies" in colour, &c.; the portraits of M. Carolus-Duran, which may

seem an exception in this respect, are rather costume-portraits than pictures in the higher artistic sense; of them more anon, they are to be found in the new Salon. Among the number we can only mention a few important ones, just noticing that there is rather a run this year on portraits of artists over their work, sculptors in their studios, &c. M. Boggio's portrait of Mme. Henri Daguerre, in her garden with her dog, is noticeable as an example of the *plein air* system in portraiture. M. Boulicaut's "M. Boyssot, Député" (XXIV.), is a good specimen of the plain prose portrait, forcibly painted with no pretence at effect, and that of M. Gusman by M. Bukovac (XVI.), who has given his sitter, in a blue blouse, the homely appearance of an artisan, but with much force of expression and character. M. Flour's "Mlle. Blanche Z..." (XV.) is one of the best of the artist portraits, a lady whose very *spirituelle* face is lighted from the reflection of a mirror over an etching-table. M. L. E. Fournier's "La Fille du Roman" (XXIII.), evidently a portrait, is charming; the lady sits with her book carelessly retained on her knee, and her face expressive of pleasant reflections arising out of the story she has been reading. M. Franzini d'Issoncourt's "Portrait de ma Mère" (XVII.) is a very fine and striking work, a dark picture from which the face of the lady, who is seated facing the spectator, stands out powerfully, a great dog of the Danish mastiff breed is grouped with her, but kept in shadow so as not to obtrude; there is a kind of heroic style and feeling about this, which puts it above the level of a mere portrait. M. Gron, in his "Tons de Suie" (XIII.) has essayed Mr. Herkomer's invention of a white-draped portrait of a lady against a white ground, while in "Tons de Fumée" (XXIII.) he gives us a little portrait of a sweep in a black frame, holding an orange in his hand as a point of colour; these are rather tricks of effect, but they are clever. M. Guay's "Mon Vieux Voisin" (XXII.) is a capital half-length portrait of an old artisan. Mr. Jardon gives a full-length portrait of "M. Jahlochoff" (XV.) in his laboratory. Mr. E. H. Lucas has a pretty portrait of two children in little blouses and with bare legs (VII.). Mlle. Marest's "La Lettre" in the same room, evidently a portrait, is noticeable as a fine study of colour. Another variety in the way of presenting a portrait is seen in M. Maurin's "Portrait of Madame —" (XI.), where the lady is just having her cloak put round her shoulders by her maid; and M. Mengin's "Méditation" (V.) is really a good portrait of a lady with a book in her hand. Like several of the best portraits of ladies, she is shown dressed in black; so is a still better portrait, the full-length of "Madame E. T..." by M. Mertens, an exceedingly vigorous and dignified work, remarkable for the fine painting of face. A small portrait of a young girl on horseback, by M. Aimé Morot (VII.) is a gem of its kind, both in regard to the figure and the horse; it is emphatically a painting of a lady, whose pose is the perfection of grace and refinement. M. L. Muraton has tried an experiment in painting the portrait of a lady by lamplight (XII.), standing before a screen which partially reflects the light and throws a kind of glow round the figure; it is cleverly done and an interesting experiment. M. Penet's "L'Improvisation" (III.) is another special treatment, a portrait of a lady at the piano. Mlle. Thérèse Pomey's "Portrait of Jeune H. T..." in the same room, deserves special mention, a charming and vivacious portrait of a little blonde-haired boy in knickerbockers with hat and whip in hand, strongly relieved against a white waistcoat background. M. Richir's "Le Famille W..." (III.) is worth looking at, especially the baby squatted on the carpet; and M. Paul Thomas's graceful "Portrait de Madame —" (VI.) seated on a park chair; Mme. Vallet's "Portrait de ma Petite Amie Othilde Langobois" (X.), remarkable both for character and colour; and M. Wencker's "Portrait of M. Boulanger" (VIII.) a worker in wrought-

iron, engaged over his craft and turning a scroll on an anvil.

French landscape painting is a rather peculiar problem at present. We read statements now and again from contemporary critics that the French are quite our masters in landscape painting. This seems to be a kind of survival in criticism; it was unquestionably true fifteen or twenty years ago, perhaps even ten years ago, but it is not true now. We have been advancing while the French have been declining, having lost some of their great lights in landscape painting, who have left no adequate successors. The special power which French landscape painters show at present is in the shape of a careful study of particular effects of light and colour, especially in twilight or under dull weather. The latter condition, indeed, they seem so fond of, that all sunlight seems to have vanished out of their landscapes, with a brilliant exception here and there; and amid their desire to show what can be got out of the barest materials, a flat field or common, they seem in danger of losing the poetry of landscape altogether. Pastoral scenes with cattle are among the favourite motives. M. Claus's "Rentrée des Vaches" (XXIII.) a small procession of cows along the margin of a cornfield at the close of a summer day, is a good example of this class of work. Mr. Davis (an American by birth but completely French in artistic style and education) gives a good example of the class of study of special effects in his large work "Le Ruissseau: Effet du Soir" (XXVIII.) This is mainly a flat expanse of grass-land looking a cold green in the twilight, with a crooked brook cutting through it; as a matter of truth to nature it improves on acquaintance, but it is a very depressing kind of work. M. Duval-Gozlan has a really fine work, the large painting of "The Seine at Goulet" with a mass of trees rising in full light on the right, the flat shore and the river on the left; it has very obviously the look of a composition, but a striking and effective one. M. Flahaut's "Le Camp de César, à Puy" (XXII.) is a fine sombre effect under a dull red sunset. There are various very good little moonlight pictures, of which one (not the best) by M. Hareux (XIII.), has the honour of purchase by the State, but hardly justifies this special choice. M. Harpignies' works we missed seeing, and had only the poor satisfaction of seeing his name in the catalogue, from which, as before observed, it is impossible, on the French system, to find the picture except by accident. M. Joubert's "La Seine à Pont-de-l'Arche" (XV.) is a fine work with more sunlight in it than usual; and M. Jourdeuil's "Derniers Rayons du Soleil" (XIV.), a mill and meadows with cattle, a little recalling Mr. Mark Fisher's style. M. Léopvre's "La Loire" (XII.), a large painting where the river is seen in the distance through a sparsely-planted grove of trees, is quite an exceptional work in its appearance of sunshine and aerial freshness, though here one complains that there is really no "landscape" in the higher sense, there is grass and trees, that is all; but one at least thanks the painter for sunlight. M. Le Marié des Landelles' two landscapes in Room VII. should be looked at, and M. Le Vilain's "Ile de Vaux-la-Reine" (XI.), an evening light effect; and M. Maincent's "Un Soir à Port-Marley" (XIII.) is a beautiful bit of evening effect on a river with wooded banks, and is one of the few which impresses one as a beautiful scene, and not merely a cleverly-painted one. M. Massaux's two pictures, "Dans le Prairie; le Matin," and "Dans les Polders; le soir" (V.) are very successful studies of morning and evening effect in a flat landscape. Mr. James Paterson's "L'Hiver sur La Cairn; Écosse" (VI.) which has been exhibited in London, holds its own very well here, and might give hints to some of the French painters as to representing light on a landscape. M. Pelouze painted a large picture on the "Bords de Seine"—dull, gloomy, and colourless to a degree; if nature were really that one life would not be worth living. M. Peiraire again, in "Le

Marais, environs de Corheil" (IV.), covers the earth with nasty green like the cloth of a billiard-table, and M. Pointelin's large painting of a scene in the Jura country (IV.) is still worse; dull greens and leaden skies; one feels choked for want of air in looking at them. M. Quignon's "Le Moisson" (IV.), is a fine work, with its dark masses of trees sailing above a golden sea of wheat; there is some colour here, at all events. M. Schenck's "Les Survivants de Troupeau" (XIV.), is a good snow-scene. A large picture by M. Tessier, "Marée Montante" (XXII.), a flat shore strewn with boulders, and where a cartload of seaweed is being painfully dragged through heavy sand, the man pushing at the wheel, is remarkable for the sense it gives of an impending danger; there is a stormy sky and the breakers of the rising tide are seen over the boulders; the evident struggle to get along with the cart as fast as possible emphasises this expression, and clenches the powerful effect of the whole.

Generally speaking, the French painters are not successful with the sea; they seem to want the feeling and sympathy for it. M. Lapeyrière's "La Plage à la Teste" (III.) is truthful in colour, but the waves are studio waves,—their forms are not from Nature. M. de Kerdréret's small painting of "L'Equinoxe" (XIX.), hought by the "Société des Amis des Arts," showing heaps of white water blown against a breakwater in a gale, has at least something of the wildness of the sea; the forms are good, but the stuff of which they are made is not watery enough,—at first glance it might be snow and ice. The two best sea-pieces are those by M. Charles Lizé (XI.) "L'Appareillage du Matin" and "Brise de Soir"; in the latter a ship and a steamer are gliding over a smooth evening sea, the latter under full sail; the former (the best work) is a fresh morning sea, with two fishing-boats bending before the breeze and sailing out of the right-hand side of the picture; a great deal of the effect depends on this little bit of composition, putting both the craft at one corner and leaving the rest open sea; the spectators seem conscious of their movement and almost expect them to sail out of the scene in a moment: the craft are well painted too, and the whole thing a complete success.

Of the splendid collection of sculpture, the glory of the Salon exhibition, we must speak separately, for it would be absurd to dismiss it with a few words, and we must devote some observation to the new Salon, a much smaller exhibition though with a good deal of special interest about it.

The "Salon Meissonnier" occupies the first floor galleries of the Palais de Beaux-Arts of last year's exhibition, the entrance to the exhibition being by the central hall and grand staircase. The best portion of the exhibition of pictures is to be found in the long galleries running southwards from the central hall at each side, called Galleries II. and IV., and in Gallery III. ranging with the width of the hall on the east side. The gallery running round the central hall is devoted to what works of sculpture there are, which are neither numerous nor for the most part important; the only one perhaps which is particularly worth mention is the plaster model of M. Dalou's seated statue of Lavoisier, a very expressive figure with the head leaning on one hand in attitude of contemplation, and the same sculptor's model of the figure of Victor Noir intended for his tomb; a bronze figure representing him lying on his back with his hat by his side, as if fallen after the fatal duel which ended his life. In giving in his adherence to the new Salon, M. Dalou does not seem to have put forth much of his power to support it. The central gallery also contains the one work which has any reference to architecture, viz., the cartoons and two models for M. Galland's decoration of the side gallery of the three large saloons of the Hotel de Ville. Two bays of this are given full size. They are divided by the broad transverse ribs of the vault, with flat soffits; between these, on the haunches of the vault, are small paintings in square frames surrounded again by oval-

shaped cartouches, the paintings representing the trades of Paris; below there are smaller cartouches containing eminent names in French architecture, "Ballu," "Depertthes," &c. The crown of the vault is occupied by a series of decorative symbols framed within architecturally disposed panels. The whole of the detail is exceedingly refined and has evidently been carefully studied. Two small models project from the wall, giving on a small scale the actual arrangement of the paintings on the surfaces of the vault. This exhibit in itself is a very interesting one. With this exception, architecture or architectural decoration finds no place in this exhibition.

The two ends of Gallery II. are occupied by large works of pictorial decoration. At the upper end, on each side of the door, are M. Lerolle's two paintings, of St. Martin as a soldier dividing his cloak with his sword to give half of it to a pauper, on the other side Christ appearing in a dream to St. Martin and relating to three angels that Martin had covered him with this cloak (according to the text "whosoever doth it unto one of the least of these hath done it unto me"). These are intended for the Church of St. Martin; they are painted in a flat fresco-like style suitable for decoration, and tell their story well. The whole of the opposite end is occupied by a great piece of "Puvisme," a great painting by M. Puvis de Chavannes, in a built-up framework of its own, intended for the staircase of the Museum at Rouen, and entitled "Inter Artes et Naturam." This has not the same merit of telling its story well, in fact it recalls the line from the Anti-Jacobin,—

"Story, God bless you! I have none to tell, sir."

It is a scattered composition of figures in which the groups have little relation to one another. On one side are three artists and an artisan in very modern costume doing nothing in particular; on the left hand are three young women in somewhat more idealised costume, one giving the other a lily to draw from, a third, a very graceful figure, half reclined on the grass with her back to the spectator, also not entering into any action involved in the subject; in the background some workmen are apparently employed in setting up again the fallen blocks of some architectural monument; engaged in a work of "restoration," possibly. The back of the scene is filled by a view of Rouen. Decorative the work is, in regard to its æsthetic and in delicate effect of colour, but it is singularly deficient in meaning and in unity of idea and composition.

After these we come to purely pictorial work. In this department the proportion of good things is very large, and there is no doubt an air of refinement and selectness which does not strike one among the more multifarious contents of the old Salon; there are many very good things, and few had ones; at least in the two principal galleries. As most of the new school have followed the new Salon, there is of course a good deal of painting with a special and progressive character of its own, which means a certain amount of eccentricity, but it is mostly eccentricity with an artistic purpose. In this connexion it is curious to find such a very mundane painter as M. Carolus Duran acting the part of Saul among the prophets. A whole row of his brilliant portraits of ladies in the height of fashionable costume are spaced equally along the end wall of Gallery II., and however lacking they are in the higher qualities of artistic feeling, they compel admiration for their brilliant execution and for the intimate knowledge, one might say instinct, which they display in the art of suiting the colour and costume to the personality of the sitter. The portrait of the graceful and *spirituelle* "Princesse de ——" in a cream-satin dress with a pink cloak, looking the very flower of aristocratic grace and refinement, is strikingly contrasted with the treatment of the more dignified portrait numbered 183, of an older lady in a plain red dress without a particle of ornament, hacked by the ample folds of a black velvet cloak; and as

another variety we have "Mlle. S——" as a study in greys, a young girl in an outdoor costume. Oddly assorted with these is the study entitled "Lelia," the torso of a nude woman seated on crimson velvet with her back to the spectator, the head just turned sufficiently to show the outline of brow and cheek, the flesh splendidly painted. All this is not very high art, certainly, but it has the merit of being superbly successful within its own range, the work of a painter who knows exactly what he wants to do and how to do it.

The Salon Meissonnier contains but one work by M. Meissonnier, "October 1806," Napoléon and his staff watching the effects of a charge of cavalry in we know not precisely what battle. The figure of Napoléon is as remarkable as in all the painter's other representations of him; he sits on his grey horse looking after the body of galloping horsemen as if his whole intellect were concentrated on the event of the movement, with an expression that haunts one afterwards. The execution of the picture is, as usual, complete in every other respect; but it is the personal interest concentrated in the principal figure that makes the picture: the rather a in this instance the soldiers in action are comparatively distant figures, and the staff officers seem merely ornamental.

In the matter of landscape it should seem that, whether intentionally or not, the new Salon shows a kind of revolt against the color greens and sunless skies which gave us so much cause of complaint in the old Salon. Here we find ourselves much more in a land of sunshine. M. Girardet's "Verger de la Vallée d'Auge" is one of the most perfect little landscapes we remember, in regard especially to the balance of the artistic relation between painting and nature; it is real but not realistic, nothing is hardly finished but everything is shown—the trees and the grass the admirably-drawn figure of the woman with her pail, the brown cow making a beautiful bit of colour in the middle of the scene; it is perfect nature, but nature interpreted (not prosaically copied) through the medium of pigments. M. Montenan has been painting about the south of France, and floods his works with southern sun; especially in "Le Quai de Toulon" and "Le Vieux Ponton," an old ship's hulk on the water, looking absolutely scorched in the glaring sunlight. M. Aublet too gives us a gay open-air scene in a large picture, "La Fête-Dieu," a company of young ladies gathering roses in a field full of grass which sparkles in the sun; the woman (except a dear little girl who holds a basket for the flowers) are rather mannered and overdressed, but after the Salon landscapes it is quite a comfort to get a scene in full sunshine. M. Aublet's collection of works here shows a remarkable variety of powers. One of the finest things in the long west gallery is M. Courten's "Matinée, Automne," a scene in which a calm stream is seen lighted by sunshine struggling through a thick mass of yellow autumn foliage from the overhanging trees covering in the whole scene; the effect of light and colour is given with wonderful truth and power, though by means of very broad and bold handling; there is little detail to be made out on a near inspection but the whole falls into its place and tells splendidly at the proper distance.

The best works are all in the two long galleries east and west, and in the shorter end gallery parallel with the central hall; a number of smaller rooms have been undividedly filled with works of little value to add to the numbers of the Exhibition, the worst possible policy in what professes to be an exhibition of select excellence. We can only now just notice in the order of the catalogue a few of the more striking works remaining. M. P. A. Baudouin's "Épisode du Siège de Paris" is one of the immense life-size pictures in which scenes of this kind are being perpetuated; apparently represents a giving-out of stores at some official place, with a crowd of people forming a queue to wait their turn; it is an impressive work of its class, with much character in it.

NOTES.



M. BALFOUR BROWNE waxed heroic towards the close of his summing-up in the Railway Rates Inquiry, his peroration contrasting strongly with the utterances of some of his clients, who have pleaded their helplessness against the "long purses" of railway companies. He said:—"Should this tribunal recommend the Board of Trade to agree with the railway companies and accept their schedule, then the traders must look elsewhere for help; and he believed that, in the long run, the traders were more powerful than the companies." It is doubtful whether anything will ever "turn up" likely to be of more advantage to the traders than the present inquiry. It has afforded them an unequalled opportunity for explaining their position and requirements,—an opportunity of which many have fully availed themselves. The companies still resist the claim for truck-load rates, being apparently apprehensive that intermediate carriers would spring up, who would take possession of the truck and fill it with small consignments of goods collected from various parties, thus diverting a portion of the profits. Sir Bernhard Samuelson's investigations showed that some of the continental trade is carried on under these conditions, to the advantage of the community. An important concession, announced by Sir Henry James on behalf of the associated companies, was as follows:—"In the case of merchandise in respect of which the service of loading, unloading, covering and uncovering is not performed by the company at any station, the maximum service terminal authorised by the schedule shall be reduced—in Class C, loading 3d. per ton, unloading 3d., covering 1d., uncovering 1d.; and in classes 1 to 5, such an amount as may be agreed upon; or, in case of difference, determined in a summary manner by the Railway Commissioners." Mr. Balfour Browne objected that the amount of rebate was insufficient, and that the words "classes 1 to 5," &c., were too indefinite. He suggested that all traders who did their own loading, unloading, &c., and provided their own station accommodation (like Messrs. Huntley & Palmer), should be allowed a rebate equal to the amount actually charged by the railway company to other traders doing the work. After all, the important point is that the principle of rebate under such circumstances is now admitted by the railway companies, and Mr. Balfour Browne's more logical suggestion may perhaps be eventually substituted for Sir Henry James's.

THE Strand Improvement Bill was on Monday last again before the Hybrid Committee appointed by the House of Commons to consider it, when Mr. Dickinson, the vice-chairman of the Parliamentary Committee of the London County Council, stated that since he had given his evidence to the effect that no experts other than the Council's own officers had been consulted on the scheme, he had learned that Mr. Vigers, the well-known surveyor, was consulted, and that he advised on the estimates. The Chairman of the Committee (Mr. H. H. Fowler) asked why Mr. Vigers had not been examined before the Committee. Mr. Pope, Q.C., the leading counsel for the promoters, replied that Mr. Vigers had not been called because he expressed disapproval of the scheme of "betterment." The next witness called was Mr. Daniel Watney, who denied that the south frontage of the Strand, or the property in the streets leading therefrom in the direction of the Embankment, would be "bettered" by the improvement. The "betterment" area which was scheduled in the Bill he considered to be very wide of the mark. Mr. Pember, Q.C., in addressing the Committee on behalf of the Strand District Board of Works against the opposition to the "betterment" clauses of the Bill, contended that it was a recognised principle which had hitherto underlain all

legislation on public improvements that the incidence of taxation should be determined by the motive of the expenditure, not by its accidental results. There was nothing in the preamble, he said, which pointed to the Bill being promoted for the special benefit of the Strand. On the contrary, they had not for a moment thought that in spending this money the County Council were actuated by a desire to improve the Strand property, their object really being to facilitate the traffic in one of the main thoroughfares of London. Mr. John Dunn, F.R.I.B.A., surveyor to the Strand estate of the Duke of Norfolk, was called, and said that he did not believe that the proposed improvement would "better" the south side of the Strand, nor Arundel, Norfolk, or Surrey streets. It was quite true that the Duke of Norfolk's Strand property had doubled in rateable value in about ten years, but that was to be attributed partly to the building and opening of the New Law Courts, and more largely to the fact that a large amount of property on the estate had been rebuilt. Mr. Tewson, another professional witness, confirmed the evidence previously given by Mr. Watney. Both these witnesses expressed the opinion that the first plan proposed by the Council, for taking the block north of Holywell-street for recoupment, was a better scheme than the alternative plan, which would leave the north side of Holywell-street the north side of the widened thoroughfare. If the latter plan were resolved upon, the Strand would be 120 ft. wide at this part; if the first plan were followed, it would be only 100 ft.—quite ample, we think. Two or three tradesmen on the south side of the Strand were called to give their opinions as to the possible effect of the proposed improvement on their businesses. One of these witnesses was Mr. Cole, the hatter, who said that he thought his business would suffer rather than gain if the improvement were carried out. He thought that a narrow street with congested traffic was better for his business than a wide street, because people who were in cabs and carriages had an opportunity given them by occasional blockages of the traffic to observe the shops and their contents. Mr. Cole has evidently quite changed his views since he attended the meeting of inhabitants held at King's College in December, 1888, to consider the question of the restoration or removal of the Church of St. Mary-le-Strand (see *Builder* for Dec. 8, 1888, p. 407). Then, Mr. Cole was a leader in the movement for the removal of the church, on the ground that it was an obstruction to the traffic! The Committee adjourned until Monday, June 9.

AS will be seen by the long report which we publish this week, the Architectural Association at its last meeting did not come to any decision as to the report of the special committee appointed to inquire into the educational methods of the Association, and the discussion has been adjourned to the 30th inst. While it is well to be deliberate in coming to a decision on recommendations which must largely affect the future of the Association, it seems to us that one or two of the speakers quite failed to realise the fact that the report must necessarily be considered as a whole. We quite agree with Mr. Cole Adams and others speakers that it would not be desirable to altogether eliminate "voluntary" workers from the Association. Some of the speakers, we are pleased to see, holdily advocated the establishment of day classes, for, as we said in our leading article on the subject last week, the Committee's suggestion on the question was rather half-hearted. Mr. Gotch, in his remarks, made the same suggestion as that which we made in our article as to the payment of the teachers or lecturers, viz., that their payment should be partially by salary and partially by capitation fees. Before the serious engagement of the evening commenced, there was a preliminary skirmish on the question whether it was advisable or not to publish the numbers of votes recorded for the candidates nominated to serve on the

separate figures. M. Jean Bérard's "Monte Carlo (rien ne va plus)" is, we are sorry to say, the popular attraction of the exhibition, for it is a most hard and commonplace work in style, but a very highly-finished representation of all the details and personages of the gaming-table, and therefore probably interesting, for opposite reasons, to those who have and those who have not taken each part in the proceedings. M. J. E. Blanche's portraits are among the best in the exhibition, especially that of "Mlle. J. M. sur son pony." There is a remarkable group of portraits by M. Boldini, in one of which he has represented a well-known Parisian artist, with his wife and daughter, with his mouth open in undisguised laughter; the effect is distinctly *not* happy, but the whole of this group of portraits are vulgar in style, though their cleverness is undeniable. M. J. C. Cazin has several good little works. M. Courtenay, by the way, whose autumn picture we noticed just now, sends a small work called "Coup de Vent (tempes pluvieux)" which is just as remarkable in its way, and wonderfully true to nature. M. Damoye has a variety of fine works, among which "Les Blés (Bretagne)" and "Dans les Dunes" are the best. M. Emile Friant's "La Lutte" is an exceedingly vigorous picture of a wrestling match between schoolboys who have been bathing; his landscape, "Le Rocher de Monaco" is also a fine thing. M. Gervex exhibits rather a medley of works of different types, the principal one being a portrait-group of French politicians of the day. The works of an American landscape painter, Mr. Harrison, are among the most original and powerful in the galleries, especially the study of the sea at night with a glance of moonlight on rough water. M. Kuehe's "Ave Maria"; M. Lafon's "En plein air," a nude figure seated with her back to the spectator (rather recalling Sir F. Leighton's "Psamathe"); M. Madeleine Lemaire's "Le Sommeil," a very fine painting of a lady asleep with a rich dress with artificial flowers pulled loosely over her; M. Lieberman's "Dans les Dunes," a painting of a dreary waste of sand with a woman tugging at a recalcitrant goat in the foreground; M. Mesdag's "Avant l'Orage"; M. Rixens' "La Toilette," a half-dressed lady before her glass, an admirably-drawn figure—these are all pictures worth looking at. M. Roll makes a good show; among his cleverest works is a portrait of M. Coquelin the younger, in evening dress and evidently in a character; and his "Enfant avec sa Bonne" is an admirable and quite unusual study of child character. It is a pity he exhibited his "Grande Marée," which looks little better than a mass of soapuds. Mr. Alfred Stevens is a large exhibitor of a great variety of works, among which "Réverie" and "La Lettre" are the best. M. Thaulow's snow scene, "Un Jour d'Hiver en Norvège," is a marvellous piece of realism, which however it is not so difficult to achieve with snow as with some other kinds of scene—the problem of light and colour is a good deal simplified. M. Tournès' "Femme qui se deshabille" has attracted a great deal of attention; it is a clever but not an interesting or beautiful work, and to our thinking has been much over-rated. Among smaller works are some admirable still-life paintings, "Prunes et Verre de Vin," and "Fromages et Fruits," by M. Zakarian, which are perfect in regard to colour handling and artistic perception.

The new Salon certainly gives one the opportunity of studying a small selection of pictures under different circumstances from the more crowded collection of the old Salon, and if it is kept as a small exhibition of high-class paintings it will be a gain; but it should be kept at the highest possible level in regard to quality rather than quantity. As it is, it would have been a much better exhibition and have preserved its special interest much more truly, if it had been confined to the contents of the three galleries we have named, and even those would have borne weeding.

Committee. We cannot see what objection there can be to stating the numbers, and therefore, as they were publicly announced, in accordance with the wish of the majority of members present, we include them in our report of the proceedings.

THE great gift of a quarter of a million pounds,* which Sir Edward Guinness last year proposed to bestow on trustees for the purpose of erecting in London and Dublin healthy houses for the working classes, requires, it seems, a special Act of Parliament to permit its acceptance. The law of mortmain, passed six centuries ago to prevent the accumulation of land in the hands of ecclesiastical bodies, now stops the building of artisans' dwellings. By the same law, Lord Cadogan's offer of land in Chelsea cannot be accepted by the Guinness trustees for the purposes of their trust. That such munificence may not go a-begging longer than need be, a Bill entitled "The Working-Class Houses Bill," has just been introduced into the House of Commons by Mr. Lees Knowles; it is backed by Conservatives, Liberals, and an Irish Home Ruler, and cannot, therefore, by any means be considered a party measure. The promoters of the Bill propose to exempt from the laws of mortmain any assurance (by deed or will) of land, or of personal estate to be laid out in land, for the purpose of providing dwellings for the working classes in populous places, provided that the quantity of land assured by will does not exceed five acres, and that the deed or will is, within six months of execution or of probate, enrolled in the books of the Charity Commissioners (for England and Wales), or (for Ireland) in the office at Dublin for registering deeds. A second clause extends the operation of the Act to assurances by deed made within twelve months before its passing by a person alive at that passing, thus permitting the acceptance by the Guinness trustees of the gifts of Sir Edward Guinness and Lord Cadogan. The Bill was read a first time on Thursday last, and we trust that it will soon become law, although we must confess that we have not overmuch sympathy with this continued tinkering of old statutes.

IN the case of the Commissioners of Works v. Banting, which was tried on Monday last, Mr. Justice Day sat with an assessor, Mr. Penfold, the architect. The case itself was of no public interest, relating only to the title to a wall at Kensington, but various technical details had to be gone into, and the Court itself was littered with plans. We note the case because, so far as we are aware, it is the first in which an architect has sat as assessor with a Judge of the High Court. The practice is very desirable, and the precedent ought to be followed in all cases in which technical questions as to buildings are involved. The Institute of Architects and the Surveyors' Institute might jointly appoint a rota of assessors from whom assessors might, when required, be selected. These bodies might well put themselves in communication with the Lord Chancellor on this point, and express their willingness to make such a selection. The Board of Trade has a regular list of nautical assessors for the purposes of shipping inquiries, and the Trinity House has also a rota of Elder Brethren for the sittings of the Admiralty Court. The Lord Chancellor can scarcely be expected to take the initiative on this point, and we therefore strongly urge on the bodies we have named that they should follow up the precedent set in this case. If assessors were employed in building cases, it would give confidence to suitors, and further the ends of justice. Lawyers, however able, cannot master technical details in a moment, but a skilled assessor can often make a technical point clear in a few moments, and thus prevent the loss of public time and judicial temper.

* See the *Builder* for November 23, 1889.

IN reference to the question of the proposed monument to the German Emperor William I., we are able to state on good authority that the Imperial "Bundesrath" will be asked by General Caprivi to come to the following decisions:—

1. That a monument to the deceased Emperor William I. be erected on the newly-opened-up extension of the so-called "Schlossfreiheit."
2. That the monument take the form of an equestrian statue.
3. That the Chancellor be empowered to organise a limited competition for the aforesaid monument.

It being a well-known fact that this idea has originated with the young Emperor, and that the latter is said to have notified to the members of his suite that he would be in favour of no other monument but one in the above form (to be placed in front of his palace), we have good reason to believe that the decision will be arrived at, in spite of public opinion throughout the country being absolutely against this mode of working out so important a project. It may be worth note that the new extension of the "Schlossfreiheit," on which the monument is apparently to find place, is being laid open by the aid of a lottery organised by a committee of financiers.

A NEW monument is to be erected at Dresden in memory of the famous German architect, Gottfried Semper, on account of the great services he rendered to the architecture of the present century. It will be a life-size statue of the architect, to be erected by the combined architectural and engineering societies of the Empire.

THE completion of the "Hofburg" at Vienna is being energetically taken in hand again, it having been decided to finish and cover in, with a cupola of some 25 metres diameter and 51 metres height, that part of the block situated towards the "Bathyanstiege," at present serving as entrance to the inner "Burgplatz," and which has for many a year shown a most ruinous appearance. The architect, Reg.-Rath Kirschner, who intends keeping the new erection in the same style and on the same lines as the riding-school close by, has planned a large portico entrance to the building, for which four pieces of sculpture of considerable dimensions, referring to the Hercules legends, are to be prepared. The opening ceremony cannot, however, be expected to take place for some time.

DR. TRISTRAM, Q.C., Chancellor of the Diocese, sitting in the Consistory Court of London, has granted a faculty for building over a reputedly "disused burial-ground," under the peculiar circumstances of the case. It appears that the open space which lies next northwards of St. Sepulchre, Holborn, and being, in fact, portion of the old parish churchyard, has, in the Chancellor's opinion, ceased to be a disused burial-ground within the meaning of section 3 of the Disused Burial Grounds Act, 1884. And this because the ground had been covered partly with flagstones, and partly—upon a higher level—with concrete (as a playground), with the parochial schools, and with an adjoining large coal-house. This coal-house it was sought to convert, at a cost of 500*l.*, into an extension of the infants' school. In view of these conditions, the Court held that the churchyard could not be considered as one of the disused burial-grounds, to which alone, as such, the Act in question applies. We may add that the Vicar's and the churchwardens' petition for the faculty was not opposed; and that the present schools, removed some years since from Ball-court, Giltspur-street, stand upon a raised bedding of concrete laid over the graveyard.

BY direction of the Charity Commissioners, the Governors of Robert Aske's Hospital have agreed to grant an eighty-years lease of the sites of Haberdashers' House and two adjoining messuages, being Nos. 59 and 75, Buttesland-street, Hoxton. The lessee is to

pay rent of 175*l.* for the first year, and the 350*l.* per annum; he undertakes to erect on this property, which covers about 23,000 sq. ft. superficial, some artisans' dwellings, at a minimum outlay of 20,000*l.* The hospital was built in 1691-2 by Dr. Robert Hook, the mathematician, upon the endowment of Aske, citizen and haberdasher, who demised a sum of 30,000*l.* in trust to the Haberdashers "ad viginti senum [to be freemen] aliment et totidem puerorum educationem;" according to an inscription under the former centrepediment. Haberdashers' House—now No. 55, Pitfield-street, *olim* Haberdashers'—forms the northern wing, and is the only remaining portion of the original fabric, which was rebuilt for almshouses in 1824-6, after the designs of D. R. Koper, architect. Separated from the present school by Buttesland-street, it is a conspicuous building, square on plan of red brick, three stories in height, having mansard roof, and high angle-pedimented dormers on the attic floor. Hook's design included the classical piazza, with an ambulatory 340 ft. long, that lay between the two wings as described by Hatton, and of which the company possess a model. The hall of the company, at one time the Hatters and Milners, was rebuilt by Wren after the Great Fire. In a return supplied to the Commissioners a few years ago the gross income of this particular charity is set down at nearly 8,500*l.*, derived from its estates at Hoxton and Kent.

DR. WALDSTEIN devoted the first part of his second lecture on "Recent Excavations in Greece," delivered at the Royal Institution on Saturday last, to an enumeration of the circumstances which led him and other archaeologists to the conclusion that Hissarlik was the site of the Homeric Troy. The topographical and physical conditions of the spot agreed with those described in the Homeric writings, and the excavations of Dr. Schliemann, coupled with the geological, zoological, and palæontological examination of the site made by Vieillot, had, in the lecturer's opinion, placed the matter beyond doubt. It was true that Strabo, in the thirteenth book of his "Geography," quoted from a certain Demetrius, a native of Skepsis, who was grammarian of the Pergamene school, a statement to the effect that the site was further inland; but there was reason to believe that Demetrius, as a native of a neighbouring and rival city, was a prejudiced witness, and certainly his unsupported testimony did not stand the test of modern criticism and research. The lecturer next described the excavations carried on under the auspices of the German Government at Olympia. These excavations he said, constituted one of the most important works of scientific investigation which have ever been undertaken, and it redounded to the everlasting credit of the German nation that it should have so unselfishly undertaken so great and expensive a work purely in the interests of research, for they were precluded from carrying away anything that was found. One of the most important findings during these excavations was a marble statue of Hermes, which was undoubtedly the work of Praxiteles. Two photographs of the statue were thrown on the screen by means of the electric lantern, and the lecturer pointed to the successful way in which the sculptor had treated the hair of the head of the statue, which was executed in what was at that time a new material, for it was not until the fourth century B.C. that marble was regarded as a sufficiently noble material for an important statue, ivory and metals having been previously used for the most important works of sculpture. Dr. Waldstein's third and concluding lecture will be given on Saturday, the 24th.

AT Lübeck, under the able management of the Architectural Department of the Board of Works, an entire restoration of the fine old Town-hall is being gone through piece by piece, without disturbing the business

carried on in the offices situated therein. The renovation, cleaning, and repairing of the fine old German Renaissance woodwork in this building is pretty well finished, and the excellence and fine detail of this old work can now be easily studied; the two halls situated on the ground-floor, and belonging to the "exchange," have been completely redecorated, and show some interesting Romanesque decoration; whilst a new main staircase in glazed brick (on one of the walls of which a mosaic in memory of the late Emperor William I. will perhaps be placed) is well worthy of note. In the same town a new Museum, showing elevations in brick in the style so natural to the place, is being erected, at a cost of about 20,000*l.*, and several new buildings, among which is an exceedingly well-proportioned post-office completed but a short time ago, are springing up in the picturesque old streets. In regard to the engineering work, the new town waterworks are being extended, and a central electric station, with an extensive net of underground wires, is now in use, this latter acquisition to the town having been carried out by the authorities so as to prevent private competition against the corporation works.

AT Hamburg the extensive new harbour works, with their multitude of warehouses, offices, minor buildings, and, last not least, bridges, may now be considered complete, and it will certainly be worth the while of any architect to visit this vast collection of structures, the elevations of which show throughout an adherence to moulded brick-work, which has always been a favourite method of building in this part of Europe. Among the buildings in the town completed during the last few years, the new Law Courts, showing façades in the German Renaissance style, and the new Post-Office, an imposing block in the modern free style, are specially worth notice; whilst of those buildings now in course of erection, the new "Rathhaus," which is unfortunately being placed on a too-crowded site in close proximity to the lately-enlarged "Exchange," may be said to be progressing as quickly as could be expected, and the new "Stadthaus" will soon be roofed in. In the suburbs villas of a more or less English type are being built in great numbers, and on the whole these private residences may be said to show some interesting elevations, besides well-finished interior work.

AT the Hall of the Armourers' and Braziers' Company in Coleman-street, an exhibition has been opened of various descriptions of metal-work, chiefly brass or combinations with brass. The exhibition occupies five rooms, but only one is devoted to work of recent date, for which prizes are given, the others being chiefly loan exhibits from South Kensington and firms of metal-workers. Upwards of one hundred and forty articles are exhibited, and of these the repoussé work in copper and brass is of the most interest and decorative value. Some especially fine plaques in copper and brass have been sent by the Guild and School of Handicraft, designed by Mr. Pearson (55), of similar character to those sent to the Arts and Crafts Exhibition last year, one of which we illustrated (*Builder*, November 2, 1889). Mr. Ashbee is represented by two coal vases in copper (53 and 31), a log box in copper and wood (35), and fireplace in the same materials. Both the latter are ornamented with a series of oblong copper panels with foliage. The Guild also sends a picture-frame in repoussé, designed by Mr. Holman Hunt for his picture of the May-morning Ceremony at Magdalen (34),—a large circular plaque with moulded edge, and a central oblong panel. From this rays extend to the border, and on ribbons are the words—
"And Fyry Phebus ryseth up so brighte
That all the orient lowlyeth at the sight."

There is also a copper bowl, of simple outline, designed by Mr. Pearson, and ornamented with flying dragons and fish. A fender in copper and iron (54) is bold, but a trifle

clumsy. It consists of a series of copper panels in an iron framework, with copper knobs at the angles. A candelabra in iron and copper (57) is also noteworthy. The work submitted by the Keswick School of Industrial Arts varies in quality. The brass and copper dishes (110-113) are very good, both in design and execution, but hardly the same can be said of the altar cross and alms-dish (23 and 24) which, although carefully wrought, are lacking in originality. Near the centre of the room is a ball lantern, exhibited by Messrs. Strode & Co., excellent in design, and awarded a special prize as being the best work in the Exhibition (67). We should, however, like to have seen a greater appearance of strength at the top. The foliage is dainty, but it lacks an air of stability. Among the smaller objects the following are most worthy of notice:—(26) a lunette panel in repoussé, (41) two brass finger-plates in brass, with delicate foliage and figures, (48) a round muffin-stool in copper, (69) a picture-frame in etched copper with an outer and inner border of wood, (70) a lock-plate in copper and brass, with Cupids, (102a) a door-knocker and knob in bronze, and (120) a tray in copper audin, with fighting birds—we suppose swans. At the end of the room is a tray with a low relief representation of fog, a figure poised in the air with flowing drapery, and the words, "Hover thro' the fog and filthy air." Some of the students' work in Room II. is good, but most of it lacks spirit. An exception to this, however, is a girandole with double sconces in brass, copper, and iron (168); a very fine piece of workmanship which has been awarded a first prize. The other rooms, as has been before mentioned, are occupied by the loan collection lent by South Kensington, and also some modern examples, many of which, we think, hardly add to the exhibition. We hope to give some sketches of the exhibits shortly.

ARCHITECTURE AT THE ROYAL ACADEMY.—IV.

1,779. "Trinity Hall, Cambridge: new buildings." Messrs. Grayson & Ould. A pen drawing of a block of buildings in Domestic Gothic style, with corbelled-out oriels under each gable. The rather high solid parapet over the upper oriel windows gives them rather a heavy effect. The double clusters of chimney-stacks with decorative surface tracery have a rich effect.

1,783. "Study for a portion of a Reredos at Dursley." Mr. H. J. Westlake. A monochrome drawing with a kneeling figure of a saint with very broad and massed treatment of the drapery, in a style suggesting a reminiscence of Albert Dürer; two other draped figures behind apparently standing, though their heads are hardly higher than that of the kneeling figure, perhaps for decorative reasons, like the arrangement of the heights of the standing and riding figures in the Parthenon frieze. The drawing is hung too high for detail to be much seen.

1,784. "Lichfield Cathedral; western façade." Mr. Arnold Mitchell. This very charming drawing, of which a reproduction appeared in the *Builder* for Jan. 5, 1889, is pretty nearly an elevation treated with some of the effect of a perspective view; the lines which are at an oblique angle, as on the sides of the spires, are inclined so as to give a perspective effect, but otherwise both the towers are seen in elevation simply. The centre spire, which is indicated in outline at the back, appears also to conform to some extent to the requirements of perspective, since it is represented as lower than the front towers. The building itself is in Mr. Mitchell's now well-known black-and-white style, but a background of trees and houses is slightly touched in colour on each side, and a sky is delicately indicated in colour. This method of treatment is of course quite illogical, but it has the merit of showing the architectural detail accurately while giving something of a pictorial look to the drawing and removing it from the category of mere elevations; the same kind of practice, as we observed when commenting on the Salon architecture, is not unfrequently adopted by French architectural draughtsmen, and it fulfils its purpose, and is carried out in this case with so much delicacy and finish that we do not

understand why the drawing was not given a place nearer the eye, which it certainly merited.

1,786. "Designs from Flowers of Paradise." Mr. Reginald Hallward. Two bits of decorative conventional floral design drawn with the brush in red, one on a light red the other on a white ground. The latter, in which the flowers form a heart-shaped cluster bounded by thin sprays of leaves, is a very good and effective piece of decorative work of its kind, drawn with a true feeling for the conventional treatment of foliage.

1,787 "Central Library Chelsea": Mr. J. M. Brydon. A very firm and well-executed pen drawing of a square mass of building with a hipped roof and cantilever cornice carried round, the window dressings treated in a style in keeping with the neighbourhood, rusticated with separated quoins and voussoirs cutting through the architrave mouldings; there is a semicircular porch with an Ionic order which is better connected with the building than is sometimes the case with features of this kind, though still looking a little as if it might have been added afterwards. This is what may be called a perfectly common-sense building, and there is little fault to find with it, taken for what it professes to be, but we not know that such a building adds very much to the architectural happiness of the neighbourhood.

1,789. "Armagh Cathedral": Messrs. Carpenter & Ingelow. A solid-looking pen drawing of a solid-looking church interior, with massive-looking tower arches with plain roll mouldings on the angles of the successive orders of arches, and corresponding plain chamfered piers below. The choir furniture, stalls, &c., which is carefully shown in the drawing, though rich in effect, partakes of the solid character of the whole interior.

1,790. "Broxwood Court, Herefordshire: additions." Mr. Leonard Stokes. There is nothing to show what are the additions,—no plan, and no distinction of them, of course, in the pen line perspective drawing, and all one can say is that as it now stands it is a curious and rather picturesque-looking old-fashioned style of house; but this is certainly not the way to illustrate architectural work. From our knowledge of Mr. Stokes's work we have little doubt that whatever additions he made were an improvement to the house; but wherein they consist and what is their merit it is impossible to conjecture from the drawing. Something more is surely required for the Architectural Room at the Royal Academy than merely to send a view of a house which has been added to, just a picture conveying no information at all.

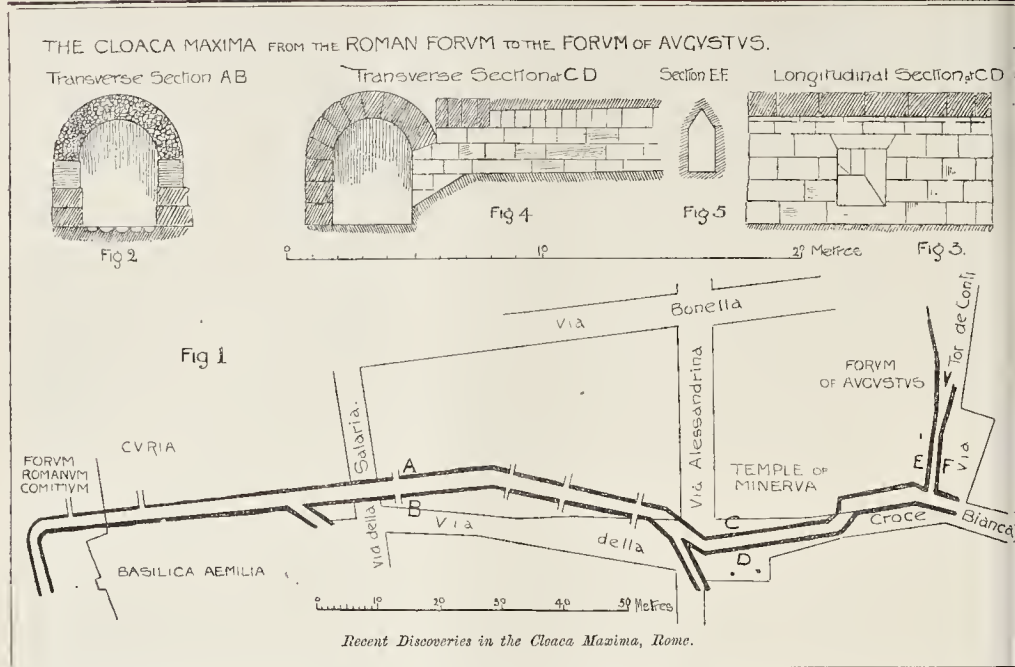
1,795. "Piazza dei Signori, Verona." Mr. A. C. Blomfield. A small and slight but delicately-executed pen sketch.

1,799. "Casket in cloisonné enamel." Mr. John J. Shaw. A rich and pretty piece of work; the top and side elevation are shown. The side and the outer part of the lid are divided into sections by bands of a pale green enamel between golden lines, and dotted with gold spots along the centre; this band assumes a kind of Moorish arch shape with foliations; the spaces between contain very daintily-designed sprays of flowers and leaves in two or three colours on a dark line ground; the edge of the lid is decorated with an undulating spray of a similar character. The floral design employed is rather of a Persian type. The feet of the casket are well designed, and the whole is a very artistic design shown in a very well executed drawing.

1801. "A Norman doorway, Glastonbury Abbey." Mr. A. B. Bamford. An apparently very well and carefully painted pen drawing of an interesting piece of ancient architecture; we do not see why it should have been pushed so high up to make room for No. 1800, which has the appearance of being a stray leaf out of a sketch book.

1802. "Seascale Church, Cumberland." Mr. C. J. Ferguson. We presume this little building is a country church in a mountain district; if so, its simple and solid character, with the small square-headed mullioned windows at the sides, seems exceedingly well adapted to the sentiment of a situation of that kind.

1803. "The Hall, Shiplake Court." Messrs. Ernest George & Peto. The style of drawing in which the works of these architects are usually shown here is far better suited to buildings which are more or less Gothic in feeling than to a Renaissance interior such as No. 1734, before referred to. There is little ornament to draw in this interior, which shows a long



lofty hall or gallery with the walls wainscotted to a considerable height with plain square-pannelled wainscot, large mullioned windows with segmental arched heads and deep internal reveals, and a rather ponderous open-timbered collar-beam roof over, with curved braces to the collar. At the further end of the hall is the orthodox traditional screen. The whole is to our taste somewhat too ostentatiously plain and solid to be in keeping with the taste and requirements of modern life; which is to say that were we to build a house with a big hall for our own use we should prefer to give it a nineteenth century rather than a Mediaeval air; but tastes differ, and as there are those who like a rather bare-looking open-timbered hall (against the latter element we have nothing to say) and an air of Mediaevalism about their house, it is well there should be architects who can do the thing as well as this is done.

1804. "St. Saviour's Southwark; New Nave": Sir Arthur W. Blomfield. This is a very carefully-drawn interior in plain pencil outline, with just the joints of the stonework filled in by way of giving a little surface to it. It is a severe and pure Early English treatment in the most conscientiously-correct style, and impresses one in fact as being a design of an ancient cathedral rather than a design for a new one, and this perhaps is the kind of commendation the architect would most desire. At the further end the wall is shown solid, with the exception of a series of lancet windows in the gable, and decorated with a series of niches giving a kind of screen effect. The tomb shown at the end is, we presume, an existing one which is to be preserved *in situ*. Slight as the drawing appears at first sight, it is a very careful piece of line drawing in regard to every detail of perspective.

1805. "Reredos in St. Mary's Church, Aberavon": Messrs. Kempson & Fowler. A coloured elevation drawing showing a wall-arcade of Early English style at each side, with the reredos raised in the centre, of rather richer work of nearly the same assumed date in detail, except that there is an open cusping to the arches over the five niches above the altar; these are filled with statues of Christ and the Evangelists. If archaeological correctness is intended, the battlemented finish to the reredos and the arcade seems a little out of keeping with the rest, the general appearance of which is architecturally satisfactory, though there is nothing out of the beaten track of modern Gothic reredoses.

1809. "Memorial Reredos in Harrow Church": Mr. R. Norman Shaw. This is a very original work. It shows a large panel with a gold

ground with a conventional floral pattern slightly indicated upon the surface, in the centre of which is a flat painting, in a decorative style, of Christ on the Cross, on one side the Virgin and on the other a figure of an Apostle; the robes of these figures form the only strong colour in the scheme. At the side of the panel, which has a moulded base, is a strip of carved work of foliage; above the panel an open-work border of foliage design. The drawing of this portion is somewhat slight and hurried, and probably does not do justice to the detail; the figures are carefully executed.

1822. "The Savelli Tomb in Ara Coeli, Rome," by Mr. J. T. Perry, is apparently a good little drawing, but cannot be well seen.

1813. "Interior of Halifax Cathedral Nova Scotia": Mr. Arthur E. Street. A large coloured drawing of an interior in the Early English style, with no triforium and a large clearstory; the bold shafts of the piers below the caps are of massive blocks of marble, which has a striking and rich effect in the drawing. The roof is ceiled with panel work, with wooden moulded tie rods; the chancel is shown as vaulted. The drawing is executed in a free and effective style, and there is a largeness and dignity of effect about the interior.

NEW DISCOVERIES AT THE CLOACA MAXIMA IN ROME.

I HAVE already described (see the *Builder*, 1889, March 30, page 235) the excavations made by the Municipality of Rome last year in the southern portion of the area of the Forum of Augustus. I mentioned that under the pontificate of Pius V., in 1570, an excavation was made in this area of the forum, in order to drain the waters that filtered through the soil, and that which descended from the Quirinal and Esquiline hills.

Recently, in order to drain the stagnant pools in the same spot, the engineer, Signor Narducci (author of an interesting work on the ancient drains of Rome), has cleansed the famous drain, Cloaca Maxima, built by Tarquinius Superbus in the year 138 of Rome,—530 years B.C.—and which runs very near the Forum of Augustus.

The part of the Cloaca drained by Signor Narducci, 91 metres in length, is between the eastern side of the Roman Forum and the Forum of Augustus (see plan, fig. 1). The results have been very satisfactory. The construction of this part of the Cloaca appears to be original only in the lower part of the walls, formed of large peperino blocks (1.20 by

4 metres). The upper part of the walls, constructed of bricks, was probably added by Agrippa when he restored the Cloaca, and but some additional branches to carry off the waters from his thermae, near the Pantheon.

The bed of the Cloaca Maxima is paved with polygonal blocks of silex; the vault, as far as the Temple of Minerva, is formed with chips of silex (see fig. 11, section A B) as a concrete, and from the temple to the Forum of Augustus with blocks of pietra gabina.

In the space of the Cloaca, between the two forums, seven mouths of secondary drains have been discovered (see plan), of the Imperial time. Near the Minerva Temple, a large ancient drain—perhaps the drain which in the Republican period ran in the valley of the Carinae—reaches the Cloaca Maxima (see plan C D and figs. 111., IV.). A drain of the Imperial time, built of bricks, and covered with imbricated tiles, which runs under the Forum of Augustus collected the drainage of the area of that forum (see plan E F, fig. V.).

L. B.

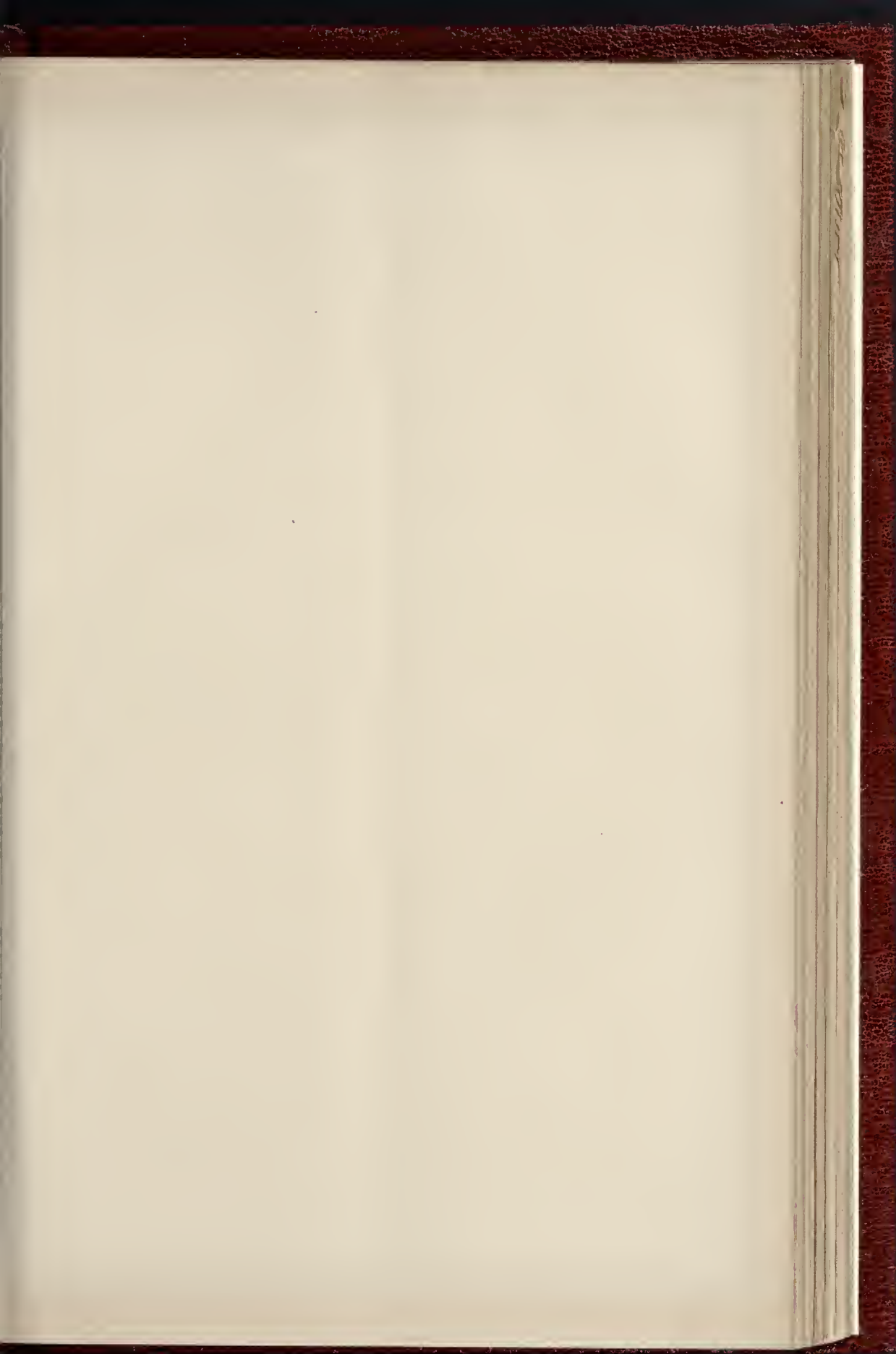
GERMAN TECHNICAL MUSEUMS.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE eleventh ordinary meeting of the presentation of this Institute was held on Monday evening last, Mr. Alfred Waterhouse, R. (President), in the chair.

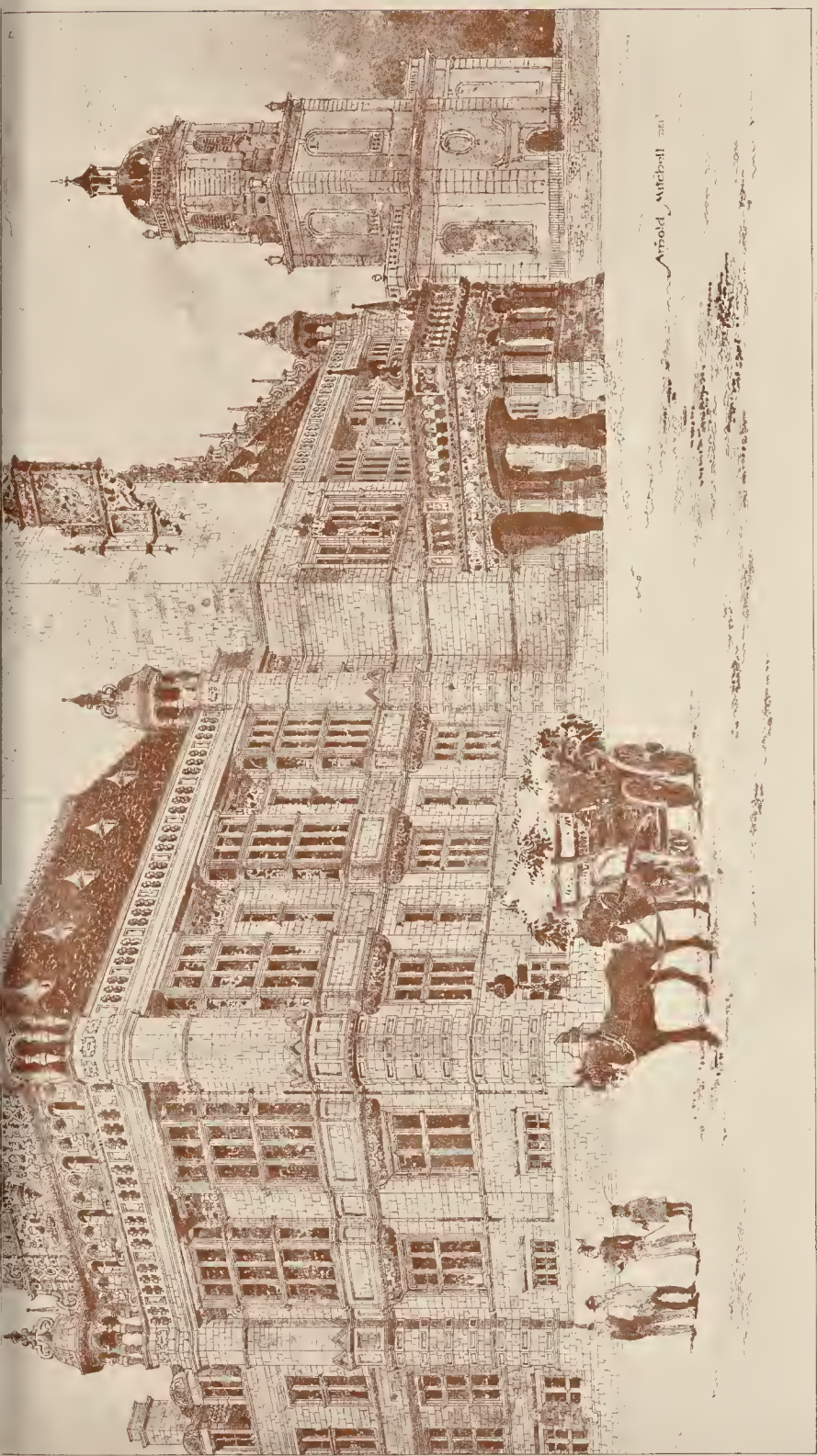
Mr. Frank Granger, M.A. (holder of the Godwin Bursary, 1889), read a paper "German Technical Museums," of which the following is an abstract:—

The author considered that this class of buildings deserved the careful attention of architects, now that so much interest is being taken in technical education. The industrial art and trade museums of Germany had been suggested in great part by South Kensington Museum, but close inspection revealed essential differences. The German practice was frequently to locate industrial art museums in school buildings, while they were regarded from the student's point of view, not that the collector of curiosities. It was advisable to group objects of one kind together, so that the characteristic methods of a group of artists (district, or a period) could be seen in combination at a glance; the division of rooms by partitions and screens, as in Berlin and Hamburg greatly facilitated this. In planning a first museum it would be appropriate, on scientific as well as on practical grounds, to group together (1) the materials employed in the industries of construction; (2) the materials employed in the textile and allied industries.



THE BUILDER. MAY 24, 1890





THE PHOTO ENGRAVED BY J. S. MARTIN LANE, ARTIST ST. LONDON. E.

PERSPECTIVE VIEW OF DESIGN SUBMITTED IN COMPETITION FOR SHEFFIELD MUNICIPAL BUILDINGS.—By MR. ARNOLD MITCHELL, A.R.I.B.A.



Having dealt in some detail with the objects to be exhibited, Mr. Grainger referred in detail to the question of planning. All the buildings cited by him were characterised by great simplicity of plan. The rooms were square, oblong, and arranged along corridors, and generally speaking there was an absence of *turns de force* in the planning. In some of the larger buildings, the corridors overlooked interior courts. The rooms in which the objects were exhibited should not be the sun upon them; and as but a small portion of an ordinarily large collection could be exhibited at one time, accommodation should be provided for storage in an easily accessible manner. A library and reading-room should be provided in connexion with the museum, and it should not be necessary to pass through the museum to reach the library, near which lavatories should be provided. The majority of the objects in a museum required glass cases, and the museum authorities in Germany preferred wood to iron for the material to be employed. Details of cases were given very fully by the author, who then turned to trade schools, and trade continuation schools. The latter were interesting because they indicated one way in which the new Technical Instruction Act might be applied.

Mr. Grainger then gave extracts from his detailed reports on particular museums, commencing with the Museum at Hamburg, erected upon the designs of Herr Zimmermann at a cost of 120,000*l.* It formed a closed quadrilateral with two interior courts, which were separated by a central block. The chief elevation looked to the east, the greatest length was 343 ft., and the greatest width 247 ft. The Industrial Art Museum, Berlin, was from the designs of Opus and Schmieden; and was constructed with stone basement and brick superstructure, with tile and terra-cotta bands. The library was on the ground-floor to the right of the entrance. The Dresden Museum of Industrial Art was in the same building as a school; and, as at Hamburg, the museum occupied the ground-floor and the school the upper stories. The Leipzig and Hanover Museums and the Hanover Trade Museum having been referred to, the author drew attention to the Trade Museum at Chemnitz as an example of its class he had seen. It occupied the second story of the building of the *Arbeiterverein*, the floor below being devoted to their library; and consisted of four passages opening into one corridor, while the other corridor led to a fifth room and a small library. The Mining, the Agricultural, and the Ceramic Museums, Berlin, were next dealt with. The last consisted of rooms ranged round a central open courtyard. The ground-floor was devoted to models of workmen's dwellings; systems of heating, ventilation, drainage, &c. Mr. Grainger having described the Mineralogical Museum of the Charlottenburg Technical High School, proceeded to deal with technical high schools, that of Charleburg being first mentioned. It was used in a fine new building, the main block being 600 ft. long by 170 ft. deep from front to back, with two large projecting wings. It had two interior courts; the basement of the exterior was faced with red sandstone, while the upper stories were in yellow sandstone with white sandstone dressings. The principal staircases were of red granite, unpolished, with the exception of narrow strips at the side. In the grounds there was a chemical laboratory, a technical testing station, and an engine-house. Further details were given by the author, who next referred to the Dresden Polytechnicum, which covered an area of 4,200 square metres. The technical, engineering, architectural, telegraphic, and electro-technical collections there were all arranged with a view to their use in instruction. Many of the doors were provided with glazed panes for thermometers, so that the attendant could regulate the temperature of the rooms without disturbing the classes. The Hanover Technical High School was also described. Mr. Grainger then mentioned several miscellaneous matters which he had noted during his visit, among others the paving and lighting of Berlin streets. The scaffolding of the new buildings were usually constructed of squared timber, and carried up to the top soon after the foundations were commenced. The provision for safety of workmen in this particular was most seriously demanded, that in the form of a tract issued by the Ministry of Public Works ran thus:—"The contractor bears the responsibility for the soundness and

strength of the scaffoldings. On the order of the superintending architect he is bound to complete or to strengthen the same immediately and at his own expense." The bricks used for the interior walling of the new shops and residential blocks were ordinarily the local yellow. Some of the fronts were being faced with brick; the majority, however, were still faced with stucco in the old fashion, the brickwork being carefully adjusted to the stucco detail. At the Academy of Art, Leipzig, the ventilation and heating were kept independent; and the author described, with the aid of diagrams, the system employed, as well as the materials of the building generally. The roof was entirely of wood; the trusses at distances of about 12 ft. merely coupling the roof together, and not carrying the rafters. These were all 7 in. by 5½ in., and about 2 ft. 6 in. apart, and were covered with 1½ in. by 9 in. boards. The lightning conductors were secured to the roof by means of iron tiles or slates, which matched and bonded with the rest. The slates were secured by hooks at the bottom; no leverage was allowed to the wind, and even in exposed situations such roofs had stood for thirty years without suffering much damage. As an instance of German professional practice, Mr. Grainger stated that in the case of the University Library and of the Academy of Art at Leipzig, the buildings were not being executed under the superintendence of their designers, but the library under another architect, the Academy under the Municipal Building Inspector. Architects, also, were often master builders, and carried out the designs of other architects.

The paper, we may add, was not read *in extenso*, although it will be so published in the Proceedings of the Institute.

Mr. E. C. Robins, F.S.A., opened the discussion, and said that he had listened with great interest to Mr. Grainger's paper. The great want felt in connexion with technical institutions in this country was that there were no such museums attached to them as were to be found in Germany. As he listened to the paper, he could not help thinking that it would be a very good thing if some of the holders of the Godwin Bursary were to go and see what had been done in this country.* Because, since his (the speaker's) visit to those foreign institutions, a great change had taken place in the buildings erected here, while some of the last buildings erected in Germany had profited by the English examples. He had received letters from professors in Germany who stated that if they had received particulars of the buildings erected here they would have profited by what had been done in England. It could not fail, therefore, to be interesting to know what had been going on in England in this direction. It was to be regretted that so very few papers dealt with buildings which had been erected here, such as those designed by Mr. Waterhouse, where the details of construction were very much in advance of those of some foreign museums and buildings of that class. There could be no doubt that it was of great benefit to bring before the public the fact that there were existing in Germany museums of a remarkable character, illustrating every branch of technical education, so that the professors had no difficulty in finding specimens to explain their lectures. In the large building erected by Mr. Waterhouse for the technical institute at South Kensington, there was, up to the present time, no museum, for, though Mr. Waterhouse had provided the room for it, there was as yet nothing in it. That was the sort of thing to be found in all recent buildings of this nature in England, viz., that the museum was the last thing to be fitted up. He was therefore glad that attention was being drawn to the fact that we were standing at a disadvantage as compared with the Germans because of the want of corresponding museums. Thus in Berlin, Dresden, Nuremberg, Munich, and elsewhere the education was carried on much further than it was here. In Germany the objects designed and executed by the students were to be found in the museum itself, and at some of these institutions there was an annual sale of the products of the students' labour. The influence of the museum was very great, not only in the interest which it had in itself, but by developing progress from generation to

* We presume that Mr. Robins means in their individual capacity as architects, and not as holders of the Godwin Bursary, which was expressly founded for the promotion of the study of works of modern architecture abroad.—Ed.

generation. It was valuable because it enabled the present generation to profit by a knowledge of past methods of work, and so led to emulation. From what he had seen of the German museums, they were most liberally fitted up, and the collections of drawings were simply charming. At Owens College recently he inspected some models of all kinds of buildings, which had been purchased in Germany. These were of the most complete description; they could be taken to pieces, and illustrated manufacturing of all sorts to their slightest detail. He had pleasure in proposing a vote of thanks to Mr. Grainger for his excellent paper, which he hoped might make an impression on the public generally, by showing that we were still far behind our neighbours in such aids to the education of the people.

Mr. T. M. Rickman, F.S.A., seconded the vote of thanks. He was pleased to find that Mr. Grainger had studied at the museums the things which they contained. So many architects were in the habit of looking at the building as being the all-important thing, and of considering that the things which were in it were of secondary importance. Such museums as he had seen abroad contrasted very favourably with many of those in this country. Mr. Grainger had given them a description of what was to be seen in those buildings, and had then come to the conclusion as to bow far the building had been fitted for the purpose. He hoped that the rising generation of architects would learn the extreme value of the objects they saw inside the museums, and always recognise that these were of far greater importance than the buildings themselves. Until they knew the uses of the buildings, and the manner in which the different objects should be seen, they were utterly unable to design such a building as they ought. He trusted that Mr. Grainger's paper would be the commencement of a new system of essays on our public buildings,—in dispensing them not according to their external appearance, so much as the actual purpose for which they were designed.

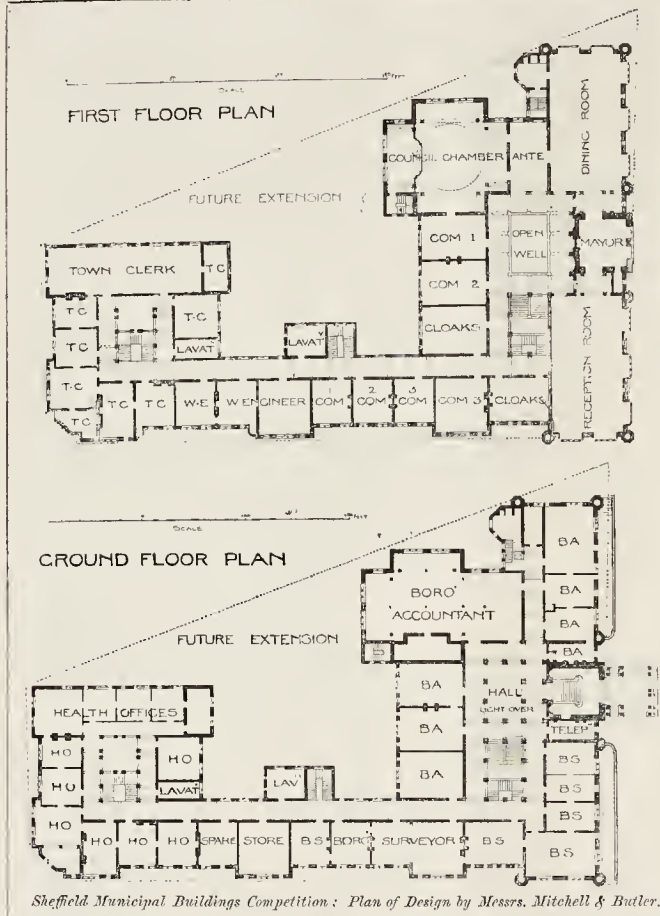
The President remarked that Mr. Grainger had certainly described very lucidly the fittings and the collections contained in the museums visited by him last year, and, with Mr. Rickman, he felt thankful to Mr. Grainger for having done so. He would have been glad, however, if Mr. Grainger had not ignored all construction in the way he appeared to have done, and he hoped that in his reply they might hear one or two facts about the buildings themselves. For instance, he would like to know whether those museums, which covered a vast amount of ground, were lighted from the roof in the upper stories, or by windows; also, if they were fireproof in their construction, and, if so, of what materials the floors and stairs were made. These would be interesting matters to them as architects. One item of information given by Mr. Grainger was very interesting,—viz., as to the advantages to be derived from photographs of accidents. When in Seville, a few months ago, he was lucky enough to obtain some very good photographs of the lamentable accident at the Cathedral, where one of the four great central piers fell, bringing down with it a corresponding portion of the vaulting. The photographs showed curiously how intact a large portion of the pier was when it fell to the ground, thus giving evidence of the excellent material of which it was constructed.

The vote of thanks was then put, and very heartily received.

Mr. Grainger, in his reply, said that in reference to the modern methods of construction used in the case of these museums, he had a capital opportunity of seeing those at Leipzig. The results would be found in his paper when it was published *in extenso*. In some of the buildings which he visited,—as, for instance, those at Hamburg,—the construction and arrangements did not strike him as being particularly good, so far as the structure or the placing of the windows was concerned. The external appearance of many of the buildings made no impression on his mind, and he kept no notes of the mouldings, &c., some of which he must say were execrable.

The President intimated that the next meeting would take place on June 2, to receive the report of the scrutineers appointed to check the election of the Council, Standing Committees, and auditors for the year of office 1890-91, and to declare the names of those elected. A paper would also be read on "An Arab house in Cairo" by Count d'Hulst.

The proceedings then terminated.



Sheffield Municipal Buildings Competition: Plan of Design by Messrs. Mitchell & Butler.

Illustrations.

DESIGN FOR SHEFFIELD MUNICIPAL BUILDINGS.

THIS is the perspective view of the design sent in by Messrs. Mitchell & Butler, and on which we have already commented in our Notes on Architecture at the Royal Academy. Plans of two floors are appended.

We regret that the drawing being obviously by Mr. Arnold Mitchell, his name alone was at first inadvertently appended to the title on the lithograph, instead of that of Messrs. Mitchell & Butler; this has been corrected in a portion of this issue, but the mistake was not noticed in time for its correction on all the copies of the lithograph.

DESIGN FOR CHURCH HOUSE, WESTMINSTER.

This elevation, which is now among the drawings hung in the architectural room at the Royal Academy, represents the north side, towards Dean's Yard, of a design prepared by Mr. J. T. Micklethwaite and Mr. Somers Clarke for the Church House at Westminster. The plan would have occupied the irregular quadrangle between Dean's Yard, Tufon-street, and Great and Little Smith streets. The left-hand block shown on the elevation contains the chapel above and library under; in the centre is the entrance gateway with the ante-chapel over it; the lower block on the right contains committee-rooms on the ground-floor and the Bishop's Convocation House above. Other portions of the plan, arranged round the quadrangle, would have included a great hall and a Lower Convocation House, &c.

The design was originally made at the request of several members of the Council, and the aim of the architects was to treat it so that it might grow naturally out of the practical requirements of the building, and at the same time have a character partly ecclesiastical and partly palatial, suited to the dignity of its purpose and the important site which it was intended to occupy.

PREMISES, No. 40, WIGMORE-STREET.

This building has been erected for Mr. Carl Bechstein, pianoforte manufacturer.

The front is built entirely of terra-cotta, made by Messrs. Doulton & Co.

Mr. Thomas E. Colcutt is the architect. The drawing from which the illustration is taken is hung in the Architectural Room at the Royal Academy.

HOUSE AT NORTHWOOD.

This hungalow-house has been built at Northwood, an estate near Pinner, and was designed with a view to great economy, the whole of the bedrooms being in the mansard roof. The house contains a hall, two sitting-rooms, kitchen and offices, five bedrooms, and a bath-room. The contract-price was 5200. The walls are faced with red bricks, and the roofs are tiled. The verandah and porch floors are laid in tiles, and the whole of the woodwork is painted white and varnished. The builder was Mr. S. Barnett, of 83, High-road, Kilburn, and the architect was Mr. R. A. Briggs, A.R.I.B.A.

HOUSE AT HAMPSTEAD.

This house is about to be built at Hampstead. The walls will be faced with red bricks, and the roofs will be tiled. The two large circular bays above the cill level will be

cemented and painted white to match the wood-work. The house contains a large hall with gallery, dining, drawing, and billiard-rooms, kitchen and offices; six bed-rooms and a dressing-room on the first-floor, and two servants' rooms on the second-floor.

The illustration is from a drawing by the architect, Mr. R. A. Briggs, A.R.I.B.A.

THE ARCHITECTURAL ASSOCIATION. THE PROPOSED NEW DEPARTURE.

THE last ordinary general meeting of this Association for session 1889-90 was held on Friday evening, the 16th inst., at 9, Conduit-street, Mr. Leonard Stokes, President, in the chair.

The minutes of the previous meeting having been read and confirmed, some discussion arose as to the resolution passed at the previous meeting instructing the scrutineers of the votes for the election of the Committee to announce the number of votes recorded for each candidate.

Mr. T. E. Pryce moved that the resolution in question should be rescinded.

Mr. H. D. Appleton seconded.

Mr. C. H. Brodie, having spoken in favour of the motion to rescind,

Mr. A. O. Collard spoke in defence of the resolution arrived at at the previous meeting. He said that it was of interest to the members at large to know what numbers of votes were recorded for the members nominated for the Committee. Certain candidates whom a large section of the members might wish to see elected might not perhaps be successful, and it would be of interest both to the candidates themselves and to the members to see how they stood in the voting.

Mr. Bernard Dickson moved as an amendment that the numbers of votes recorded for the successful candidates only be announced, and that the numbers for the members not elected be not declared.

Mr. E. Woodthorpe seconded this amendment, which, on being put, was lost by a large majority.

The Chairman then put Mr. Pryce's resolution to rescind the motion in question, which was declared lost, although only by a small majority.

The report of the scrutineers as to the election of officers and committee was then presented.

Mr. Leonard Stokes was unanimously re-elected President, and Messrs. F. T. Bagge and H. O. Cresswell were unanimously elected Vice-Presidents.

For the Committee the following were the results of the voting:—H. D. Appleton, 19 votes; T. E. Pryce, 173; John Slater, 153; A. E. Pite, 141; G. C. Horsley, 130; W. Burrell, 128; F. Hooper, 128; G. R. Julian, 128; Owen Fleining, 117; E. W. Mountford, 116. (The foregoing were declared elected.) The candidates not elected were:—P. J. Marvin, 114; A. C. B. Booth, 110; A. O. Collard, 92; T. McLaren, 86; B. F. Fletcher, 84; A. W. Earle, 68; F. T. W. Goldsmith, 55; F. M. Simpson, 45; and F. M. Elgood, 34.

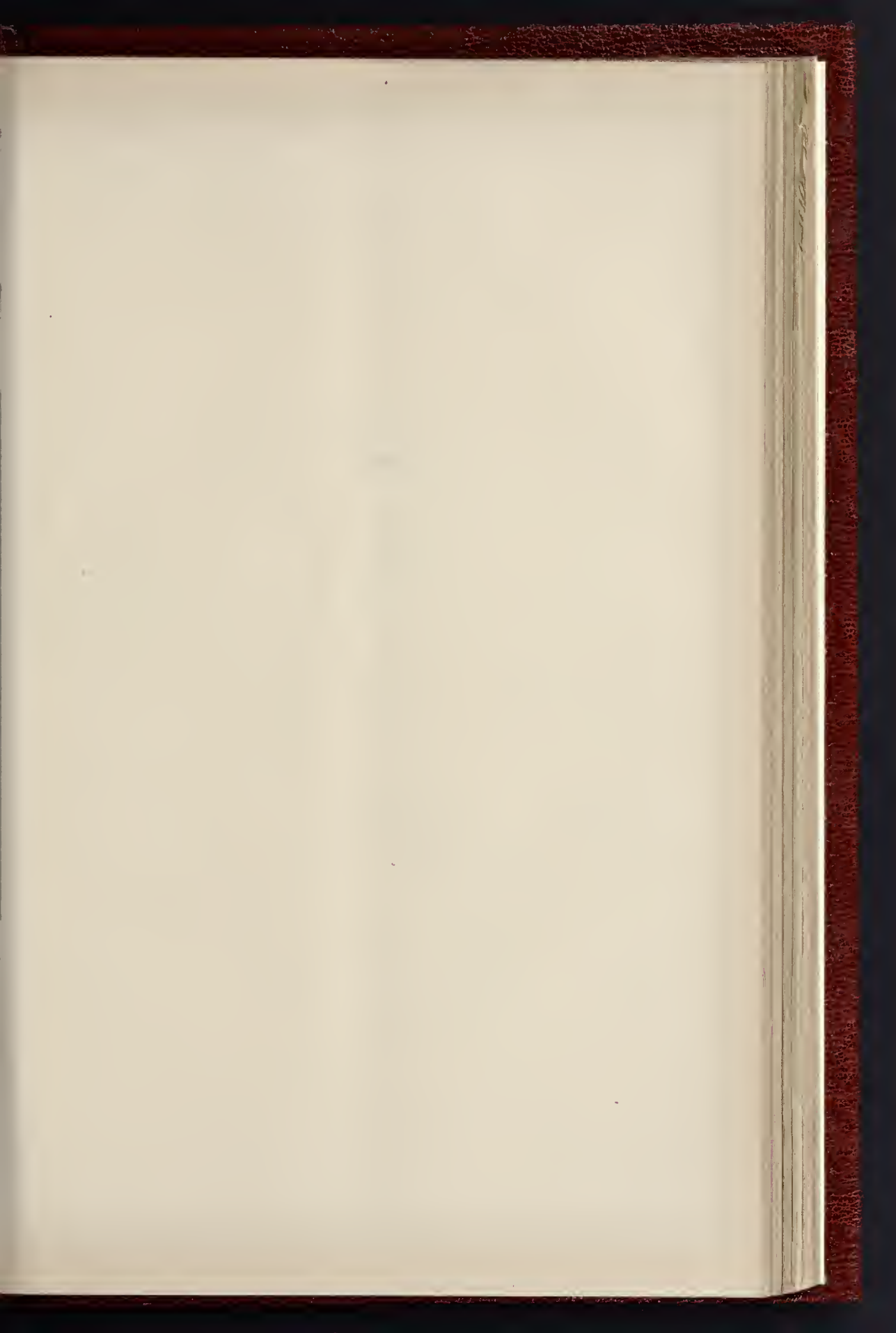
Mr. H. W. Pratt was unanimously re-elected Treasurer, and Messrs. F. R. Farrow and E. S. Gale were unanimously re-elected honorary secretaries.

The President announced that Mr. Percy D. Smith had been elected Travelling Student of the Association for the current year, Mr. Tugwell obtaining the second prize.

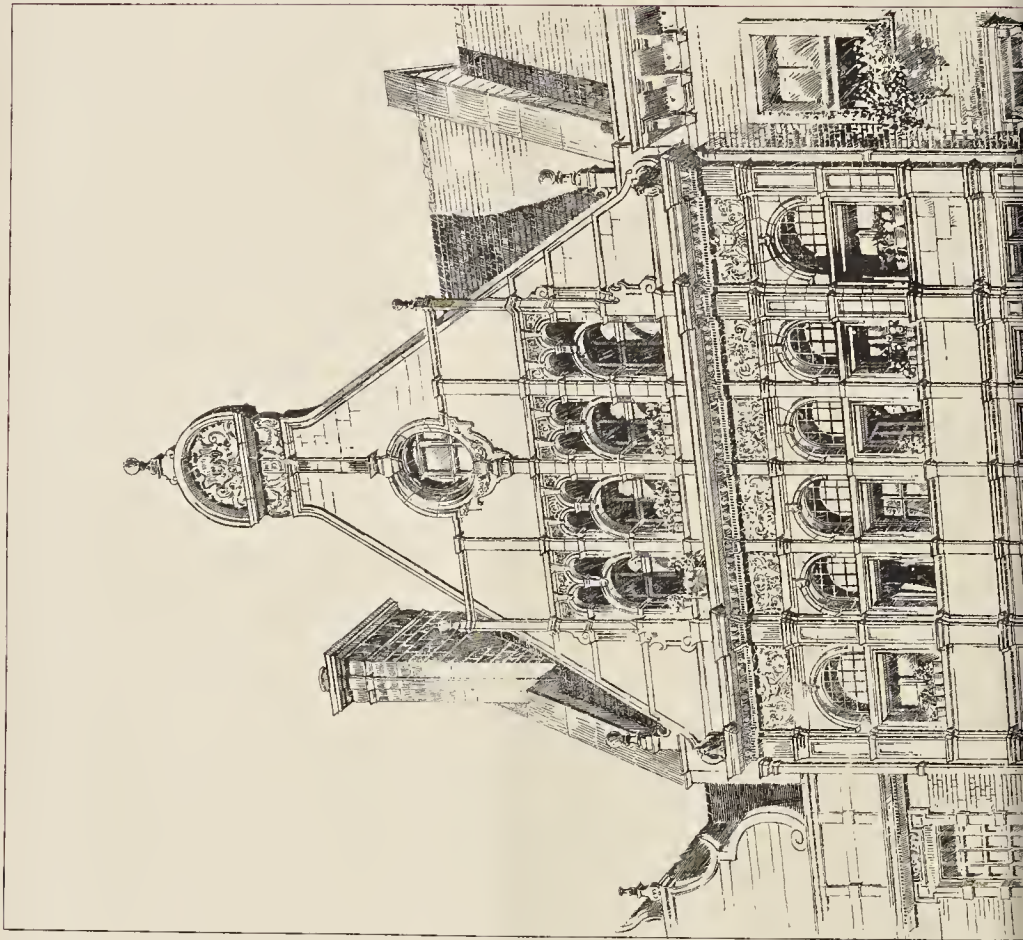
The following gentlemen were elected members of the Association:—Messrs. J. Todd, R. H. Hunter, E. Cruikshank, H. Jefferis, A. G. Dutton, G. W. Haywood, S. Constanduros, H. G. Collins, S. D. Mitcheson, and Hubert C. Corlette.

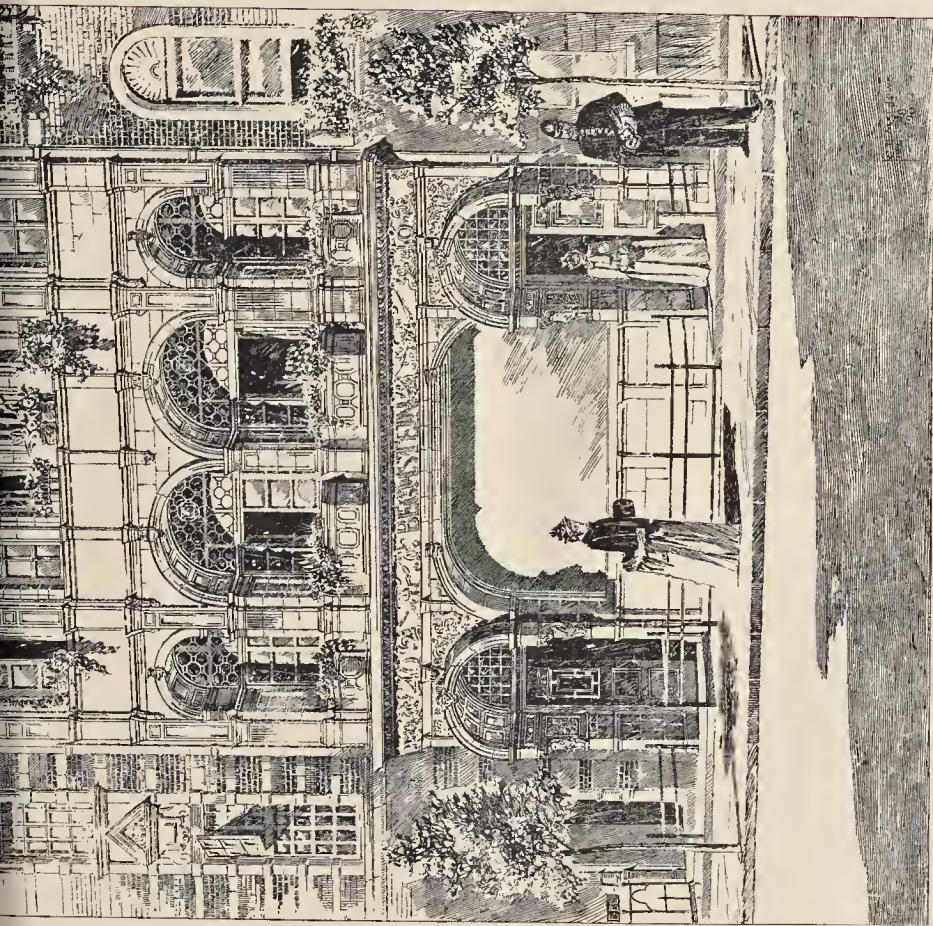
The meeting then proceeded to consider the report of the Committee appointed to enquire into the educational methods of the Association, the salient points of which were referred to in the leading article in last week's *Builder*.

Mr. John Slater, in moving the adoption of the report of the Educational Committee, said that the proposals embodied in it were of great importance. Indeed, the report might be said to be epoch-making in the history of the Association. He should like to point out that this movement commenced within the Classes themselves. It was only on the earnest representations of the members of the Classes and Class secretaries as to the dissatisfaction of the



THE BUILDER, MAY 24, 1890

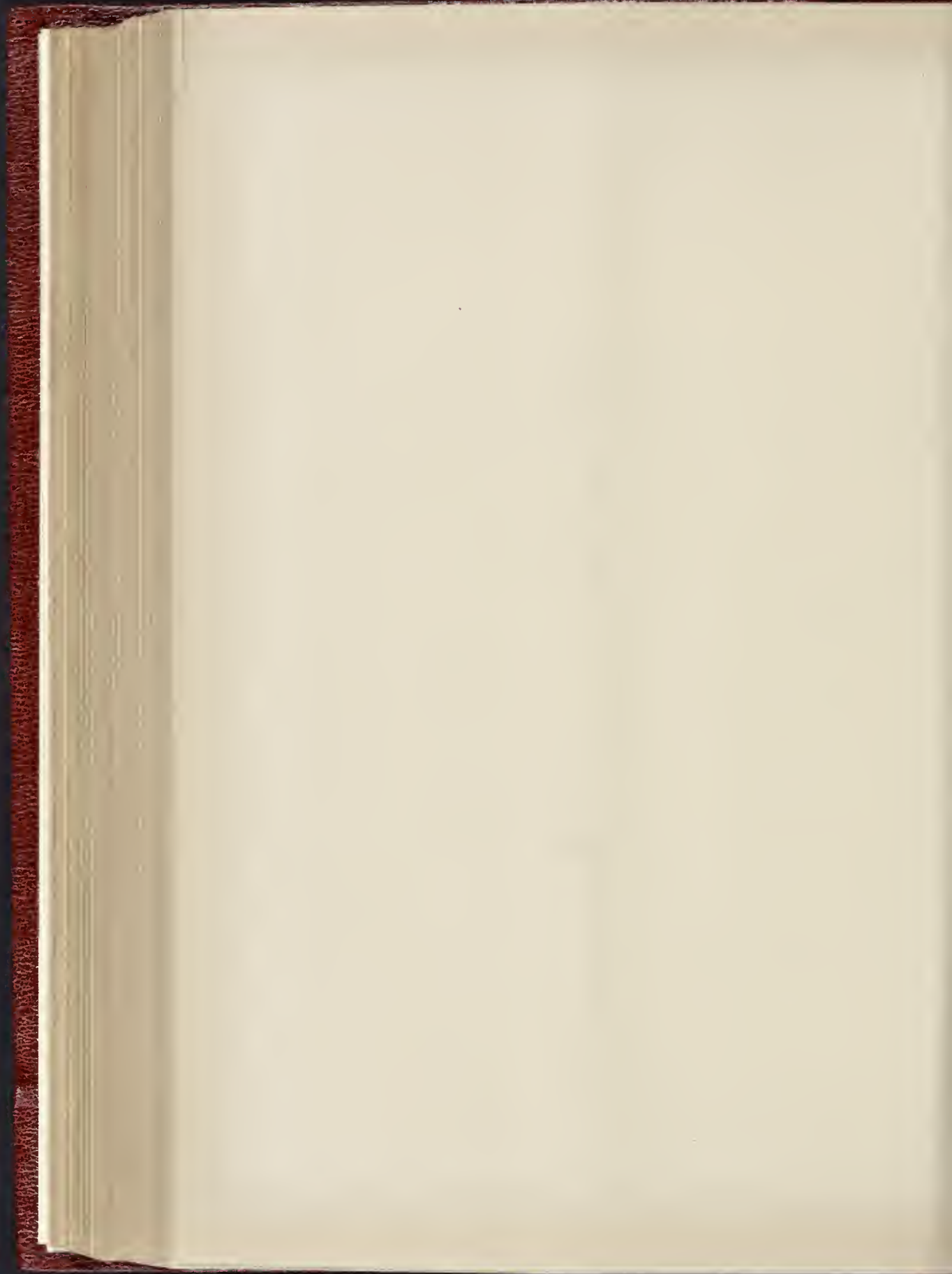


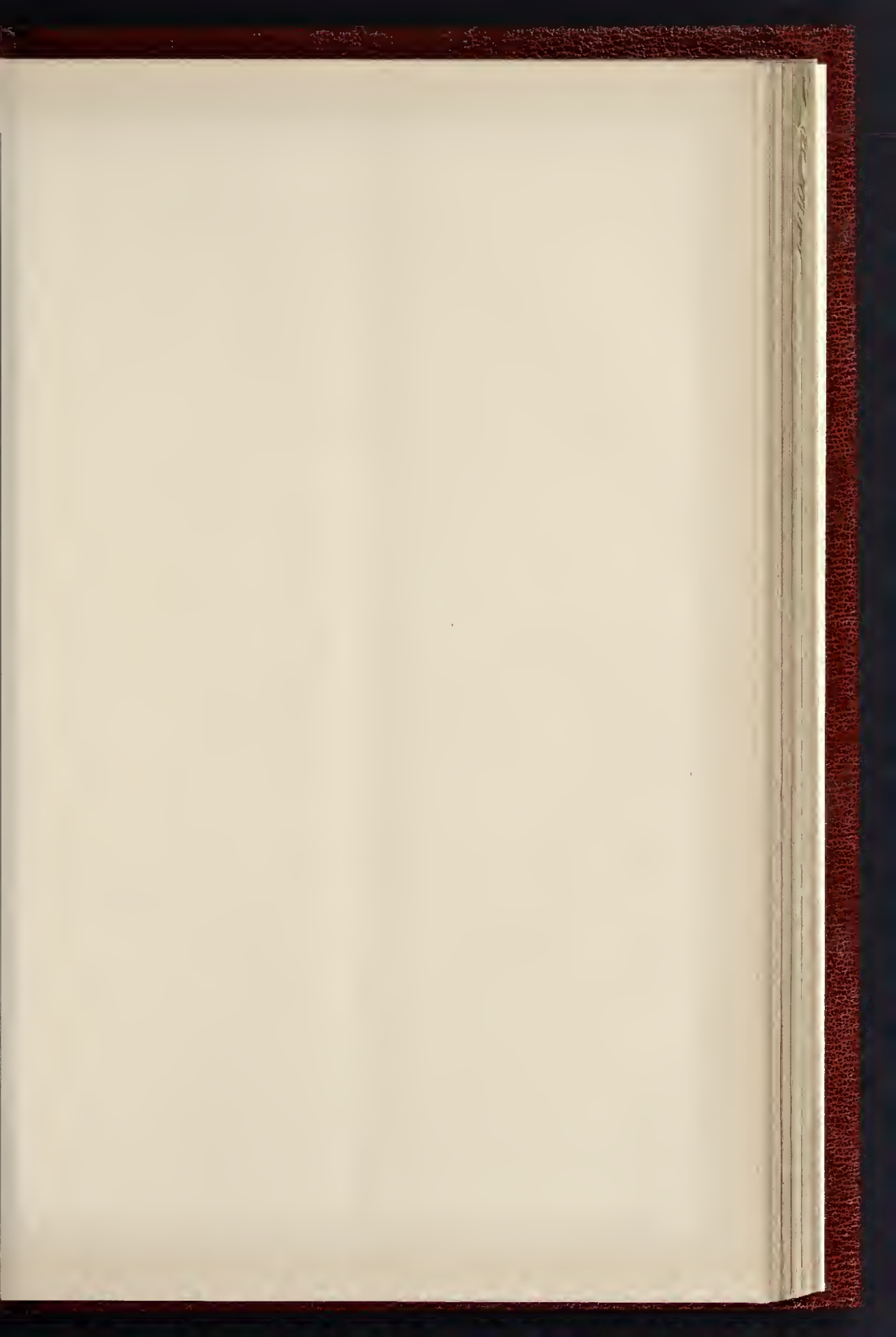


W. & A. GILBERT, 15, SOUTH BARRICK, LONDON, E.C.

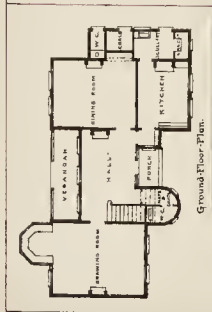
NEW FRONT, 49, WIGMORE STREET.—MR. T. E. COLCOTT, F.R.I.B.A., ARCHITECT.

No. 1564 Royal Academy Exhibition, 1890.





THE BUILDER, MAY 24, 1890.



R. F. Briggs del
1889

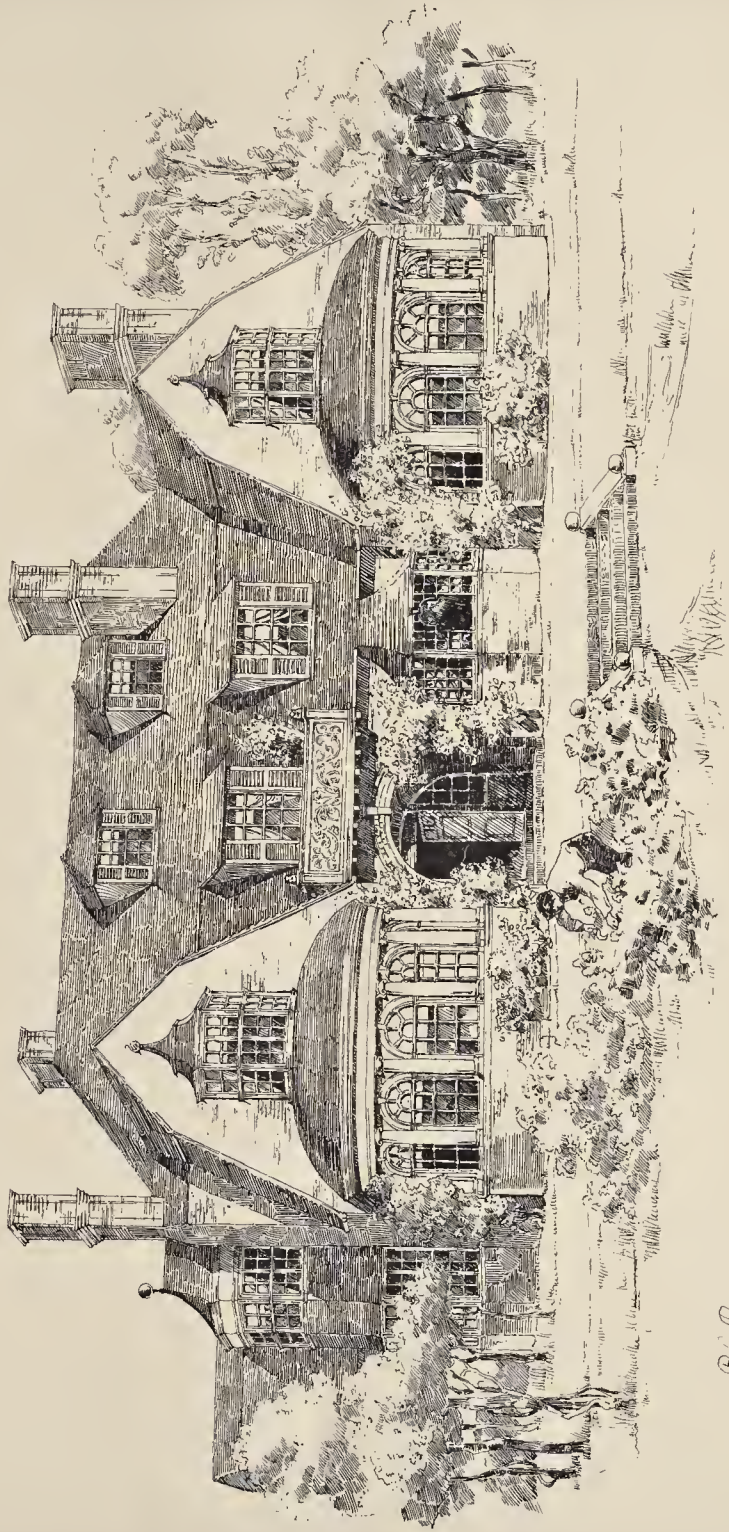
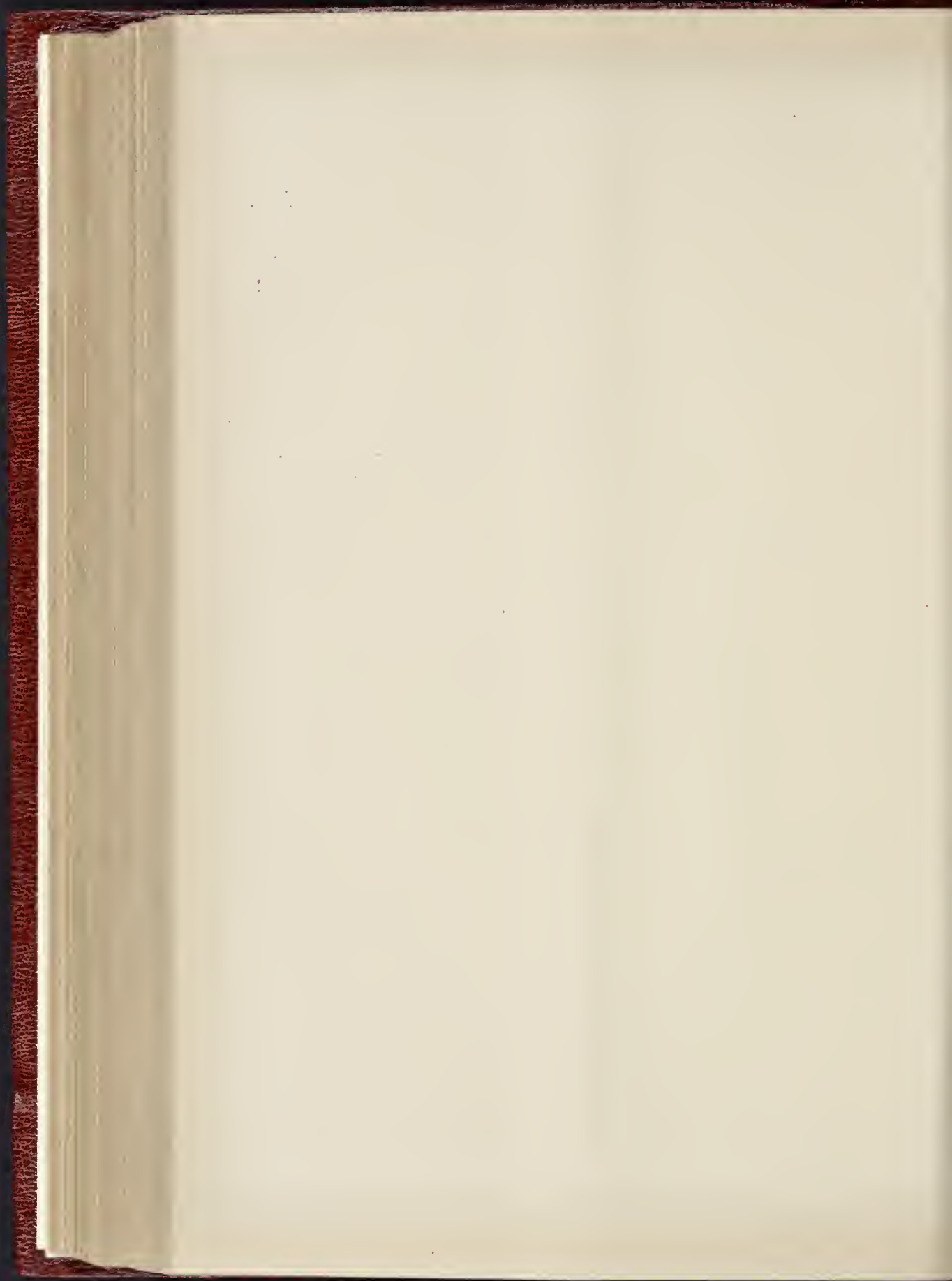
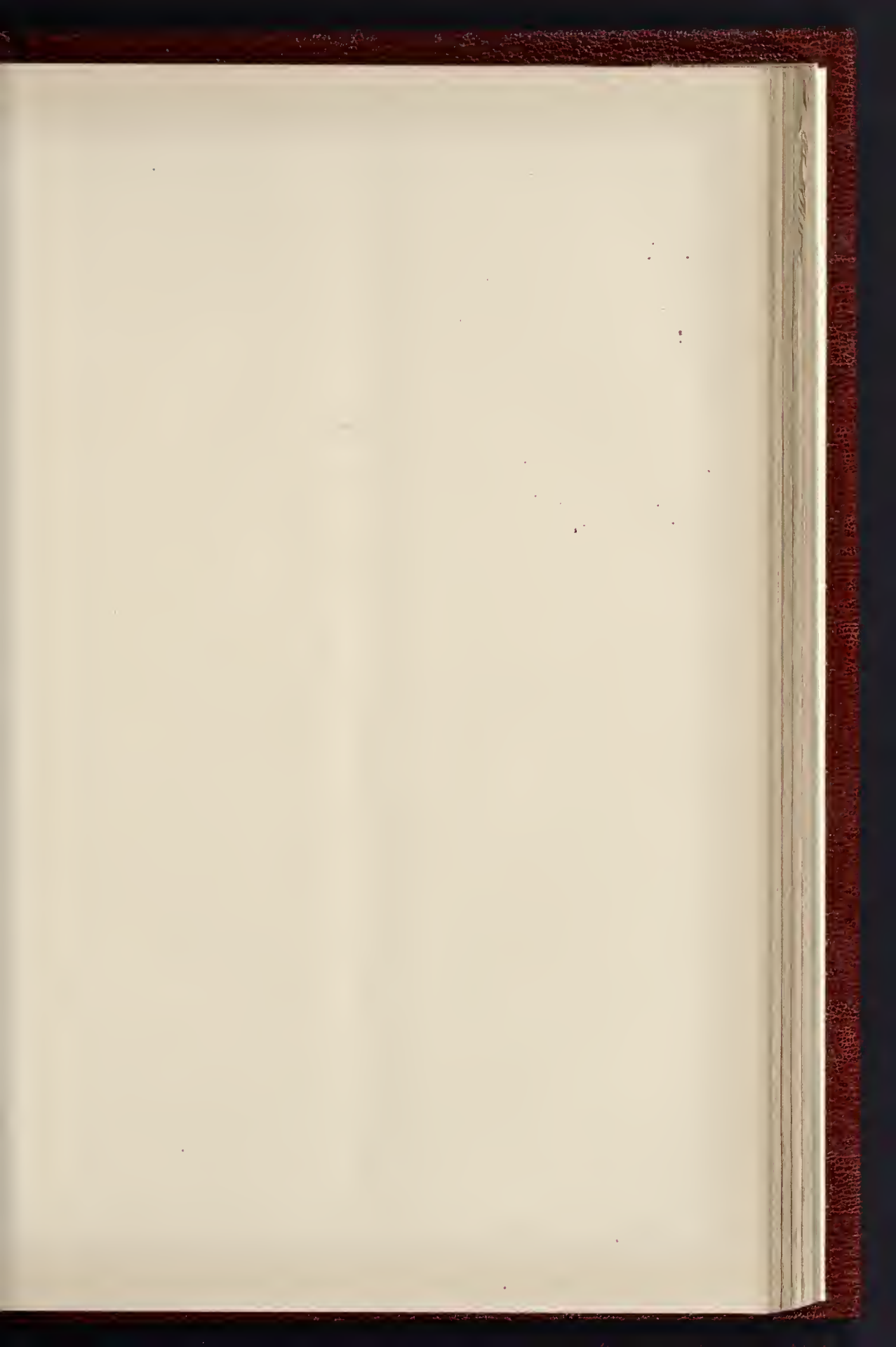


PHOTO LITHO. SIMON & CO. 27, MARTIN LANE, LONDON, E.C.

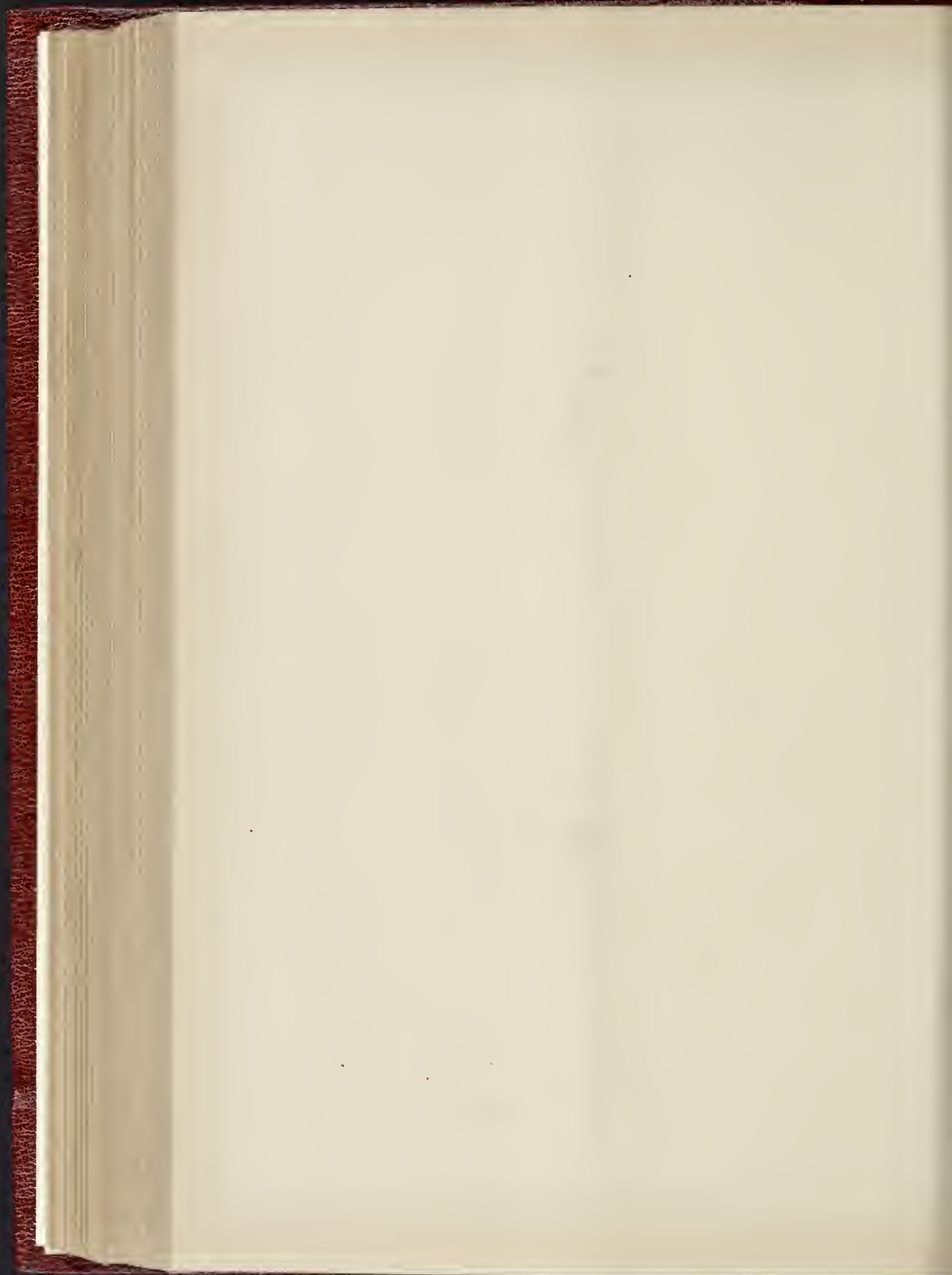
HOUSE AT HAMPSTEAD.—MR. R. A. BRIGGS, A.R.I.B.A., ARCHITECT.

R. A. Briggs del
1890.









students themselves with the present means of education and the methods of receiving instruction within the Association, that the committee was appointed to institute an inquiry, first of all into the working of only two or three Classes. It was, however, soon found to be impossible to limit the inquiry in that way, and consequently it was determined to make an inquiry into the whole working of the Association. No one who had followed the history of the Association closely for the last ten years could be ignorant of the fact that the cry for change was no new one. It had been long evident that the voluntary principle had been loaded almost to the breaking-point; and successive Presidents, beginning with Mr. Cole A. Adams, had referred to the subject in their presidential addresses, and had pointed out that some radical change would become necessary in the near future. The sum and substance of the committee's report now before them was that that "near future," so often alluded to, had become the present. There was no doubt that the institution of the scheme of progressive examinations by the Royal Institute of British Architects had brought matters to a head. After all, examination was not education; and if the members of the Association were to enter for the examinations with the hope of passing them, it was necessary that some more efficient means of education than at present existed should be devised by the Association. He would just like to make one word of explanation as to the statement which had been made, and somewhat strongly criticised, that the rôle of the Royal Institute of British Architects was not that of a teaching body. He was afraid that that statement might have led some members of the Association to think that the Institute took no interest in education. That idea was erroneous, for the Institute was of opinion that some improved method of education was earnestly and strongly to be desired. Personally he thought it quite possible that in the future the Institute might have to become a teaching body; but it could not become a teaching body without very great changes in its constitution, and the changes which would be requisite would have to be very carefully thought over, and could not in any case be brought into operation for a very considerable time. That being the position of affairs, the Association thought that it ought not to wait for the Institute to devise a scheme of education, but that it ought to do its best to promulgate a scheme of its own. He might say that it appeared to him that the position of the Institute in relation to the architectural world was analogous to that of the University of London in relation to the educational world. Although the University of London was established only as an examining body, and not as a teaching body, yet its beneficial effect upon education had been very great and far-reaching. In like manner, he believed that the institution of the Architectural Examination would have a wonderfully fostering effect upon architectural education throughout the country. Going back to the subject of the report, he should be very loath to disparage the voluntary system, which had been worked for so many years in the Association; but it should be remembered that when the Association was first started, and for many years afterwards, it was an Association entirely consisting of students meeting for mutual help and instruction. So long as the only classes were the Class of Design and the Class of Construction it was very easy indeed to adhere to the voluntary system and to have unpaid visitors coming down time after time to help with their advice to the students; but they now had eighteen different classes or courses of lectures, with an aggregate attendance of some three hundred students. How was it possible for voluntary effort to cope with that enormous amount of work? They could not expect competent members to give up their time for that purpose. On the other hand, he was quite sure that it would be possible to find amongst the ranks of the Association some talented individuals who would be found willing to give their time to educational work. The Association had, *volens volens*, become a great teaching body, and it behoved them to be as efficient in their work as possible. It should be remembered that they were not starting upon altogether new lines. They had had a few Classes with paid instructors for some few years past, and it seemed to him that the knell of the voluntary system was struck as soon as they instituted classes with regular permanent

paid instructors. They would see from the report that the committee had taken a considerable amount of evidence as to what should be the basis of the instruction which it was recommended that the Association should endeavour to give; and that evidence was almost unanimously to the effect that the scheme of examinations which the Institute had set forth should be taken as the basis of the proposed curriculum. But, nevertheless, they all felt that there were a number of other important subjects which were not set forth in the Institute programme,—subjects without some knowledge of which an architect's education could not be said to be complete,—and therefore it would be found from a perusal of the report that, while the sub-committee proposed the Institute programme as the basis of the curriculum, they by no means meant it to be regarded as the limit of the instruction which they proposed to offer by this scheme. There was one new feature which had been introduced into the programme which the sub-committee had drawn up,—viz., the studio,—where members could meet and do their drawings. It was a modification of the studio system which they found abroad. Such studios as that which it was now proposed to establish were, however, not altogether unknown to members of the Association; and those who had experience of them were perfectly convinced that the benefit to the student drawing with a number of his fellows, and having their friendly advice and criticism, was of the greatest possible benefit and assistance to him. Therefore the committee had made such a studio a cardinal feature of their proposed scheme. He did not propose to go through the curriculum which the committee had laid down. They did not put it forward as a perfect scheme, but they had endeavoured to base it as closely as possible upon the lines of the old classes which had been established by the Association. One new and important feature had been suggested, viz., the day classes. The committee felt very strongly that those architects in practice who were responsible for pupils ought to give them time in which to obtain instruction otherwise than in the office, so that they would not be compelled to work every evening, or nearly so, when they had some claim to relaxation and rest. He should like to say that he was quite sure that nothing had been farther from the wish or the intention of the members of the Education Committee than to enter into rivalry with any existing institution. They believed that there was room for all the means of architectural education which we had in London, and that the University College classes, the King's College classes, and the Academy classes, would not be swamped by the scheme which the committee had propounded. They did not expect to start this big scheme out and dried in its entirety by the beginning of next session. Its adoption must be gradual, and to a very considerable extent at first of a tentative character. They hoped that the Classes of the Association would continue very much as they had been carried on in the past, but that instead of having sporadic instructors they would be able to appoint regular paid instructors. With regard to the question of fees the committee had come to the conclusion that for anyone who wanted to go through the whole course, ten guineas—five guineas for the lectures and five guineas for the studio—was not too much to ask. If they looked at their profession as a liberal profession, he would ask the education of those entering it could be obtained at so low a rate? It might be said that they were legislating too exclusively for the purely student class, and that not everybody would wish to go through the whole curriculum. But the committee quite hoped and believed that the scheme which they propounded would be of use to others than the merely new students. They confidently hoped that many country assistants would desire to come into some of the classes or to attend some of the courses of lectures without necessarily having to attend the other courses. In order to meet the wants of such students, the committee had fixed the rate of payment at 2s. 6d. per lecture—a fee which he thought was a very moderate one. Of course the committee had had to look upon the matter in some degree in a commercial light, but it might be taken that 2s. 6d. per lecture would be the *maximum* fee which a student would have to pay. He did not think, therefore, that the scheme of charges

which the committee had drawn up was too high. They contemplated that an aggregate number of 100 students would join these classes and the studio; that was to say, not 100 of each year's standing, but 100 for the four years' course. That was only about one-third of the number of members who now attended the various classes; if they could only get that number they thought that the scheme would be self-supporting. Then in connexion with the report there was another proposal which might excite some comment, viz., the proposal for raising the annual subscription of the members of the Association. He himself very much regretted that when that proposal was brought before the Association about five years ago it was not carried, because he firmly believed that if that proposal had been carried then they would not have a dozen fewer members now than they had. The only wonder was that they had gone on with a half-guinea subscription for so long. He found that the work of the Association, including classes, meetings, and visits to buildings, extended over thirty-two weeks of the year; and if they made the calculation they would find that their half-guinea subscription, entitling them to the advantages of the classes, the meetings, and the visits, worked out at a little over 3d. per week! Did they seriously believe that if the subscriptions were raised to a guinea, there would be any large number of members who would fall out of the ranks because they could not afford to pay it? Even apart from the extra work and expense involved in the adoption of the proposed new scheme, the time had come when the detailed routine work of the Association had so greatly increased that it could go on with honorary secretaries only no longer. Was it right that any member of that Association should be expected to devote his time to their affairs to such an extent that he was 40l. or 50l. a year out of pocket—for that, he was assured, was the case. They ought not to let such a state of things continue. They must remember that if that educational scheme, or even part of it, was carried out, it would add an enormous amount of clerical work to the present labours of the officers of the Association. The Association was barely paying its way now; it was only by starting its work that it did so. Let them look at the library, for instance. Would not the library of the Association be more valuable if there was some one there every day to change books? But that could not be done at present, because they had no one to do the work. How, then, could they avoid coming to the conclusion that they must raise the subscription if they were to go on with anything like the success which had attended their work hitherto? It should be borne in mind that the proposal to raise the subscription was only intended to apply to town members, because,—much as they regretted it,—they did not see their way to offer the whole benefits of the Association to the country members. There might be some means of doing that, but he did not see what those means were at present, and therefore, it would not be desirable to raise the subscription of country members. If the present scheme were adopted, it would be very easy to frame a precise definition of a country member, so that only those who benefited by the full work of the Association should pay the increased subscription. Before he sat down he should like to make an earnest appeal to the older members of the Association, many of whom he saw around him who had derived great benefit from the Classes when they were in them, and who had generously contributed much assistance in carrying them on in after years. He asked those old members not too hastily to assume that the new scheme was a bad one because it was a new one. Let them ask themselves whether it was not at least possible that those members of the Association who were now more closely in touch with its workings, might see more clearly than others the defects and shortcomings of the present system. New responsibilities were created by new necessities. The special committee, in presenting that report, invited criticism; but he asked that the old members should not withdraw their sympathy and countenance from the Association, but should give them the benefit of their experience and judgment and business insight. If they would only do that he did not fear for the future of the Association, but rather would have strong grounds for hope that as its past had been a glorious one, so a great career of increasing

usefulness was open to it in the future. He begged formally to move the adoption of the report.

Mr. A. O. Collard seconded the motion. He said that he believed some members were in favour of dividing the report into two portions, separating the proposal to increase the annual subscription from that dealing with the educational curriculum. But he did not see how that would have been feasible, for the two things were inseparably connected. As Mr. Slater had pointed out, the present annual subscription of half-a-guinea was ridiculously low, considering the advantages derived by the members; and even if it were increased to a guinea, the cost of the advantages of the Association to its town members would only be about 1d. a day. It was most essential that the Association should be able to put its secretarial work upon a sound footing. The proposal was to have an assistant secretary who should be paid, and who should work under the direction of honorary secretaries, just as in the Institute the Secretary was a paid officer, although the chief secretary was the Honorary Secretary. Although, as Mr. Slater had said, the proposed curriculum had been framed with a special view to the necessities of those who went in for the Institute Examinations, which did not profess to embody everything necessary for the education of an architect. What, however, was lacking in the course of studies prescribed in the examinations would be supplied by work under the proposed curriculum. The institution of the new education scheme as a whole would no doubt tend to the elevation and improvement of the Examination itself, at the character of which there were some who were at present only too ready to sneer. Some might think that the proposed fee of ten guineas,—five guineas for the lectures and classes and five guineas for the studio,—was too high; but while he did not think so himself, having regard to what they would get in return for it, he was quite alive to the fact that the fees would press heavily upon some of the members, and he could not help thinking that some arrangement might be and ought to be made by which the masters should pay the fees either in whole or in part. As to the proposed institution of day-classes, he thought the idea was an admirable one, and possibly it might be found advantageous for youths who contemplated entering architects' offices to spend a year or two in those day-classes before entering upon their articles. They would then come to the study of the work of the profession with some idea of what was before them.

Mr. Cole A. Adams said that there could be no doubt that by the adoption of the proposals contained in the report they would be making an important new departure in the history of the Association. He could only have wished that there had been present on that important occasion a larger number of the senior members of the Association. With regard to the scheme which had been brought forward by the committee, he wished to give his own unhesitating thanks to the members of the committee for their very admirable report. He was quite sure that all the members of the Association would join him in that expression of thanks, even although they might differ as to some of the recommendations made by the committee. They were also very much indebted to Mr. Slater for the admirable and lucid manner in which he had brought the scheme before them. But there was one part of Mr. Slater's speech, which found an echo in that of the seconder, which seemed to foreshadow opposition to the proposals contained in the report on the part of the older members. He himself did not think that there was much ground for that fear; but, on the other hand, he must say that he could not regard the report, or, at any rate, the form of it, as absolutely faultless. With regard to the scheme generally, he felt that it was one which was inevitable. He had long felt that the time must come when the system of mutual help which had prevailed for so many years in the Association would have to be largely augmented by regular, systematic, paid assistance. That time had now arrived, and the question must be faced. Any attempt to put back the hands of the clock would be a mistake. But, at the same time, he would put in a plea for the retention of the mutual or voluntary system as far as possible. He had no doubt that that was the intention of the committee, but in a report such as that which had been presented to them, it would be impossible to clearly put everything that was in the minds of those who were respon-

sible for it. He should be very sorry indeed to see the Association turned simply into a college of architecture, and for the old Association as they knew it to become a thing of the past. But was such a course either necessary or desirable? He did not think it was. While no doubt to a very large extent the future work of the Association must be conducted, upon the lines mentioned in the report, by systematic paid instructors, yet he thought it would be a great pity to eliminate the services of those who were willing to give voluntary assistance. He thought there would still be scope for the work of voluntary instructors. Part of the scheme proposed by the committee suggested the establishment of a studio which should have a salaried master. He would say at once that he did not think the proposed salary of 100*l.* a year for the master of the studio was at all adequate. He would be a very clever fellow indeed who would be able to undertake the work of the proposed studio and to carry out instruction in all the subjects included in the programme; and being a clever fellow, was it to be supposed that he would be content to value his services at only 100*l.* a year? It was not likely. But it was just in regard to the work of the proposed Studio where he thought voluntary assistance would best come in. The Association numbered within its ranks men of great artistic ability, as was evidenced, for instance, by the "Sketch-book"; and he thought it would be perfectly possible to enlist the services of many of those men as Visitors to the Studio. Many of them, he was quite sure, would be perfectly willing to take turns in visiting the studio for the purpose of inspecting the work of the students, and of giving them advice. If that feature could be introduced into the scheme of the studio, it would be one means of preserving the continuity of that element of voluntary help, and of maintaining that feeling of enthusiasm for their art, which together had been the mainstay of the Association in the past. The subject of colour-decoration, for instance, was one in which the services of such Visitors would be of great value to the Association. The Honorary Visitors to the proposed Studio would no doubt all be senior members of the Association,—men who were in practice for themselves, and who, although they would have no time to take part in the regular teaching of the classes, would be only too pleased to give occasional attendance and advice. By carrying out that system they would maintain that feeling of enthusiasm which, as he had said, had been for so long one of the mainstays of the work of the Association. Inadequate as the voluntary system had become to their present needs, and necessary as it was to engage paid assistants, yet it should be borne in mind that a reliance upon paid assistance alone involved the danger of the teaching becoming perfunctory and stereotyped. Therefore, he said, "Maintain the voluntary system in some part, at least, as a link between the past and the present." As to the question of the proposed increase of the annual subscription,—an increase which he had urged five years ago, when the proposal was defeated by a rather narrow majority—he regretted that the proposed increase was not then adopted; for he regarded it as an absolute necessity, if their work was to be carried on properly. He could have wished, however, that the proposal to increase the subscription had not been identified with the proposed change of curriculum. If the question could have been separated he thought it would have been better. They had present in that room, perhaps, two hundred members; but the Association numbered a thousand members; and were the two hundred to decide upon raising, not only their own subscription, but the subscription for the other eight hundred members? If the two questions could be separated, and if the opinions of the members at large on the subject could be taken by means of voting papers, he thought it would be a very desirable course to adopt. It was quite true that, as Mr. Slater and other speakers had said, that half-guinea subscription was ridiculously small to those town members who were reaping the full advantages offered by the Association; but it should be remembered that an extra half-guinea a year might be regarded as a ridiculously large subscription by those who were getting nothing in return for it. He could not but think, in the light of past experience, that it was a question at the present time upon which it was desirable

that they should take a plebiscite of the members. Personally he was strongly in favour of the increase of the annual subscription, but unless that question could be separated from that of the adoption of that part of the report which dealt with the curriculum, he should ask leave to move as an amendment to Mr. Slater's motion, that the opinion of the members as a whole be taken by voting papers on the question of the increase of subscription for he did not think it would be right that that meeting, which numbered only one-fifth of the members of the Association, should take upon itself to decide so important a question, after the opposition a similar proposal met with some five years ago.

Mr. J. A. Gotch said he very heartily welcomed the report of the committee, as it expressed very clearly views which he had been cherishing for a good many years. He was exceedingly pleased to see that the committee had grappled so thoroughly with the question, and had brought before them so comprehensive and so admirable a scheme. It appeared to him that to propose any half-measures would be worse than useless. While he thoroughly admired and appreciated the voluntary system of the past, it had long been apparent to him that it would be impossible to carry on the work of the Association with success by continuing to rely upon it. What they wanted was a thorough system of teaching by competent men,—men who would be able to devote themselves to teaching systematically. With regard to the proposed increase of the annual subscription of the members, his own feeling was that that question was now in an entirely different category to what it was four or five years ago. Even at that period he thought those who proposed the increase of the subscription had adequate reasons for doing so, although those reasons did not commend themselves to the majority of the members. But if they had adequate reasons then, how much more adequate were the arguments now put forward in support of the increase? He thought that in the Association as it would be worked under the proposed new educational scheme, the young architect would learn much more there than he would in the office of his principal. He was strongly in favour of the institution of day classes, because he thought it was a mistake to expect young men to work hard in learning their profession at the fag-end of the day. Young men in the prime of their strength and spirits might reasonably expect to have some time for relaxation and for the lighter occupations of life. Without the institution of day classes, what would be the position of young men entering upon the proposed curriculum? The earnest student would occupy his Saturday afternoons with visits to buildings; every alternate Monday he would be at the Institute meetings; and every alternate Friday at the Association meetings. What with these meetings and his work in the Classes and at the proposed studio, what time would remain to him for relaxation? Everything, in his opinion, pointed to the necessity of the establishment of day classes, and he only regretted that the committee had not seen their way to boldly recommend their institution at once. While the Association was making a change in its methods of procedure, why not make the change as complete as possible, and establish day classes? He was very much afraid that if the Association did not do so when making this new departure in their methods, they would be stereotyping and confirming evening work; and it might be much more difficult afterwards to institute day classes. The institution of day classes would be of special value to country members, many of whom would be able to come up and stay in London for a sufficiently long period to attend the courses of lectures, &c. One important point in that connexion was that country students needed to have a thorough general knowledge of construction, such as they would not necessarily get in a London architect's office. He quite agreed with Mr. Cole Adams as to the desirability of retaining voluntary work in the conduct of the Association as much as possible. The voluntary principle could, to quote the instance mentioned by Mr. Cole Adams, be very well maintained in connexion with such a class as that for the study of colour-decoration, where voluntary Visitors would be able to come down and give valuable advice; but in all matters relating to science and construction it would be much more advantageous to have regular lecturers,

taking up their subjects in a systematic way. For the proper teaching of such subjects continuity was a necessary element. How would it be possible, for instance, to conduct a class for the study of the principles of sanitary science on the voluntary system? If half-a-dozen men volunteered to come down and give instruction in that subject, one after the other, he thought the students in the class would obtain a very confused notion of the science of sanitation. He was convinced that with regard to nine-tenths of the proposed curriculum they would be obliged, to carry it out efficiently, to have a system of paid lecturers or teachers. No doubt, as had been suggested, they would be able to retain the voluntary system to a larger extent in the proposed studio. With regard to the question of fees to the lecturers or teachers, he was strongly inclined to the opinion that they should be paid partly by salary and partly by a capitation fee. He trusted that the meeting would adopt the report substantially as it had been presented by the committee. If they did, he believed that the Association would develop into the leading institution for the education of architects in Great Britain.

Mr. S. B. Beale said he quite agreed with the last speaker that the proposed day classes should be made part of the scheme under discussion. He wanted to know how, unless they were going to provide young architects with cast-iron constitutions, as well as with brains, they were going to get them to take up the proposed curriculum? He proposed to move that it be an instruction to the Committee of the Association that as an experiment day classes should be started concurrently with the initiation of the new programme of studies. They were all agreed that the young architect should be educated; but he maintained that without the day classes they would not be giving him a fair chance. Unless they saw to it that he had an opportunity of being educated in rational hours, he was afraid that the whole scheme of the special committee must be a failure.

The Chairman said that if Mr. Beale had read a little further on in the Report, he would find that the committee did recommend the institution of day classes as part of the ordinary work of the Association. They strongly recommended that they should be started if possible.

Mr. Hugh Stannus said he rose rather to raise a point of order than for the purpose of discussing the elaborate report which was before them. It appeared to him that there were five or six distinct points raised by the recommendations contained in the report, and he very much regretted that the adoption of the report as a whole should have been moved,—he would not say thrust upon them,—*en bloc*. The special committee who were responsible for it, naturally felt very anxious about it, and desired to see it adopted; but he thought that the various points which have been dealt with much better in discussion if the report had been divided up into heads or parts. It was exceedingly difficult to discuss it as it stood, for there was not even any numbering of the paragraphs. It would certainly have been the better for a little editing. He wished to ask Mr. Slater and those who were responsible for the report whether they could not take it back for reconsideration, with a view to its being arranged in such a way that it might be considered point by point. They would then have definite issues before them. At present some of them, while entirely sympathising with one portion of the report, were not in favour of other portions.

Mr. F. T. Beggally said he should certainly oppose any motion for dividing the report into sections, for the whole thing hung together.

Mr. E. Woodthorpe said he agreed with Mr. Stannus as to the desirability of dividing the report into sections. He thought that the fees proposed were too heavy to be paid by the young students. He could not agree with all that had been said in favour of the day-class system, nor could he agree that the studio or atelier system was everything that could be desired. He thought there was rather too much disposition on the part of some of them to join the eight hours movement. If young fellows wishing to advance in their profession were not disposed to use every available opportunity for study they could not expect to succeed. The wisdom of the proposal to raise the annual subscription was, he thought, doubtful. If it were true that the secretaries were 50*l.* a year out of

pocket by their work for the Association, he thought it ought to be made up to them. Although, perhaps, the curriculum laid down by the committee was an ideal one, yet he thought the charges to be made to the young students were much too heavy, and, therefore, he thought it would be a pity to take the report *en bloc*.

Mr. H. L. Florence said that of all the speeches which he had heard that evening he felt most in sympathy with that of Mr. Cole Adams, for he thought it would be very desirable that the old spirit of enthusiasm for their art, which had prevailed in the Association from its commencement, should be kept up even throughout the proposed changes. He thought it would be regrettable if they were to change the Association into a mere educational machine. He felt sure they were all desirous and anxious to further and forward any scheme which might be considered advantageous to the general body. He was willing to accept as a whole the report which had been presented by the committee, although he thought there were certain things in which it fell short of what was desirable. He certainly hoped that the voluntary system would as far as possible be kept up, side by side with the new aids. The question of day classes involved a point of very great importance; and it seemed to him that it would not be a very difficult thing to establish them. If the proposed studio were worked in the day time as well as in the evening, he was convinced that many architects who had pupils would not only allow their pupils to attend, but would pay their fees. With regard to the general question of ways and means, he was not convinced by the figures put before them that the proposed new scheme would be self-supporting. Some important points, it appeared to him, had not been taken account of. Their library, for instance, would need to be greatly developed if it were to become at all adequate to the work of the Association under the new scheme. What they would really want, and what they wanted now very badly, was a proper reading-room. It was of no use pointing to the Institute Library as providing a proper reading-room, for that was not a room in which anyone could read with comfort. Therefore he thought the question of providing a good reading-room, where the members could read and study, was one of the first importance. It was impossible to get any permanent good merely from attending lectures. Besides listening to lectures, they must afterwards study and read up the subjects of which the lecturers treated. Students required adequate means for deliberate study, and one of the first essentials was a good reading-room. Besides that, the library itself would have to be improved in the number and character of its books. A past-President of the Association, who attached great importance to that point, had commissioned him to say that if the proposed scheme, or some scheme of the kind, came into force, he would be willing to give a donation to the library of 100 guineas. With regard to the question of raising the subscription, for his own part he felt that that was an absolutely necessary step to take. There was no doubt, however, he thought, that the financial aspect of the proposed changes needed consideration in greater detail; but subject to that he was disposed to give the report of the committee his best support.

Mr. Stannus then formally moved that the report be referred back with a view to the committee preparing a series of separate resolutions embodying the principles involved in their recommendations, and that that report should be submitted to an adjourned meeting, the opinion of the members being taken on the question in the meantime by means of circulars.

Mr. Bernard Dicksee seconded.

After some discussion, in the course of which it was objected that by the rules of the Association the course proposed by Mr. Stannus with regard to voting papers would be out of order.

The Chairman, who was appealed to to give his opinion as to the best course to be taken under the circumstances, said it was rather an invidious thing to ask him to give his opinion on the matter. The special committee had made their report on the questions referred to them as a whole; and the Committee of the Association had adopted it as a whole, and sent it down to the present meeting for consideration as a whole. He might say, however, that in committee, ten members of the thirteen who were present voted for sending it down as a whole.

Mr. Max Clarke thought it would be advisable to divide the report, as suggested by Mr. Stannus. If put to the meeting as a whole he thought it would be lost.

Mr. W. Burrell said he thought it would be hardly fair to the special committee to refer the whole question back to them after the time and care they had bestowed upon it.

Mr. H. O. Crosswell said he could not see what Mr. Stannus was to gain by persisting in his amendment. Supposing the report were to be divided under several heads, and supposing some of the divisions of the report were carried and others were lost, they would find themselves in a ridiculous position. Surely those members who objected to any particular portions of the report could move amendments directed against them. As to the question of raising the subscription, it was of no use to say that the Association had been successful hitherto on the half-guinea subscription. Even under the voluntary system the amount had not proved adequate to maintain the Association in a state of efficiency. He thought that it would be very undesirable to send round to the members to ask them to say whether they would pay half a guinea or a guinea per annum. Those who took no active part in the working of the Association would naturally vote for the smaller sum.

Mr. Slater said that as the hour was getting late he desired to make an appeal to Mr. Stannus. The points which Mr. Stannus had touched upon had already been very carefully considered by the special committee. It appeared to him that they had had that evening a very good general discussion upon the scheme as a whole; and as it was the view of the special committee and of the majority of the Committee of the Association that the report must be taken as a whole he thought the best way to proceed would be to adjourn the discussion, and he, therefore, asked Mr. Stannus to withdraw his amendment. If Mr. Stannus's objection was only to the proposal to increase the annual subscription it would be perfectly competent for him to move an amendment on that point.

Mr. Gotch supported Mr. Slater's appeal, for on consideration he thought that that would be the best course to adopt.

Mr. Stannus, however, declined to withdraw his amendment, but on the contrary urgently appealed to Mr. Slater to withdraw his motion, as persistence in attempting to carry the report *en bloc* would imperil the whole scheme.

Mr. C. H. Brodie moved the adjournment of the discussion.

Mr. Leverton seconded, and on a show of hands being taken the motion for the adjournment was carried.

The date to which the discussion was adjourned was not announced from the chair.

"INDUSTRIAL CONCILIATION."

"The Position and Prospects of Industrial Conciliation" was the title of a paper read by Mr. L. L. Price, M.A., of Oriel College, Oxford, on Tuesday, the 20th inst., at the seventh ordinary meeting, for the present session, of the Royal Statistical Society, held at the Royal School of Mines in Jermyn-street, Sir Rawson W. Rawson, K.C.M.G., C.B., a past President of the society, in the chair.

The paper was, to some extent, a continuation of a previous paper read in December, 1886, in which the methods of preventing and adjusting industrial disputes in the iron and coal trades of the North of England had been described in detail. The writer commenced by alluding to the prominence of the subject at the present time, both in England and abroad. He pointed out that the continental *conseils de prud'hommes* did not as a matter of fact remove, and apparently were not intended to remove, all occasion for industrial quarrels. He then proceeded to notice the advantages which the prominence of the subject seemed to involve. In the first place the attention of the general public was directed to the question; and the conciliation scheme of the London Chamber of Commerce followed upon the London dock strike, while abroad, the International Labour Congress at Berlin was, to some extent at least, the result of the miners' strikes in Westphalia. In the second place, effective interest might be aroused in the history of past experiments, such as that of the Board of Conciliation and Arbitration on the manufactured iron trade of the North of England, which might, the writer held, be considered

as furnishing a crucial instance of the possibility of industrial conciliation; for the difficulties to be encountered in that trade were as serious as could well be conceived, and the Board had now been in successful working for more than twenty years. And, thirdly and lastly, some of the elementary principles of the subject were more likely at this than at other times to be generally understood. The necessity of effective representation of both parties, and the advantage of a trade union as supplying the means for such representation of the men were, the writer argued, gradually winning their way to recognition; and in this connexion the London dock strike presented some noteworthy features. But on the other hand there were disadvantages as well as advantages attaching to the present prominence of the question. The public were inclined to entertain extravagant expectations of the results to be achieved by industrial conciliation, and to underrate the importance of the element of human nature, which was necessarily involved in the solution of the problem. The abandonment in 1887 of the sliding-scale, which formerly regulated wages in the Northumberland coal trade, was quoted as an illustration of the possibilities of failure of the most admirable and advanced scheme of industrial conciliation; and the recent history of that trade was examined at some length. From this history it appeared that the system of the sliding-scale was liable to break down in seasons of rapid and extensive fluctuations in prices, and also that the authority of trades union officials was not invariably secure from impeachment on the part of the general body of the members of their organisation. The writer concluded by urging that industrial conciliation should not be regarded as a panacea, but rather as an advantageous and reasonable alternative to strikes and lock-outs, which might commend itself to sensible men as a practical means of adjusting disputed questions with tolerable assurance of success.

In the interesting discussion that followed, Mr. Sydney Buxton, M.P., Mr. George Howell, M.P., Mr. C. M. Norwood, Mr. S. B. Boulton, Mr. W. H. Hey, and the Chairman took part.

ARCHITECTURAL SOCIETIES.

Birmingham Architectural Association.—At the final meeting of the present session of this Association, held on the 13th inst., the President declared that the following gentlemen had been elected to the various offices named for session 1890-91, viz.:—President, Mr. T. Naden; Vice-President, Mr. W. H. Lloyd; Hon. Treasurer, Mr. C. E. Bateman; Hon. Librarian, Mr. H. Beck; Hon. Secretary, Mr. H. R. Lloyd, A.R.I.B.A.; Hon. Auditors, Messrs. A. T. Powell, chartered accountant, and E. F. Tildley, Council, consisting of four Members and three Associates, viz.:—Members: Messrs. W. H. Bidlake, M.A., A.R.I.B.A.; W. Donhead; W. Hale, F.R.I.B.A.; and W. H. Keudrick. Associates: Messrs. F. B. Andrews, A.R.I.B.A., G. T. Bassett, A.R.I.B.A., and H. R. Bewlay. A hearty vote of thanks was passed to the President for the services he had rendered to the Association during the past session, and the thanks of the Association was also voted to the retiring officers. It was announced that the services of Professor R. H. Smith, M.I.M.E., Assoc.-M.I.C.E., had been secured as lecturer on Statics, and that a number of members had already given in their names for the lectures.

Manchester Society of Architects.—An exhibition was held on Friday, the 9th inst., at the meeting room of the Manchester Society of Architects (Diocesan Chambers) of the drawings and descriptive report of a town, in Belgium and a portion of northern France, made by Mr. Th. E. Barker, A.R.I.B.A., who had been selected, in a preliminary competition, as the holder of the Society's Travelling Studentship for last year. The studentship, of the value of fifty guineas, was given on the condition of the holder submitting satisfactory proofs of work done during a tour of three months, and the Council of the Society, at a meeting held on February 20, passed a resolution expressive of their satisfaction with the result.

Association of Municipal and Sanitary Engineers and Surveyors.—A Lancashire and Cheshire District meeting of this Association is to be held at Burnley on Saturday next, May 31.

A NEW LIME.

SIR,—We are using a new patent lime (Ferguson's patent) in rebuilding the "Swiss Hotel," Old Compton-street, Soho, and as this is, to our knowledge, the first time that this lime has been practically used in this country, a few words of our experience concerning it may be of interest to the numerous readers of your paper.

We must confess that we are highly satisfied with the result, so far. The mortar made with this lime resembles in its properties more a Portland cement than a grey lime mortar, as it is very quick setting, becoming almost as hard as cement in a few days.

We made a very satisfactory concrete which, in spite of a heavy rain during the night, was hard enough next morning to build the foundations upon.

The usual proportion of lime to sand, however, is much too good for ordinary brickwork, and we find that one part lime to four parts sand makes perfectly satisfactory work.

The inventor says that the mortar will be in no way affected by frost, which, however, we had no opportunity of testing.

In plastering, which we shall begin shortly, the lime is said to give even better satisfaction, as it takes colour easier than common plaster or cement, and becomes dry enough to take paint or paper within three or four weeks.

Sold at the low value of ordinary grey lime, we should say that there is a large future in store for the lucky inventor, and we think it but right that publicity should be given to this invention, as in certain cases (as, for instance, where it is necessary to execute works with great rapidity) it will prove invaluable on account of its setting properties.

Any architect or builder interested in the subject can inspect the work done with this lime at the "Swiss Hotel," now in course of erection at 21, Old Compton-street, W.

WILLIAMS & HOPTON.

156, Regent-street, W.

** In reply to an inquiry, our correspondents state that the lime or cement in question is obtained from Germany, and is not at present manufactured in England.

"ON THE PLANNING AND CONSTRUCTION OF HOSPITALS."

SIR,—In your notice of Mr. K. D. Young's paper on "Hospitals" you refer to the circular ones erected, but omit to mention that of the Hampstead Workhouse Infirmary, which was built from my designs in 1885, and illustrated by you the following year.

It is of interest in consequence of it being the largest on the circular system, and the first which received the approval of the Poor-Law Board, having seventy-five beds and nurses' quarters, and a diameter of 50 ft.

It has been fully occupied for nearly six years, and has, therefore, been considered as having stood the test of time, a desideratum desired by Mr. Young in his able paper. The medical and nursing staff at Hampstead speak of the building in the highest terms; and the ventilating system leaves nothing to be desired. My experience with both kinds of wards enables me to say that, in this most important particular, the circular ward is greatly superior. Unless this form of building had been adopted at Hampstead, a valuable site would have been useless for the much-needed extension of sick wards accommodation.—I remain, yours, &c.,

CHARLES BELL.

SIR,—In the interesting and valuable paper on this subject by Mr. Keth D. Young, F.R.I.B.A., as published in your columns I observe Mr. Young stating (as per page 359, first column) "There is, I think, very little doubt that in England the most suitable form of ventilation is the most simple. Opposite windows, assisted by the extracting power of open fire-places, supply all that is required, where properly handled, to keep the atmosphere sufficiently diluted."

Now, while I admit the value of good, simple ventilation, I think it is a mistake to credit the open fire-place with first-class value as an efficient "extracting power." My reason for saying so is that it is far too low, only about thirty inches or so above the floor. As the vitiated air exhaled from the lungs is heated to 97 deg., and the vitiated air from gas lights still higher, it follows that before this warm vitiated air can get up the chimney it has to be driven down somehow to the thirty-inch level. Now I would ask why there should not be provision

made to carry off this warm vitiated air to the ceiling as it rises?

I respectfully think that provision for doing so should exist in a changeable climate like ours, quite independent of the windows, either by shafts or flues in the walls, or by sufficiently large pipes properly fitted in.

I write this after visiting a recently-erected hospital, and a large number of schools and churches, and watching the bad effect produced wherever there was deficient provision for carrying off the vitiated air at the top of the room.

At one school a good lesson was got as to not believing all you hear too readily. The headmaster and myself went into one school-room in which there were two female teachers; the window was open on the windward side, so I asked:—"Do you children not feel a draught from the window?" One of the girls immediately cried out, "No, sir," I remarked, "I fear that is not true." The headmaster then said: "All you children who feel the air blowing in upon you hold up your hands." About thirty immediately did so! Then a mistake occurred between the teachers, one stating the cold draught from the window was often very disagreeable, the other, who was out of the current, felt nothing wrong. There will be more published in this relation shortly.

W. P. BUCHAN.

THE OLD NAVE, SOUTHWARK.

SIR,—Instead of the nave of Southwark being demolished, as said on page 340, in 1838, I can vouch for its being untouched in July, 1838, having never visited London till that month, and that being the first building I entered, little dreaming I had ever seen it again. Since that time there was no south porch; but in any case the west end, now proposed to be solid, had a central entrance and carved doors of later date than any other part, but of rich and unique design, delineated in Pugin's "Specimens," vol. ii., plate K, described on page 9, where a note says, "See vol. v. of 'Architectural Antiquities,' by J. Britton, F.S.A., for ground-plan and five other views of this church." I cannot find these, nor is Southwark in any of the indexes to that work.

E. L. GARRETT.

3, Maddelton-square, E.C.

PRICE BOOKS.

SIR,—In your issue of May 3, I have read with considerable interest an excellent article on Messrs. Lockwood's, Laxton's, and Spon's new books on prices. With the whole of your remarks I cordially agree, and, moreover, I think no practical man would ever dream of consulting them as a guide in forming a correct estimate cost of work, and I am convinced that if any one took his ideas of prices from any yet-published book, and entered into competitive estimating, he would find himself completely out of it, as the greater portion of their prices are absurdly high, and not at all suitable to the present day, with its close-shaving and fierce competition.

What I would suggest is that one of the above-named firms should get a practical man, — a "tradesman," — in each of the trades, to treat upon his ideas on the subject, assuming, of course, that he has also sound ideas re establishment expenses, wear and tear, depreciation of plant, &c., and I feel confident by so doing to do far more valuable work could be brought before the public.

In my own case I could advise on one trade alone, but on that thoroughly, having served an apprenticeship to it in town, and since then have had six years' experience in an office as estimating clerk, bookkeeper, &c.; and in every trade there are numbers of such men who, it is reasonable to suppose, know their own individual trade better than any one man possibly can who attempts to lay down laws on all trades, and consequently cannot be a specialist in any one.

PRACTICAL.

"BOUNDARIES TO FOOTPATHS."

SIR,—The General Highways Act, 5 & 6 Will. IV., cap. 50, provides for cutting hedges by the side of carriageways but not footpaths. The presumption is that footpaths mostly crossed unenclosed land.

There are several cases that have been tried, and it is held that if a footway is fenced on either side the person fencing is bound to maintain a good hard path, and, failing this, can be indicted. It is held that when a footpath is unenclosed the public can walk on the adjoining land, but fencing prevents this. Since 1862, Highway Boards can authorise the fencing of footpaths.

I have no doubt an action could be brought against the owners of the hedges for obstructing the highway, and if the public broke through the hedge and trespassed on the adjoining land no conviction would follow.

The highway is "between the fences thereof," and if a wall or any other fence was built, the line would be the outside of the stem of the quick or briar at its contact with the earth.

The duty is to use jointly for the drainage of the land and road, and cannot be alienated.

ROBERT PHILLIPS,
County Surveyor.

CASE UNDER THE EMPLOYERS' LIABILITY ACT:

OLIVER v. GREENWOOD.

In the City of London Court, on the 16th inst., before Mr. Commissioner Kerr and a jury, the case of Oliver v. Greenwood was heard. The action was brought by John Oliver, carpenter and joiner, of 8, Manchester-road, Reading-hill, to recover 200*l.* in compensation for personal injuries he was alleged to have sustained through the negligence of the foreman of the defendant, Mr. James Greenwood, builder, of 86, Cannon-street, E.C.

Mr. Morton was counsel for the plaintiff and Mr. A. H. Ruegg for the defendant.

For the plaintiff, it was stated that the defendant was engaged in making structural alterations to two houses in Milton-street, City, which were being thrown into one. On Dec. 24 last, the plaintiff was in the defendant's service, and while at work an accident happened, which resulted very seriously for the plaintiff, as he was injured to such an extent that he was prevented from doing any work from then until the present time. A part of the work consisted of removing the party-wall, and to do this girders had to be employed. The plaintiff worked under the superintendence of a foreman named Fleming, and a deputy foreman named Edward. He was instructed to do some work on the ground floor. After dinner the foreman told a man named Deersley to commence drilling a hole in the wall on the second floor. To do this a ratchet-drill was employed. While the men were at work, Deersley, by some mistake, allowed the ratchet to slip. It fell on to a joist, and the plaintiff was struck on the head, hurting him very much. He was removed to St. Bartholomew's Hospital, and was afterwards sent home, where his private doctor attended him. It was asserted by the plaintiff that in the building trade it was a recognised custom to have either guard boards to prevent tools, &c., falling, or cloths to prevent any one being injured should anything fall. Had that been done, the accident would not have happened.

Evidence was given in support of the case, the doctor stating that it was impossible to fix the time how long the plaintiff might suffer.

For the defence, Mr. Ruegg admitted that the plaintiff had suffered injuries for which if he were entitled to anything he should be fairly and reasonably compensated. But the case for the defendant was that he was not liable for the sad occurrence. The customs of the building trade were at issue. It was not the habit of builders to provide guard boards or drop-cloths when work of this sort was being done. The man Deersley was working on a four-board scaffold, whereas many frequently worked on one board. No provision was necessary to avoid tools falling, as in the defendant's experience a ratchet drill had never fallen in this way before. The defendant was, under the Employers' Liability Act, only responsible for the negligence of such men as had superintendence, which the man Deersley had not.

Mr. Commissioner Kerr summed up and the jury, after a short deliberation, found a verdict for the defendant.

Judgment, with costs, accordingly.

SEWERAGE AND DRAINAGE.

Cleethorpe.—The Cleethorpe Local Board have instructed Mr. W. H. Radford, C.E., Nottingham, to prepare plans and obtain tenders for carrying their Beaconthorpe outfall 150 yards farther out to sea, in consequence of the tidal increase of sand on the beach.

Wolston.—The Leamington Courier says that the Rugby Union Rural Sanitary Authority has called in Mr. J. E. Willcox, C.E., of Birmingham, to report and submit a scheme for the drainage of Wolston.

SCHOOL BUILDING NEWS.

Ashton-under-Lyne.—A mission school is to be built at Ashton-under-Lyne for the Methodist New Connexion, at a cost of about £1,500, from plans prepared by Mr. J. H. Barton, architect.

West Hartlepool.—The schools which the West Hartlepool School Board have been erecting in Oxford-street are now completed. They comprise a mixed school for 360 boys and girls and infants' school for 270. The former has an assembly-hall, 54 ft. by 30 ft.; five class-rooms, each 25 ft. 6 in. by 24 ft.; masters' room, 15 ft. by 12 ft.; and cloak-room, 30 ft. by 20 ft. The infants' school is 50 ft. by 24 ft., with two class-rooms, each 24 ft. by 20 ft.; marching hall, 44 ft. by 14 ft.; mistresses' room, 15 ft. by 12 ft.; and cloak-room, 24 ft. by 12 ft. There is also a caretaker's house, with six rooms, and there are play-sheds and latrines, approached by covered ways, to each department. The buildings are erected in brick covered with slate, the woodwork being of

pitch-pine varnished. The playgrounds are paved with compressed concrete flags. The total cost has been about 4,200*l.*, including caretaker's house, or about 6*l.* a head for schools after deducting the cost of such house. The design selected in open competition was that of Mr. J. P. Pritchett, of Darlington, who has carried out the work with the assistance of Mr. Henderson, clerk of works, the contractor being Mr. Joseph Howe, of West Hartlepool.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—XXI. COMMERCIAL UNITS.



ELECTRICITY SUPPLY is a phrase used as a rule, to denote, not the supply of electricity, but the supply of work or energy by means of an electric current. When a building is being supplied from a central station, the extreme points in its circuit or circuits are joined one to each of the two mains belonging to the supply company. As many coulombs flow out from the building into the supply main, which is at the lower potential, as flow into the building out of that which is at the higher potential. The coulombs of electricity which flow out have lost potential, or capability of doing work, and it is the energy conveyed to the consumer in this way which constitutes an electricity supply. To put the same thing in other words, a current of electricity does not leave electricity behind it, but work.

The practical unit of energy, the joule (see article V.), is much too small for trade purposes; the Board of Trade have therefore fixed upon a commercial unit, which they define as follows:—"The expression 'unit' shall mean the energy contained in a current of one thousand amperes flowing under an electro-motive force of one volt during an hour." This unit is commonly spoken of as the Board of Trade unit, and written B.T.U. The B.T.U. is therefore equal to 1000 x 1 x 60 x 60, or 36 x 10⁶ joules.

The fact that a million joules can in certain districts be bought for about 2*d.* may give some idea of how relatively small an amount of energy it really represents. Before the joule was adopted as a unit, the B.T.U. was generally defined as 1,000 watt-hours; but unfortunately those who are incapable of distinguishing the difference between power and work have confused matters by defining the B.T.U. as 1,000 watts. The original definition, however, given by the Board of Trade can leave no doubt as to whether the B.T.U. is a measure of energy or of power.

Makers of dynamo-machines, finding the watt too small a unit of power in which to express the possible output from their plant, have adopted a unit equal to 1,000 watts. A 12-unit machine can, therefore, give an output of 12,000 watts, and we also immediately know that such a machine can in one hour deliver 12 B.T.U.'s. This new unit of power is also fairly convenient in its relation to horse-power, since 1 H.P. = 746 watts, or 1 unit [of 1,000 watts] = 1.34 H.P. If, therefore, a machine is specified as 30 many units, it follows that, allowing for the loss in the conversion of mechanical into electrical energy, it will take about 1 1/2 times that quantity of horse-power to drive it; a 12-unit machine must receive 18 H.P., actual, in order that it may work to its full capacity.

The unit of quantity employed in connexion with secondary cells is the ampere-hour; that is, the number of coulombs carried past any point in a circuit by an ampere flowing for an hour. The ampere-hour is, therefore, equal to 1 x 60 x 60, or 3,600 coulombs.

Makers commonly state the capacity of a cell in horse-power-hours, though the word hours is usually omitted. A "1-horse-power cell" means a cell that, under normal working conditions, stores an amount of energy equal to that delivered by one horse-power in one hour. Taking the discharging E.M.F. as 2 volts, such a cell will give $\frac{746}{2} = 373$ ampere-hours.

If a secondary battery be charged and discharged with care, it will be found that the ampere hours of discharge very nearly equal those of charge, and on these grounds it is sometimes stated that the efficiency of a cell may be very near 100 per cent.; but it must be pointed out that a secondary cell is required to store

energy. The difference of potential between the terminals is about 2.5 when being charged, and 2 when being discharged under ordinary conditions; hence, even if no loss of ampere-hours took place at all, only 80 per cent. of the energy used in charging would be returned. In point of fact it is considerably less than this, though no exact figures can be given, as the true efficiency varies considerably with the nature of the work a battery is called upon to do.

The number of watts required to drive a given current through a conductor of known resistance can be at once calculated (see article V.); the work thus used reappears as heat, and causes the temperature of the conductor to rise.

If J = number of joules, h = number of units of heat* produced:—
 $h = 0.24 J.$

MAINS.

In small installations of electric light or power plant, the loss of power, not the rise of temperature, which takes place in the conductors, is a very serious matter; but when long distances have to be traversed, or large currents carried, the question of the size of the conductors or mains can no longer be overlooked.

Loss of power involves merely the question of cost. When the conditions under which power will be produced are known, the cost can be calculated. Interest on capital outlay and depreciation are the items in the annual cost of a cable; to these, however, must be added the annual cost of the work done in getting the current through the cable. The larger the cable, the smaller the latter cost, but the greater the two former items; a medium course should therefore be taken to make the sum of the two a minimum. The mathematical solution of the problem was given by Sir William Thomson in 1881.

The rise of temperature permissible in a main is limited by the temperature to which it can be raised without injury to the materials of which it is constructed. This question was investigated mathematically in a very complete manner by Professor George Forbes, in a paper read by him before the Society of Telegraph Engineers in 1884, to determine what section the conductor of a main or cable should have to prevent overheating with any given current.

If in a cable the permissible loss of power per mile is proportional to the current, formulae already given show that if the current increases the cross-section of the cable must increase in the same ratio, or if D be the diameter of the cable, since the cross-section varies as D² then, D ∝ C² a very simple relation. Passing on, however, to the consideration of how the rise of temperature, T, varies with C and D—let R be the resistance of, say a mile of the cable, if h = the quantity of heat produced, we know that:—

$$h \propto C^2 R \propto \frac{C^2}{D^2}$$

$$\text{or } h = p \frac{C^2}{D^2} \text{ when } p \text{ is some constant.}$$

Again, the quantity of heat which passes out varies as the product of the area of the surface of the cable from which it can escape and the temperature of the surface. But in the case of a circular cable the surface is proportioned to D, hence

$$h \propto T D$$

$$\text{or } = q T D \text{ when } q \text{ is some constant.}$$

The value of h in both cases is the same, because when the cable is at the highest temperature the current can produce, as much heat must escape from the cable as is generated in it, or the temperature would continue to rise; therefore

$$q T D = p \frac{C^2}{D^2}$$

The value of T, however, must be the same for all sizes of cables when this value, the highest allowable, has been decided upon. We then have

$$\frac{C^2}{D^3} = \frac{q}{p} T \text{ a constant.}$$

$$\therefore D \propto C^{\frac{2}{3}}$$

This expression shows that with a cable of circular section, the weight of conductor per mile is proportional to the fourth power of the

* The unit of heat is the quantity required to raise one gramme of water, at its maximum density, 1 deg. centigrade.

cube root of the current; so that, to take an extreme case, if the current is increased a thousandfold, the weight, and consequent cost of conductor, will increase ten thousandfold; that is, the conductor must be ten times as large as it would have to be on the score of loss of power alone. The difficulty, however, is more apparent than real: either a number of conductors may be used, or a single conductor shaped so as to present a vastly increased cooling surface; by either of these means, then, may the excessive temperature in large cables be reduced without increasing the area of cross section abnormally.

Books.

Schliemann's Ausgrabungen in Troja, Tiryns, Mykené, Orchomenos, Ithaka, im Lichte der heutigen Wissenschaft. Dr. CARL SCHUCHARDT, mit 2 Porträts, 6 Karten, und Plänen, und 290 Abbildungen. Leipzig: Brockhaus, 1890.

THE results of Dr. Schliemann's excavations have always been given with remarkable promptness to the archaeological world. In no direction has his marvellous business capacity been more strikingly shown than by the readiness and completeness with which huge volumes like "Troja," "Ilios," "Myceen" have been put through the press. Spite of this, there are no excavations as to the net result of which for science it is so difficult for the ordinary student to form a distinct idea. Dr. Schliemann's books are, as is well known, loaded with personal and (for science) irrelevant detail, they are further vitiated by much erroneous theory. To make satisfactory use of them, a student had need be a trained specialist in prehistoric art. There was great need for Dr. Schuchardt's book, and this need it admirably fills. It is not saying too much to state that the student has now before him the whole results of Dr. Schliemann's various work so far as yet attained by science; he has it, moreover, in a book clearly arranged and admirably lucid in style, and abundantly illustrated with plans and cuts, taken not only from Dr. Schliemann's books but also from recent publications in the *Hesperia* and other periodicals not usually at hand for the student. Probably a work so admirable will not go long untranslated into English. Dr. Schuchardt notes in his preface—as, indeed, is well known to all,—that it is in England especially that Dr. Schliemann's merits have been most conspicuously recognised, and in England, surely, such a book will be widely circulated.

A Handbook on Investments in Houses and Land. By R. DENNY URLIN, Barrister-at-Law. London: Elingham Wilson, 1890.

THIS is a sensible book, which will give a layman a general idea of the legal steps required in order to carry through a purchase or a loan, though, of course, it cannot supersede the need for legal assistance. It also contains many little hints and bits of information of a practical kind, such as those on the advantage of the septennial system of fire insurance. There is also a short chapter on property in Ireland, which would have been better omitted. It does not attempt—as, indeed, would be impossible—to describe the Irish law of property in five pages. It contains odds and ends of statements of no particular force or use; "The purchase of land in Ireland is very legitimate as a speculation, but it should be entered upon with a full knowledge of facts." This oracular utterance is so much waste paper.

Die Altischen Grab-reliefs. Erste Lieferung. Textbogen 1-2. Tafel i.-xxv. Berlin: Speemann, 1890.

THE first issue of the long-expected corpus of Greek grave-reliefs, undertaken by the German Archaeological Institute, is now before us, and comprises forty-one reliefs, complete and fragmentary, all dated before the Persian war. The series opens with the beautiful and, to professionals, familiar stele of Lyseas, a model of exact coloured reproduction. The publishers of the corpus act indeed wisely in sparing no cost to facsimile these coloured stele, the tints from which are fast fading. In the present instance it is only by standing at a particular angle to the stele that the remaining colour can be at all adequately seen. The stele of Lyseas is followed by that of Aristion, long the only known sample of this sort of work,

but now, we believe, for the first time reproduced in colour. Side by side with it is the analogous stele, recently found by the American excavators at Dionysio. But few of the series are here published for the first time, but the superiority of the plates over all previous attempts at reproduction will apply alone in the eyes of the intending purchaser. The text is brief and to the point. It rightly confines itself to a precise statement as to provenance, dimensions, and present state of preservation, and full bibliography. The price of the first issue is 3*l.*, but no hint is given, and perhaps none could be, of the ultimate cost of the complete work.

Die Antiken Sarcophag-Reliefs im Auftrage des Kaiserlich deutschen archäologischen Instituts, mit Benutzung der Vorarbeiten von Friedrich Matz, herausgegeben und bearbeitet von Carl Robert, Zweiter Band. Mythologische Cyklen. Berlin: G. Grote'sche Verlagsbuchhandlung, 1890.

SIDE by side with the "Attic grave reliefs," noted above, appears the first instalment of the corpus of Greek and Roman sarcophagi, with text by Dr. Robert. The number first published is in reality the second volume of the complete series. It deals with certain cycles of mythological subjects, i.e., with the Trojan, Argonautic, and Theban sets of myths. The remaining volumes are to deal with isolated myths, Bacchic and Erotic scenes, and subjects purely decorative. All general considerations are reserved for the issue of the first volume, and hence any detailed criticism of the text would at present be premature. As regards these plates, it may be noted that quite special difficulties have had to be overcome. Very few of the sarcophagi were sufficiently well preserved to be photographed direct in most cases; and the drawing supervised by a trained archaeologist. To this difficulty has been added another. Many of the sarcophagi are to be found walled into halls and courtyards at a great height. Due inspection could only be carried on by the erection of platforms and scaffoldings. This will give some idea of the magnitude of the task undertaken by the editors and publishers,—a task in which they have everywhere, they own, met with the most real help from directors of museums and owners of private palaces and collections. Further, in the case of sarcophagi that have been known to exist, but have since disappeared, old publications have had to be collated, and a selection reproduced. A most useful portion of the book is a list of the original MS. drawings that have been laid under contribution. These include the remains of the collection of Cassiano del Pozzo, which later in 1672 passed into Cardinal Alhani's possession, and (acquired by George III.) are now most of them in Windsor Castle. Of the great importance of the work in relation to the study both of mythology and art, it will be best to postpone all mention till the issue of vol. I. Meanwhile, we may call attention to the admirable indexes topographical, provenance, and chronological. The dates of discovery vary from 1488-1889.

The Architects', Surveyors', and Engineers' Compendium, and Complete Catalogue. Edited by JOHN EDWARD SEARS, F.R.I.B.A. London: The Compendium Publishing Company, 16, New Bridge-street, 1890.

THIS issue of Mr. Sears's "Compendium" takes a somewhat different form to that of the three previous annual issues, and includes several new and useful features. It is, of course, largely composed of advertisement pages, and the building materials or appliances to which they relate are classified into several groups; but we are bound to say that not one of these groups is a "complete catalogue" in itself, and therefore the claim of the work as a whole to that designation is a trifle exaggerated. The publishers have no doubt brought together as many pages of advertisements as they could get, and on the whole they are fairly representative; but although the present volume is sufficiently bulky (it extends to nearly 700 pages), it will require a far bulkier tome to contain the advertisements of all the inventors, manufacturers, and merchants who appeal to the building trade. To quote only one or two examples, in Section A of the so-called "Complete Catalogue," devoted to "Bricks, Tiles, and Terra-Cotta," several well-known firms are not mentioned. The same remark applies to Section D, "Engineering and Fireproof Con-

struction," Section L, "Sanitary Manufactures," and other sections which we might instance. Nevertheless, a very large number of illustrated trade advertisements are here brought together and classified in a way that cannot but be found very useful to architects, surveyors, and builders. A few illustrations of modern architecture at home and abroad are included, but these will not be so useful as the "Price-Book" compiled by Mr. Henry Lovegrove; the Notes on Acts of Parliament and Legal Decisions of the past year, compiled by Mr. John Warburton, solicitor; and a great deal of other matter, for the reliability of the whole of which, however, we cannot vouch. The work is not free from mistakes both in editing and printing. For example, under the first head we find the leading and only really representative architectural body of the United Kingdom three times in succession spoken of as "the Royal Institution of British Architects." Under the second head, in the list of "builders nominated by architects," the name of the well-known firm of Cubitt & Co. is rendered as "Cubitt & Co." But notwithstanding these criticisms, the work has been very well produced on the whole.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

5,980, Fanlights. T. P. Graham.

This invention relates to a device for securing, at any angle doors, fanlights, &c. A semi-circular ratchet, with a stop or pin, is fixed in such a way that the teeth of the ratchet, engaging in the stop, fix the fanlight, &c., at any desired angle.

6,433, Building Material. W. Schleunig.

According to this invention, the residue of soda manufacture or soda gypsum is used, with lime and gypsum in suitable proportions (or chemically treated with sulphates to increase the hardness). The result is a substance which is stated to be particularly useful for building purposes.

9,045, Window-sash Fastener. G. F. Belling.

This invention consists of a small plate screwed to the outer sash. To this plate is attached by an upright pin a cross piece, which is of a shape that when the sashes are closed, and the piece brought into position, it draws the sashes together, and locks into the staples, giving an additional security. It is not opened by anything passed over or forced up between the sashes.

9,479, Hasp Locks. J. Bates.

According to this invention, two additional or supplementary bolts are controlled by springs, and lock into the staples, giving an additional security. These two bolts are placed so wide apart that an eye or loop may be used with the lock for fastening it by a padlock, should the bolt be inoperative.

19,548, Door Knobs. R. H. Rastrick.

The attachment between the handle and the shaft or bar is obtained, according to this invention, by means of a spiral spring tightly wound round the spindle, and acting as a grip or screw. The knobs can only be removed when one end of the spiral is raised from its seat, and the fastening may be adapted to a variety of uses.

NEW APPLICATIONS FOR PATENTS.

May 5.—6,904, G. Martin, Glazing Sash-lights and Sky-lights.—6,914, T. Fawcett, Machinery for Making and Pressing Bricks.—6,918, G. Deacon, Strips or Bars for Glazing.—6,922, E. Whitehead, Sash-fasteners or Holders.—6,950, M. Rodger, Ventilators.

May 6.—6,952, C. Kellner, Coating Iron, Steel, or other Metals with Portland Cement, &c.—6,953, J. Sankey, Butt Hinges.—6,999, W. Lancaster, Level.—7,023, A. Rosewater, Automatic Flushing-tanks.—7,025, J. Jones, Safety Appliances for Windows.

May 7.—7,074, A. Wilson, Bolts for Doors.—7,079, J. Mason, Door Springs and Checks.—7,099, B. McTeer, Kilns for Burning Bricks, &c.—7,106, J. Bayley, Folding Doors.—7,107, J. Bayley, Paving-blocks.

May 8.—7,153, W. Stock, Syphon-cisterns.—7,160, W. Peace, Chimney Cow.—7,174, E. Pearson, T-squares, &c.—7,184, C. Edwards, Drain-pipes, Cas-rotors, &c.

May 9.—7,215, D. Alport, Foundation for Light Buildings, &c.—7,225, T. Baker, Electric Bell Pushes.

May 10.—7,294, W. Thompson, Mortising and Boring Machines.—7,306, J. Boulstead, Paint-brushes, &c.—7,312, E. Baudry-Diot, Bridges.—7,318, J. Bailey, Drainage and Sewage.

PROVISIONAL SPECIFICATIONS ACCEPTED.

3,075, G. Light, Intercepting Traps for Drains.—4,458, G. Le Maistre, Sliding Sash Window.—4,608, C. Longley, Wood-block Flooring.—4,712, H. Doulton, Construction of Sewers.—4,738, S. Haslam, Window Sash and Frame.—4,749, W. White, Sliding Sashes of Windows.—5,121, J. Ring and J. Kelly, Flushing Apparatus for Water-

closets.—5,161, J. Gillespie, Water-closets.—5,363, L. Chambaz and L. Schmid fils, Wash Fasteners.—5,459, W. Mears and others, Water-Fastener Preventers.—5,572, W. Millington, Boiler for Fireplaces or Stoves.—5,899, T. Robinson, Wood Planing and Moulding Machines.—6,083, E. Brook, Kilns.—6,413, W. Junge, Saws.—6,461, W. Jones, Chimney Sweep.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months. 10,297, J. Dealey, Syphon Flushing Cisterns.—10,463, W. Donlin, Door Fastener or Curbboard Turn.—19,524, S. Empsal and W. Fish, Syphon Water Flusher.—3,776, W. Ingram, Sash Fastener.—4,323, C. Hanneberg, Machines for Making and Laying Drains.

RECENT SALES OF PROPERTY:

Table listing recent sales of property with columns for location, agent, and price. Includes entries like 'May 8.—By CHASBY & SONS (at Brighton).', 'Southwick—F. Stage and oyster beds', 'Four plots of land, near the Station and garden', etc.

Table listing property for sale with columns for location, agent, and price. Includes entries like '14, Rochester-ter., ut. 54 yrs., g.r. 26, r. 252, 10s.', '34, St. Augustine's-rd., ut. 60 yrs., g.r. 26, r. 245', 'Marylebone—W. Green, c. r. 235', etc.

Table listing property for sale with columns for location, agent, and price. Includes entries like 'Chelsea—25 and 26, Tadema-rd., ut. 91 yrs., g.r. 214, r. 276 p.a.', 'By Messrs. VENTON, BULL, & COOPER.', 'Chiswick, High-rd.—"Merton Lodge," l. r. 2130', etc.

MEETINGS.

Table listing various meetings with columns for date, time, and location. Includes entries like 'SATURDAY, MAY 24.', 'Architectural Association.—Visit to the Field and Queen new printing offices, Bream's-buildings, Chancery-lane, 3 p.m.', 'Royal Institution.—Dr. Charles Waldstein on "Recent Excavations in Greece."', etc.

A New Convalescent Home at St. Leonards-on-Sea, in connection with the Chelsea Hospital for Women, Fulham-road, is now in course of erection. The site is at the western end of the Marina, St. Leonards, on the cliff, about 100 ft. above sea-level. It has a direct southern aspect, and very extensive sea and land views. The Home is approached from the road on the sea front by a main road leading from West St. Leonards to Hastings. It is within three minutes' walk of the West Marina (Brighton and South Coast Railway) and the West St. Leonards (South-Eastern Railway) Stations. The building will be faced with red bricks, with Bath stone dressings and red tile hanging, and the roof will be covered with brindled tiles. The internal joiner's work of the main building will be executed in pitch pine and varnished. The main building, which will be two stories high, will contain the following accommodation:—Ground floor: day-room, reading room, dining room, waiting room, matron's room and office, lavatories and water-closets, kitchen, scullery, ladders, stores, &c., and servants' hall. First floor: patients' bedroom, Matron's and nurses' bedrooms, and bath rooms, water-closets, &c. There will also be an attic floor for servants' bedrooms, box-rooms, &c. A corridor, 8 ft. wide, will run through the main building on ground and first floors from east to west, so that a current of fresh air can always be obtained through the building. A verandah, where the patients can sit and enjoy the sea breeze under shelter in wet weather or hot sunny days, will extend along the whole of the south front, and the day-room will have a door opening on to the same. The whole of the drains will be laid outside the building. The wastes from sinks, lavatories, baths, &c., will be entirely disconnected, and the soil pipes will have ventilation shafts with fresh-air inlets. Mr. Frank H. Humphreys, of Hastings, is the architect. The contract, which was submitted to tender, was secured by Messrs. Eldridge & Critchden, of St. Leonards-on-Sea. We are asked to point out that as the erection of this convalescent home will add very considerably to the financial responsibilities of the Board of Management, they earnestly beg for special annual subscriptions to help to maintain the Home in a state of efficiency, and for donations to the Furnishing Fund. Any donations or subscriptions will be thankfully received by Mr. Henry E. Wright, the Hon. Treasurer.

Miscellaneous.

Properties for Sale.—(1) "The Chimes," standing in nearly two acres of ground, in West End-lane, West Hampstead. This conspicuous house was designed by the late Edward Pugin, architect, for the late E. R. Herbert, R.A., who named it after one of Dickens's Christmas story-books. So rapidly has this once rural by-way changed its character that the only vacant land on either side is the ground attached to this residence. (2) By auction in Edinburgh, at an upset price of 15,000*l.*, the Underwood and Raglewhat estates, of about 450 acres, in Dry-fusdale parish, Dumfriesshire. Dryfusdale lies in the Annandale district, watered by the Annan and Dryfe. It has remains of Roman and Celtic camps; at the former of which Agricola encountered the forces of Corbred II. (Galdus) in A.D. 79. In Lockerbie is the ancient fastness of the Johnstones of that ilk, whose great contest with the Maxwells, on December 7, 1593, is commemorated by the "Maxwell's Thorns," with a tumulus at their base, about half-a-mile distant from the old churchyard. (3) Horton Manor house, Epsom, virtually rebuilt after the late Sir G. G. Scott's designs, together with 1,060 acres, including a home-park and farm, four other farms, several homesteads, &c.; and also, in lots, the Nork Park estate, lying near to the Banstead and Epsom Downs, and stretching over some 2,430 acres.

The English Iron Trade.—The depression in the English iron market has not passed away during the past week; on the contrary, it has become rather deeper. Pig-iron is without animation. In the North of England pig metal has been flat, Middlesbrough No. 3 having receded 1*s.* 6*d.* per ton. Scotch makers' iron is also quieter, and lower in price, quotations having dropped from 9*d.* to 3*s.* 6*d.* per ton, makers being rather anxious to book contracts with the shipping demand falling off. The warrant market is lifeless; Glasgow warrants are fairly steady, but Middlesbrough warrants have experienced a fall of 1*s.* 10*d.* per ton. There is but a poor demand for hematite iron both on the west and east coasts. Although makers in the north-west are quoting 57*s.* 6*d.* to 60*s.* for mixed numbers of Bessemer, a few sales have been made at 5*s.*, the price of hematite warrants. The finished iron market is weak and dull, and this is almost equally true of steel; but steel rails are somewhat better enquired for in the north-west, and keep steady. Tinplates are improving. The reports regarding shipbuilding are discouraging, speaking generally. Engineers, especially those making marine machinery, are still fairly well employed, but there is slackness here and there.—*Iron.*

Berlin.—The details of a prospectus of a newly founded "Crystal Palace Company" are circulating in the local press. The Company intends putting up a collection of buildings devoted entirely to public entertainment. The site will include a theatre with 1,700 seats, a large concert-hall for an audience of 1,500, four large assembly-rooms, with stages attached; a public dancing saloon, an aquarium, a diorama, and an extensive bazaar; besides restaurants of various nationalities. The whole group is to be connected by means of a system of arcades, which, whilst open in summer, will be kept closed during the winter season. The total estimate for the buildings shows the figure 200,000*l.*, whilst the annual expenditure is estimated at about 35,000*l.* If the project be really carried out under good practical management, it seems likely to be a success.

The Fine Art Exhibition at Cordwainers' Hall.—The Cordwainers' Company have resolved to keep open the Fine Art Exhibition, at the Hall of the Company, No. 7, Cannon-street, E.C., for another month, from the 17th instant, charging one shilling for admission, and devoting the proceeds to the fund now being raised for the relief of the survivors of the Balaklava Charge. We made brief mention of the Exhibition in the *Builder* for April 26, p. 310. The Exhibition is well worth seeing as an exhibition, apart from the laudable object to which the proceeds of the extra month's opening are to be devoted.

New School Buildings at Zurich.—A large school building, containing twenty-two classrooms, three large halls, and having two gymnasiums attached, is to be erected here at a cost of 680,000 francs, and a competition for the building has been opened to Swiss architects.

St. James's (R.C.) Church, Liverpool.—On the 4th inst. the R.C. Bishop of Liverpool opened a new high altar and reredos at St. James Church, Marsh-lane, Liverpool, the interior of which was illustrated in the *Builder* for March 27, 1886. The new altar and reredos, with screens and alabaster rails, have been presented by Mrs. E. Lynch, in memory of her brother, the late Mr. Christopher J. Corbally; and have been nearly two years in hand. The reredos is a departure from the regulation type of the modern R.C. reredos, and is carried round the chancel to a height of 25 ft., the upper portion of the side walls above the arching being lined with slabs of rouge fleur marble, and there are medallions with paintings of the Evangelists, by Westlake, on gold grounds. A central composition on the east wall has two tiers of niches, and rises to the east window-sill level. The window will later on be filled with stained glass, and complete the whole composition at a height of 50 ft. The niches have a series of twelve figures in polished white alabaster. Our Lord in Majesty, St. Joseph, the Blessed Virgin, SS. Peter and Paul, and others. The altar, throne, and tabernacle are of white polished alabaster and Irish and Derbyshire fossil marbles; and there is a relief in the frontal of the Last Supper, and at either corner figures of adoring angels. The wall arcade is worked in polished light alabaster, with Kerry red shafts and Comenara green veined panels. These marbles have all been arranged on the old North Italian model as to tone and figure, and are stated to harmonise well with the stone of the pillars, arches, vaulting ribs, and stonework of the church. Messrs. J. & H. Patteson, of Manchester, have executed the marble and alabaster work, including the carving; Mr. Boulton, of Cheltenham, executed the figures; and Messrs. Hardman, Powell, & Co., the tabernacle door, of chased, enamelled, and engraved metal, richly gilded, and enriched with rock crystals. Mr. C. Hadfield, F.R.I.B.A., of Sheffield, was the architect.

Rainfall of the Globe.—The usual monthly meeting of the Royal Meteorological Society was held on Wednesday evening, the 21st inst., at the Institution of Civil Engineers, 25, Great George-street, Westminster, Mr. Baldwin Latham, F.G.S., President, in the chair. Mr. W. B. Tripp, M.Inst.C.E., read a paper on "The Rainfall of the Globe." It was a comparative chronological account of some of the principal rainfall records. The earliest record was that of Paris, which commenced in 1689. The English records began in 1726. The rainfall observations in the southern hemisphere did not extend over a very long period; at Adelaide they were commenced in 1839, but they do not go back further than 1866 for New Zealand. The greatest fall in any particular year at the stations given by the author was 160.9 in. at St. Bernard in 1839, and the least, 3 in., at Sandiego, in California, in 1863. By combining the stations in the northern and southern hemispheres, the author found that in recent times the years with the highest average rainfall were 1878, 1879, and 1883, and the years with the lowest average were 1854 and 1861.

The Sanitary Institute.—At a meeting of the Council of this Institute, held on May 14, a scheme was adopted for establishing periodical examinations for inspectors of nuisances at various centres throughout England. Mr. Arthur Bates, F.R.I.B.A., Mr. Alfred E. Harris, L.R.C.P., and Mr. S. W. North were elected Fellows; four members and twenty-four Associates were also elected. Twenty-three applications were read for election at the next meeting.

The Church of St. Paul, Preston, has been enriched by the addition of a painted window in memory of John and Sarah Dewhurst. The window, which is the gift of their children, has subjects of "Joseph honouring his father" and "Solomon honouring his mother." Illustrated with rich ornamental surroundings in character with the church. Messrs. Charles Evans & Co., of London, have executed the window.

Appointments.—Mr. W. Grant, of the Borough Engineer's office, Plymouth, has received an appointment as assistant in the Borough Engineer's office, Croydon; and Mr. G. Reginald Davey, late of the same office, has been appointed assistant to the County Surveyor of West Sussex. They were both pupils of Mr. Geo. D. Bellamy, M.Inst.C.E., Borough and Water Engineer, Plymouth.

New Library at Streatham.—The new library which, together with the site, is to be presented to the parish of Streatham by Mr. Henry Tate, has been commenced. The style of the building is Greek, and the whole of the facing is to be Portland stone, the most prominent feature being a large cupola (covered with copper and supported on an arcade) over the main entrance. The floors of all public rooms are to be of wood blocks, and the walls plastered and decorated and the coffered ceilings in fibrous plaster. The contractors for the building and fittings are Messrs. Higgs & Hill, and the cost (exclusive of site) about 6,000*l.* Mr. Sidney R. J. Smith is the architect.

Dissolution of Partnership.—We are informed by Messrs. Henry Saxon Snell and Alfred Saxon Snell that their partnership has been dissolved by mutual consent, and that each of them will henceforth practise on his sole account. The dissolution of partnership will not affect their work or commissions now in progress. We understand that it is the intention of Mr. Henry Saxon Snell to restrict his practice generally to that of consulting architect, so far as consistent with his official appointments.

Freiberg.—A new chimney, having a height of some 450 ft. to an interior diameter of about 15 ft., is being built on the grounds of the Halsbruecke Smelting Works in this town, and as this erection is being placed on a piece of ground the summit of which is 260 ft. higher than the surroundings, the mouth of the chimney will be fully 710 ft. above the floor level of the workshops. The chimney will show a square base of 40 ft. side.

PRICES CURRENT OF MATERIALS.

TIMBER.		£.	s.	d.	£.	s.	d.
Greenheart, E.G.	..... ton	6	10	0	7	10	0
Teak, E.I.	..... load	11	0	0	14	0	0
Senegal, U.S.	..... foot cube	0	2	0	0	0	0
Ash, Canada	..... load	3	0	0	4	10	0
Birch	.....	3	0	5	0	0	0
Elm	.....	3	10	0	4	15	0
Fir, Danstic, &c.	.....	1	15	0	3	10	0
Oak	.....	2	10	0	4	10	0
Canada	.....	5	10	0	6	10	0
Pine, Canada red	.....	2	10	0	3	10	0
" "	yellow	2	10	0	5	5	0
Lath, Danstic, &c.	.....	5	0	0	5	0	0
St. Petersburg	.....	5	0	0	7	0	0
Wainsoot, Riga, &c.	..... log	0	0	0	0	0	0
Deal, Finland, 2nd and 1st. std.	..... 100	7	10	0	10	0	0
" "	4th and 3rd	7	0	0	7	10	0
Riga	.....	6	0	0	8	10	0
St. Petersburg, 1st yellow	.....	9	10	0	14	0	0
" "	2nd	7	10	0	9	0	0
" "	white	6	10	0	10	0	0
Swedish	.....	7	0	0	15	0	0
White Spruce	.....	8	0	0	17	0	0
Canada, Pine 1st.	.....	15	0	0	28	0	0
" "	2nd	10	0	0	16	10	0
" "	3rd, &c.	7	0	0	10	0	0
" "	Spruce, 1st	8	15	0	11	0	0
" "	2nd and 3rd	6	10	0	8	10	0
New Brunswick, &c.	.....	6	0	0	8	0	0
Battens, all kinds	.....	5	0	0	16	0	0
Flooring, Baltic, sq. 1 in. prepared, first	.....	0	10	0	0	14	0
Second	.....	0	8	0	0	10	0
Other qualities	.....	0	8	0	7	9	0
Cedar, Cuba	..... foot	8	0	0	4	0	44
Honduras	.....	0	0	0	4	0	44
Mahogany, Cuba	.....	0	0	44	0	0	44
St. Domingo, cargo average	.....	0	0	5	0	0	44
Mexican	..... lb.	0	0	44	0	0	44
Tobacco	.....	0	0	44	0	0	44
Honduras	.....	0	0	64	0	0	44
Box, Turkey	..... ton	4	0	0	13	0	0
Rose, Rio	.....	14	0	0	20	0	0
Bahia	.....	13	0	0	13	0	0
Satin, St. Domingo	..... foot	0	0	6	0	1	3
Porto Rico	.....	0	0	9	0	1	3
Walnut, Italian	.....	0	0	4	0	9	0
METALS.							
IRON—Bar, Welsh, in London	..... ton	6	17	6	8	0	0
" "	at works in Wales	6	10	0	7	0	0
" "	Staffordshire, in London	8	0	0	8	10	0
Cast—British, cast and ingot	.....	58	0	0	57	0	0
Best selected	.....	59	0	0	59	10	0
Sheets, strong	.....	66	0	0	60	0	0
Chill, bars	.....	62	15	0	0	0	0
YELLOW METAL.	..... lb.	0	0	54	0	0	0
LEAD—Pig, Spanish	..... ton	13	0	0	0	0	0
English, com. brands	.....	13	2	6	13	5	0
Sheet, English, 3 lbs. per square foot and upwards	.....	15	0	0	0	0	0
Pipe	.....	15	0	0	0	0	0
TIN—	.....	95	0	0	0	0	0
Straits	.....	95	0	0	0	0	0
Australian	.....	95	0	0	0	0	0
English Ingots	.....	98	0	0	0	0	0
OILS.							
Linedseed	..... ton	23	15	0	23	17	6
Cocconut, Cochin	.....	29	10	0	0	0	0
Cocconut, Ceylon	.....	25	5	0	25	10	6
Palm, Lagos	.....	25	10	0	25	15	4
Kapaseed, English pale	.....	32	10	0	0	0	0
" "	brown	30	15	0	0	0	0
Cottonseed, refined	.....	22	10	0	0	0	0
Tallow and Oleine	.....	21	0	0	0	0	0
Lubricating, U.S.	.....	5	10	0	6	0	0
" "	refined	7	0	0	12	0	0
TAR—Stockholm	..... barrel	1	6	0	0	0	0
Archangel	.....	0	15	9	0	0	0

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 Re-construction of Portion of Public Hall, Public Library, and New Buildings.

CONTRACTS.

Table with 5 columns: Nature of Work or Material, By whom Required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page. Lists various construction contracts such as Wood Paving Works, Flood Works, and New Offices.

PUBLIC APPOINTMENTS.

Table with 5 columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Lists appointments for Inspector of Works, Building Inspector, and Borough Surveyor.

TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]
AUDENSHAW.—For pulling down and rebuilding the "Sun" Inn, Hooley-hill. Mr. J. H. Burton, architect, Warrington-street, Ashton-under-Lyne.—
Z. Pike, Hooley-hill £1,958 0 0
W. H. & H. C. Brown, Stockport 1,684 0 0
Jos. Davison, Manchester 1,659 0 0
Jabez Gibson, Dukinfield 1,640 0 0
J. W. Williamson, Ashton-under-Lyne 1,639 0 0
R. Whitell, Manchester 1,638 0 0
Ed. Kirkby, Ashton-under-Lyne 1,625 0 0
Allen Holmes, Ashton-under-Lyne 1,584 0 0
Owen Williams, Manchester 1,579 0 0
Garside, Barnes, & Co., Stalybridge, 1,569 0 0
H. Gardner & Co., Ashton-under-Lyne 1,557 10 0
Underwood & Bro., Dukinfield, 1,526 0 0
John Robinson, Ashton-under-Lyne 1,484 0 0
Thos. Storer, Denton (accepted) .. 1,350 0 0

FOREST GATE.—For additions and alterations to steam laundry at Forest Gate, for Mr. B. L. James. Mr. W. Stiche, architect.—
Gregar £1,731 0 0
Sharp 1,390 0 0
Hooking 1,330 0 0
Yates 1,190 0 0
Neal 1,172 0 0
North 1,163 0 0
Watson, Hford (accepted) 1,044 0 0
For Boiler-Setting and Shaft.
Noble £263 0 0
Howlett 249 0 0
Tyan 198 0 0
Watson, Hford (accepted) 190 0 0
Neal 173 0 0
Yates 172 0 0

HARROW.—For the erection of a factory at Harrow. Mr. Charles Bell, architect. Quantities by Mr. Henry Lovegrove.—
Kilby & Gayford £9,930 0 0
Nightingale 9,883 0 0
Anley 9,786 0 0
Chas. Wall 9,775 0 0
Smith & Son (accepted) 9,197 0 0
Allen & Sons (accepted) 7,563 0 0

LINCOLN.—For new church for the united Parishes of St. Nicholas and St. John, Lincoln, for the Reverend Canon Biemkin.—Mr. E. P. Loftus Brock, F.S.A., architect.—
Chas. Baines, Newark £2,270 0 0
S. & S. Pattinson, Ruskington ... 2,690 0 0
H. S. & W. Close, Lincoln 1,975 0 0
W. Wade, St. Neots 1,968 0 0
Wm. Wright & Sons, Lincoln 1,841 0 0

LONDON.—For the erection of Westfield College, Hampstead. Mr. Falconer MacDonald, architect, 139, Oxford-street, W. Quantities by Messrs. Stoner & Sons.—
Works to be delivered.
Holiday & Greenwood £10,370 £10,856
Bull & Sons 476 10,711
Colls & Sons 10,089 443 10,543
Peto Bros. 9,840 485 10,325
Stimpson & Sons 9,859 459 10,318
Holloway Bros. 9,882 395 10,377
Higgs & Hill 9,484 370 9,854

LONDON.—For erecting New Central Electric Lighting Station at Notting Hill. Mr. John Slater, architect. Quantities by Mr. A. Boxall.—
Firbank £12,500 0 0
Eckersley & Co. 12,000 0 0
Colls & Sons 10,857 0 0
Macey & Sons 10,336 0 0
Holland & Hannen 10,267 0 0
Holloway Bros. 10,085 0 0
Kilby & Gayford 9,427 0 0

LONDON.—For the enlargement of the Montem-street School, Tollington Park, by 400 places, and also the provision of a Cookery Centre on the site, for the School Board for London. Mr. T. J. Bailey, architect.—
Trickwork is built in cement.
Kilby & Gayford £4,627 £4,620
E. Lawrence & Sons 4,470 4,515
G. S. S. Williams & Son 4,577 4,572
B. E. Nightingale 4,245 4,329
Dove Bros. 4,162 4,282
W. Goodman 3,613 3,708

LONDON.—For enlargement of schools, parish room, &c., in connection with St. Stephen's Church, South Lambeth. Mr. E. Turner Powell, architect.—
Maxwell £1,398 0 0
Pliniker 1,333 0 0
Lathey 1,270 0 0
Laphorte & Co. 1,240 0 0

LONDON.—For the erection of stable buildings at Warwick-place, Upper White Cross-street. Messrs. Hudson & Booth, architects. Quantities by Mr. Henry Lovegrove.—
Morter £2,166 0 0
Greenwood & Son 2,139 0 0
E. & H. F. Higgs 2,135 0 0
Dabbs 2,119 0 0
Nightingale 2,089 0 0
Hall, Beddall, & Co. 1,994 0 0
Spencer & Co. 1,970 0 0

LONDON.—For completion of tower and spire to St. Paul's Church, Upper Norwood. Messrs. Elington & Son, architects, 96, Cannon-street, E.C.—
Bryan £1,040 0 0
Downs 925 0 0
Jerrard 889 0 0
Smith & Son 873 0 0
Jas. Greenwood & Son 852 0 0

LONDON.—For the completion of the Printers' Almshouses, Wood Green. Mr. Charles Bell, architect. Quantities by Mr. Henry Lovegrove.—
T. W. Woodbridge £2,437 0 0
G. Wagstaff & Son 2,168 0 0
W. D. Palmer 2,109 0 0
G. E. Todd 2,095 0 0
John Mills (accepted) 2,090 0 0
Rudd & Co. (Graftonham) 2,087 0 0

LONDON.—For adapting Nos. 139, 140, Tottenham Court-road, to the requirements of Messrs. Chas. Baker & Co. Messrs. N. S. Joseph & Smithson, architects, 45, Finsbury-pavement, E.C.—
Srivener & Co. £2,730 0 0
Patman & Fotheringham 2,681 0 0
Drew & Cadman 2,489 0 0
Internal Fittings.
Drew & Cadman 473 16 0
G. Colls & Co. 412 0 0

LONDON.—For alterations at 9, Bishop's-road, Paddington, for the Phoenix Brewery Co. Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within, E.C.—
Tyerman £517 0 0
Smith 510 0 0
Ivory 485 0 0
Courtney & Fairbairn (accepted) ... 460 0 0
Counter, Cabinet, and Fettering.
T. H. Matthews (accepted) £117 10 0
Gas-fittings.
Myers (accepted) 44 16 0

LONDON.—For alterations at the "Red Lion" Blackman-street, Borough, S.E., for Messrs. Poole & Venner. Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within, E.C.—
Allen & Sons £1,320 0 0
Fould 1,075 0 0
Hough 1,015 0 0
Spencer 970 0 0
Mowes & Son 946 0 0
Voller (accepted) 890 0 0

LONDON.—For alterations and repairs to the "Princess Royal" public-house, Sydney street, Mile End, E., for Mr. F. Garner. Mr. Joseph G. Needham, architect, 11, Powerscroft-road, Clapton, N.E.—
Johnson Bros. £315 0 0
Mower & Son 239 0 0
A. & A. Wilson 223 0 0
Staines & Son 222 0 0
A. Hood (accepted) 205 0 0
Gas-fittings.
Ungar & Co. £44 16 0

LONDON.—For alterations and repairs to warehouse, Farringdon-road. Mr. H. Lovegrove, surveyor.—
W. D. Palmer £563 0 0
Sage & Co. 549 0 0
W. V. Gow 530 0 0
Drew & Cadman 499 0 0
G. Colls 490 0 0

LONDON.—For block of model dwellings, Abbey-street, Bermondsey. Mr. Charles Bell, architect:— M. Scott.....£7,838 0 0

LONDON.—For alterations, No. 3, Bow-lane, E.C. Mr. Charles Fowler, architect. Quantities by Mr. Henry Lovegrove:—

Table with 2 columns: Name and Amount. Includes Clarke & Bracey (£1,028 0 0), Heaps (987 0 0), Tarter & Son (842 0 0), Simpson & Son (851 0 0), Lidstone & Son (829 0 0).

LONDON.—For making-up and paving Mendoora-road, for the Vestry of Fulham. Mr. W. Sykes, New Streets Surveyor:—

Table with 2 columns: Name and Amount. Includes Nowell & Robson, Kensington (£1,005 0 0), Neave, Paddington (375 0 0), Rogers, Notting-hill (933 0 0), Tomes & Wimpey, Hammer-smith (920 0 0), Nash, Fulham (851 0 0), Greenham, Hammersmith (833 0 0).

LONDON.—For the formation and metalling of roads, Barkton-gardens, South Kensington, for Mr. John B. Roberts. Mr. Wm. Weaver, Surveyor:—

Table with 3 columns: Name, Flints, Granite. Includes Neave & Son (£410), Rogers & Co. (400), J. Howles (390), Nowell & Robson (384), Joseph Mears (accepted) (380).

LONDON.—For alterations, decorations, and fittings in adapting the old Eastern District Post-office, 228, Commercial-road, E., into a café and club, for the Tea Growers' Association. Mr. A. H. Thompson, architect:—

Table with 2 columns: Name and Amount. Includes E. Triggs (accepted) (£1,111 5 0). [No competition.]

LONDON.—For shoring, laking down, and re-building party-wall between 15 and 16, Long-acre, W.C. Messrs. Evans & Deacon, surveyors:—

Table with 2 columns: Name and Amount. Includes E. Triggs (accepted) (£454 0 0).

LONDON.—For alterations, decorations, and fittings in adapting premises at 27 and 28, Whitechapel-road, E., for a café and club for the Tea Traders' Association. Mr. A. H. Thompson, architect:—

Table with 2 columns: Name and Amount. Includes E. Triggs (accepted) (£1,480 4 11). [No competition.]

LONDON.—For alterations and decorations at 62, Oxford-street, W., for the Medical Battery Co. Messrs. Benison & Bargman, architects:—

Table with 2 columns: Name and Amount. Includes E. Triggs (accepted) (£595 0 0). [No competition.]

LYMINGTON.—For rebuilding the "Dorset Arms," architect, Southampton:—

Table with 2 columns: Name and Amount. Includes T. J. Jukes, Southampton (£900 0 0), A. Wheeler, Lymington (893 15 0), H. Stevens & Co., Southampton* (826 0 0). * Accepted.

SOUTHAMPTON.—For alterations and additions to the Wills and Dorset Banking Company's premises. Mr. W. H. Mitchell, architect, Southampton:—

Table with 2 columns: Name and Amount. Includes Webb & Co., Salisbury (£4,098 0 0), T. H. Kingerlee, Oxford (4,947 0 0), J. Hall, Sons & Co., Limited, Southampton (4,384 0 0), H. Stevens & Co., Southampton (4,357 0 0), W. Franklin, Southampton (4,217 0 0), W. R. Light & Co., Portsmouth (4,169 0 0), J. Crook & Son, Southampton (4,100 0 0), Morgan, Isted, & Morgan, Southampton (3,946 0 0), D. W. Lewis, Southsea (accepted) (3,852 0 0).

TOTTENHAM.—For building three houses in Pembroke-road, Page Green, Tottenham. Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within, E.C. Hayworth:—

Table with 2 columns: Name and Amount. Includes Goodall (accepted) (960 0 0).

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The Builder.

Vol. LVIII. No. 2463.

SATURDAY, MAY 31, 1890.

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Some Sculpture of the Year.



THE remark made by a sculptor at the Art Congress at Edinburgh last year, that sculpture was only the highest development of mason's work, served at all events to suggest a new view of the relations between sculpture and architecture, as arts which are both concerned in modelling or building up conceptions in the round, in stone or some analogous material. In proportion as the masonic element is the more prominent in sculpture, in that proportion it approaches to closer contact with architecture, and is decorative; in proportion as it departs from these masonic or architectonic conditions it approaches to the conditions of pictorial art. A good deal of modern sculpture is pictorial in style rather than architectonic, and though this pictorial use of sculpture has its own charm, there can be little doubt that the tendency in this direction, so far as it has gone, marks a decline from the highest ideal of sculpture, which, even where it is not treated as a decorative adjunct to architecture, should be so far architectonic in character as to be simple in its lines and well balanced and firm in its structure. These conditions being satisfactory, we have then to consider the value of the intellectual idea expressed in the work, which must also be simple and concentrated. A complex idea can hardly be well represented in sculpture. What we look for is the portrayal of a moment of action and expression which seems to express and include the main characteristics of the personage, historic or ideal, who is portrayed, or the central thought which is in the sculptor's mind; and this should be expressed through the medium of a figure also simple and typical in its attitude and in its lines, well balanced constructively, having something of that character of standing firm on its base which belongs to architecture, something of that well-knit structure and that severity of line which are essential to architectonic conditions. An ill-balanced figure in sculpture is as much *hors ligne* as the leaning tower of Pisa in architecture.

The central work of the year, among Royal Academy sculpture, the monumental statue of Gordon (1,958) by Mr. Onslow Ford, appears to answer well to these requirements.

We fear that the idea of representing Gordon seated on a camel looks as if it arose a little more from the sculptor's desire to model a camel than from any innate conviction that this was the most suitable way of portraying our lost hero—every artist is on the *qui vice* nowadays for a new effect; but the group stands well, the figure is very well seated on the saddle, and the attitude is simple and devoid of any striving after effect. Mr. Ford has the honours of this year in sculpture, for his “Music” in the Lecture Room (2,118), although not placed in one of the central positions in the room, is certainly one of the best works, if not the best, of the year. This is a figure of a woman singing to a lyre which she has just struck with her right hand. The hand has been drawn back again with a dramatic flourish which Mdme. Schumann would have highly disapproved of; but the figure is finely modelled and most satisfactory in pose and balance. The lower portion is half concealed by a piece of drapery which hangs in a negligent manner from the girdle, this serves to give greater breadth to the figure. The odd fancy of placing an owl on the head of the figure seems to have arisen from a wish to get the effect of showing the face shadowed between the bird's drooped wings; this is very effective, and gives a special expression to the work, but one does not see its relation to the subject. The same artist's “Peace,” of which the completed bronze is exhibited this year, was hardly so great a success as to justify a second exhibition; it is a pretty and well-modelled figure but a poor conception.†

The central places on the two long walls of the lecture-room are occupied respectively by the two works of which illustrations are given in this number: Mr. Lawes's “Design for a Relief” (2,004) and Mr. Armstead's “Guardian Angel” (2,063). The former, which is a large work (figures nearly life-size) appears to be an allegory of the spread-eagle description, the figures representing “America, Liberty, Peace, Commerce, Indians, the Extinction of Slavery, and Abundance”; the catalogue omits “America.” From the list, which has been furnished to us by the artist. The whole is surrounded by an architectural framework, of which the

* Mdme Schumann, as related in a recently published book of musical gossip, strongly rebuked a young pianist for throwing her hands up at the end of a difficult passage, as a kind of flourish out of keeping with true artistic feeling.

† An illustration from the plaster model was given in the *Builder* for May 7, 1887.

lower portion, which is a kind of immense bracket for carrying the projected mass of sculpture, is not shown in the illustration. This is an exceedingly clever work with a great deal of spirit and energy, but it is decidedly not architectonic sculpture, in spite of its semi-architectural frame; in fact, it is a most pronounced example of pictorial sculpture, and looks like a picture of Lebrun or some other painter of “la Siècle” which has sprouted into relief. Instead of being architecturally combined with the background, the object of the sculptor seems to have been to detach it completely, and to leave the whole mass of struggling figures as a kind of excrescence protruding from the wall plane. This is certainly not the way to treat decorative sculpture. Mr. Armstead's more sober and reticent work is a part only, as appears from the catalogue, of “a memorial to an only daughter”; it would have been of interest to see a sketch of some kind of the whole memorial, so as to see the relation between the sculpture and the architectural design; the group, as it is and taken on its own account solely, is a graceful composition imbued with a touching sentiment; the manner in which the angel's wings form a kind of framework of shadow round the whole is very effective and adds to the sense of repose in the group. In his group of small-scale figures for the reredos of St. Mary's Church Aberavon (a general drawing of which is to be seen in the architectural room), Mr. Armstead seems to have been rather under the influence of ecclesiastical ideas and has adopted a certain rather mannered type of figure for Christ and the evangelists, such as may be said to be more orthodox than original, except in the case of the figure of St. John, which appears to us the most successful of the group, and of which we give an illustration.

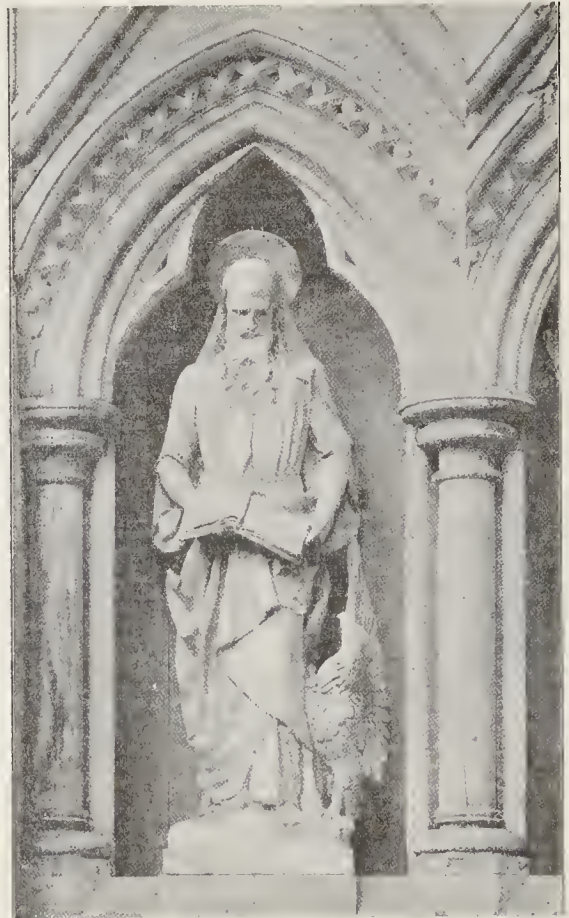
The fancy for treating statues with the head in shadow is illustrated again in Mr. Frampton's figure “The Angel of Death,” (2,090), in which the head is also shadowed with wings, in this case attached to the figure itself, and by which the face is so far shadowed that it is somewhat difficult to see the features. The figure is a thin emaciated life-size nude, carrying a scythe over the shoulder and poised on one foot in the attitude of walking, the other foot being extended in the air behind it. This is an attitude which has been frequently used in bronze figures, for which only it could be practically possible without danger; and of course a bronze w r x

comes out of the category of masonic sculpture; but it may be questioned whether this method of planting a figure is not at variance with the true genius of sculpture. There is a poetic feeling in this work, which is very expressive in its way, but both the pose and the method of shadowing the face combine to place it rather in the category of pictorial sculpture—design which would be better suited for treatment in painting.

Mr. Harry Bates's "Design for an Altar, Holy Trinity, Chelsea" (2,861), is eminently suited for its position. It is a long panel in very low relief, a figure of the dead Christ in the tomb, with an angel stooping over the head and another in like attitude at the feet. The angels are treated in a manner entirely suitable to architectural decoration; they are in almost similar attitudes at each end of the panel, the wings drooped behind them are arranged as a decorative filling to the ends of the panel. The figure of the dead Christ, recumbent, seems to us to be open to question in one respect, that it is treated so as to show rather too much of the front of the figure and the further limb, so as to have the effect of lying on a plane inclined towards the spectator. Very low relief like this comes so nearly into the category of pictorial perspective that it is difficult to draw the line between the two; but it appears to us that, for a relief, this figure is treated a little too much like a drawing, with the effect on the eye which we have described, and which is not quite satisfying. Mr. Bates's other work is a kneeling marble figure of Pandora, with a small and beautifully-modelled head, stooping forward over the fatal casket, which is treated in ivory with a delicate frieze of figures on the sides, a very pretty decorative incident.

Mr. Hamo Thornycroft's diploma work "The Mirror" (2,037) is a small and very charming bas-relief of a mother and child, the latter leaning back from her knee to look in a hand mirror. Two other low-relief works near this which may be noticed are Mr. Le Queene's "Spring" (2,062) a pretty sketch in low relief of a head in profile with rather too long a neck, but graceful in design and free in execution, and a profile "portrait" (2,064) in marble by Mr. T. S. Lee, in which the artist has gone to about the furthest possible extreme in making sculpture into painting; the hair and portions of the profile are just lightly touched so as to lose themselves almost imperceptibly in the ground plane of the marble. The surface of the face is polished to the extent of giving it rather a waxy appearance. The effect is unusual and *recherché*, perhaps, but is this truly "sculpture"? It seems rather like playing on the confines of an art in which everything should be clearly defined.

Mr. A. G. Atkinson's "Out in the Fields" (1,956) is one of the attempts which we see now and then in modern sculpture to bring purely realistic subjects of rustic life within the boundaries of the art. Mr. Thornycroft's "Mower" has been the parent, probably, of some of these attempts in English sculpture; but though the hoots and other articles of dress of his figure were perhaps too forcibly realistic, the pose of the figure was statuesque and fine—hence a great part of its success. Mr. Atkinson gives us a "clod" of the fields, spade in hand, and with clownish countenance; the surface of the dress is stained so as to appear discoloured with soil. The thing is well done, but it is not a thing of beauty, nor can we imagine that any one would care to possess a life-size work of this type. This is the kind of thing to paint on a small scale, as has been done by Knaus and other German artists; it is not the sphere for sculpture, which is too ideal an art to be used in this way. The want of intellectual perception of another kind, often painfully evident in English sculpture, is to be seen in such figures as the commonplace "Hypatia" in the Central Hall, and the large figure in the lecture-room of "Sophocles leading the chorus of victory after the battle of Salamis." This latter shows a head of a well-worn conventional classic type, on the figure



St. John: one of a series of five figures for the Reredos of St. Mary's Church, Aberavon. Mr. H. H. Armstead, R.A., Sculptor. No. 2,050, Royal Academy Exhibition.



Design for a Medal for the Worshipful Company of Musicians. Mr. C. B. Birch, A.R.A., Sculptor. No. 1,984, Royal Academy Exhibition.

of a mature man of rather thin and lean torso, with the ribs showing in a very pronounced manner. Now the event supposed to be illustrated occurred when Sophocles was quite a youth, and he was chosen to lead the chorus and dance on account of his delicate and almost feminine beauty, so that the figure by no means represents the incident intended.

Among the numerous portrait busts is a very spirited one of Lord Dufferin by Sir J. Boehm, a fine bust of Mr. Blake Wirgman (1899) by Mr. Thornycroft, one by Miss Alice Thornycroft entitled "My Mother" (2,000), a very dignified head, and a fine study of an old woman's head by Mr. G. A. Lawson (3,008). Among minor things we may mention Miss E. M. Rope's very pretty little bas-reliefs of children, reliefs for a mantelpiece (1,985 1991), Miss Emmeline Halse's design for a decorative frieze (1,977), dancing figures modelled on a small scale in wax on a wood panel ground—this is a very pretty little bit of work; and Mr. Birch's design for a medal for the Company of Musicians (1,984), of which we append an illustration.

There are but two or three works among those we have mentioned in the Academy which could hold a place in the first rank in the Salon, if transported there. Not only is one struck with the far greater proportion of works in the numerous Salon collection, which show real power in modelling, but with the superior intellectual character and force of the best French sculpture of the day. As before observed, it may be questioned whether the French, with the exception of a few leading men, are not rather astray about painting at present: but there is no doubt whatever about their sculpture. Take what is perhaps the finest work of this year, the "Femme au Paon" of M. Falguière, which fronts the visitor opposite the principal entrance. The idea of this is really the same as that of the artist's painting called "Juno" last year, and it is not easy to understand why he should have abandoned this ideal title for a prosaic one, especially as the woman and peacock are standing on "conventional clouds," the only weak point in the work, for which the title of "Juno" would at any rate have afforded an excuse and explanation. Not only is this one of the most splendidly modelled examples of a perfectly fine female figure, but the head is of the noblest type—type which M. Falguière seems to have developed for himself, first in his "Diana" and now in this figure, and which is the very embodiment of womanly dignity and chastity of expression. The pose of the figure is as dignified as the physiognomy; in conception and execution this is an ideal type of sculpture, complete as far as it goes, but expressing one simple idea, and attempting no complication beyond the proper limits of sculpture.

Among the prominent works of this year M. Lemaire's colossal bronze statue of Du Guesclin, Constable of France in the fourteenth century, of which we give an illustration: a figure upon which Englishmen ought to look with respect, as it was he who was mainly instrumental in ejecting the England of that day from her partial footing in France. The sculptor of what may be called a portrait statue is at an immense advantage, no doubt, when he can make use of so picturesque a dress as a suit of Medieval armour; but even making allowance for this advantage, what a remarkable work is this both in sculptural quality and in the half-fierce half-herotic individuality which is given to the figure. We can recall nothing in English military sculpture to stand against it at all since Foley's "Outram," which unfortunately did not remain in England. Du Guesclin forms the centre figure in the southern portion of the sculpture court. Among the more prominent works grouped around is M. Rouleau's "Leda," which has been purchased by the State; this is unquestionably a very powerful work, the figure is finely modelled, the swan's plumage splendidly treated, the outer wing raised, the other forming a kind of background to the figure of the woman, who is not yet enlightened as to the supernatural character of the bird, and checks it with

her hand, with an expression of mild surprise on her face. All this is exceedingly clever, but it is a curious commentary on French ways of thinking, that a paternal Republican government should thus purchase, for the edification of its citizens, a work the real meaning of which could not be explained to any decent woman (or so at least we should think in England). That Leda should have been a favourite subject in the time of the Renaissance is not surprising, but one might think it was time to have done with such a motif in these more decorous days. In a prominent position in this part of the court is M. Fremiet's equestrian statue of Velasquez, a very fine and powerful thing, but the costume, no doubt historically correct, is unfortunate for sculpture. M. Cordier's "Eve" is a finely-modelled figure but not with any special originality of idea, and the representation of the loose hair hanging over the body, conveyed by scoring the torso with incised lines, is a false trick of execution which we do not approve of. There are a number of works around here not of the first order (according to Salon standard), but remarkable for the number of distinct and original fancies which they display; M. Dagonet's "La Nuit"; M. Guglielmo's "Faucheur" sharpening his scythe, a piece of frank and almost brutal realism—there is no attempt at sculptural grace, but also there are no boots, as in Mr. Thornycroft's "Mower"; M. Tony Noël's "Querelle d'Amour," a beautifully-modelled nymph raising an arrow into the air to chastise a little Cupid who clings about her legs; M. Gautherin's "Avant l'Orage," a girl with flowers gathered in her skirt, looking round with an expression of apprehension, her dress blown about by the coming storm, a very expressive work. M. Pech exhibits his idea of Sophocles dancing at the head of the Chorus, not a very great success, but M. Pech at least knows that Sophocles was a youth and not a man at the time, and does not misrepresent him as he is misrepresented at the Royal Academy. There are many other works on which we made notes, but which we must pass over to look up the side of the court where the monumental works of the year are mostly arranged. These are indeed a remarkable group. One of the principal of them, M. Delaplanche's monument to the Archbishop of Bordeaux, we give an illustration of. It is an admirable example of the combination of sculpture in an architectural whole, and also of that intellectual treatment of a monumental subject by the addition of ideal figures grouped around the portrait figure, in which the French so much excel. These two figures, of life-size and in a very grand and broad style, represent apparently Charity and Faith. The bold manner in which the escutcheon is treated as a decorative centre will not escape the architectural reader. Among the finest of the monumental works, after this, may be named first M. Coutan's colossal figure of a woman in large and ample draperies seated between two great scroll or cantilever features which seem like the buttresses to a tomb-stone; this is for the tomb of Madame Louis Herbet, and bears the inscription,—

Où vous qui j'aime et qui m'aimiez
Je vis, je vis en vous.

A fine work is M. Albert Lefeuve's "Pour la Patrie," two allegorical figures, the one robed the other armed, the latter represents "Duty"; the two step onward hand-in-hand, and each looking a little to the right as if at some common object of devotion. M. Chapu exhibits a monument to Flaubert the novelist; a mighty slab, in the upper portion of which is the head of Flaubert as a cameo in a sunk medallion; below is a fine nude nymph, apparently Truth seated on the well-curb; between her and the medallion a laurel grows over the slab in low relief. Near this is the same sculptor's "Danseuse," a figure in a tranquil pose and as if seen through transparent drapery,—a trick a little below M. Chapu; the figure is treated as a relief in a niche, and has a charmingly expressive head, to which

her fan forms a kind of nimbus. M. Levasseur's "Le Premier Né," a group of father mother and child, merits special mention for its fine and carefully-studied composition and the harmony of its lines, illustrating that architectonic quality which we have been claiming as a proper attribute of sculpture.

Among the works at the upper end of the court is M. Charpentier's fine and poetic figure entitled "Chanson," a kind of embodiment, in a splendidly-modelled female figure, of the abandon of Song,—

"Insoucieuse, un peu bohème,"

with head to one side and holding up a flower in one hand. The expression of light-hearted gaiety in this work, quite within the proper limits of sculptural expression, is remarkable; we could not do it in England, for we have not, as a nation, the quality which it represents; it would almost startle people if found in the room at Burlington House, that home of sobriety; there is an attempt at something of the kind in Mr. Montford's "Venus Triumphant," but how harmless and conventional in comparison with the French sculptor's exuberant and yet refined conception. M. Laporte's group "La Conscience," is a very fine work of a more serious type, illustrated by two lines from Victor Hugo's "Légende des Siècles":—

"Vous ne voyez plus rien, dit en tremblant Stella;
Et Cain répondit: 'L'œil est toujours là.'"

Stella (Cain's daughter) kneels looking up anxiously at him, Cain looks away in the same direction; in expression and in composition the whole thing leans as it were towards the direction of the dreaded vision; the composition is fine, the expression of the group very powerful. Among other works in this part of the court are M. Teixeira-Lopes' "Veuve," a most pathetic group of mother and child; M. Engrand's "La Réve," a strange but attractive fancy, showing a nude woman asleep in a beautiful half-seated pose on the back of a chimera monster which represents the dream; and M. Puech's very remarkable work "La Sirène," which is another striking example of the powerful intellectual treatment often found in French sculpture. This is a figure of a fish-tailed siren floating along in a prone position but with her body half raised, and carrying on her shoulder a youth to whom she is turning up her face in a feigned expression of love and tenderness; the boy's face expresses with remarkable power the mingled feeling of interest with apprehension; as a piece of expression this face is a most remarkable study, and the whole work, besides being splendidly executed, is a perfect poem in marble. This, we see, has been purchased by the State, and was well worth the honour. Another dream subject which is curiously expressive is M. Dampf's "La Fin du Réve," where also the chimera figures the dream, this time seen only as a subordinate object flying off; the point of the work lies in the expression of the awakened figure, sitting up with a face full of melancholy and apprehension. Another work purchased by the State, and one of the finest things of the year, is M. Marqueste's "Perseus Slaying the Gorgon." This is a remarkable group both for force of conception and finish of execution. Perseus, his handsome features, under a splendidly-decorated helmet, showing only a calm resolution, stoops over the prostrate figure of the Gorgon, clutching the snakes of her hair at the back of the head to keep her face from him; the woman-fiend, with her mouth open in a scream, struggles to get her face upwards to exercise her power of turning him to stone; but her adversary is relentless in his calm power. With the exception of the scream of the Gorgon, which is perhaps a slightly violent incident for sculpture, there is a Greek calm and reserve about the group, and the figure of Perseus is fine and impressive in shape and action from every point of view.

Another among the State purchases is M. Carlier's "Gilliati Saisi par le Pieuvre," from Victor Hugo's obstreperous romance; the

sculptor has shown a fitting reserve with the expression of terror in the man's face, which is powerfully represented without going beyond the limits imposed by sculpture.

There are many other works well worthy of mention among the Salon sculpture, which for lack of time and space we must pass over. Taking this as the representation of French sculpture for one year, and comparing it with our little show at the Royal Academy, the contrast is extraordinary enough, and the evidence of mental vigour and power of invention as well as of execution among French sculptors at present is extraordinary. Whilst in our opinion (which, as not feeling at liberty to speak with authority on the technique of sculpture, we express with a certain diffidence) the executive power of French sculptors is considerably higher than that of their English peers, the more striking contrast (whereon we speak with no diffidence at all) is in regard to the intellectual quality of the French work. In walking through the collection at the Palais d'Industrie we are confronted by new ideas, new treatments, and new force and meaning given to old subjects; we are gaining new poetic conceptions of the subjects; and this not in isolated instances, but in the case of a large proportion of works. How often do we get new ideas from the sculpture-room at the Royal Academy? The difference, however, is not only in the artists but in the public. In practical England the vast majority of people are absolutely indifferent to so purely abstract an art as ideal sculpture; they do not want it, they do not even know what it means. Until there is some difference in this respect, some desire on the part of the English public for high-class sculpture, we must probably remain in this respect at our ordinary level of respectable commonplace, in regard to the conceptions of sculpture.

BREAKWATER CONSTRUCTION.*

BY F. H. CHEESEWRIGHT, ASSOC.-M. INST. C.E.



As a fallen tree or a floating log may have given to the inhabitants of Tyre (the earliest sea-going people of whom there is any record) the first idea of a ship, so doubtless artificial breakwaters originated from the models supplied by nature herself in the projecting promontories of a rocky coast. The Tyrian sailors, storm-tossed in the Egean Sea, often found shelter in the smooth water formed by the jutting horns of a land-locked bay, the rocky horns breaking with passive yet stubborn force the fierce tumultuous masses of water hurled against them by the outer sea. It is but reasonable to suppose that the experience gained upon the coast of Greece, with its countless natural harbours, should have suggested to the Tyrians the way of rendering their own port, lying on an exposed and unprotected shore, accessible in all states of weather, and hence, doubtless, their famous mole. At first sea-going people would probably confine their voyages to ports which possessed safe anchorage; but it often happened that large populations, attracted by local advantages, such as a healthy site or a fertile soil, settled on various points of the sea-board which afforded no facilities for the reception of shipping. Increase of wealth made it necessary to open communications with other nations, and art had then to supply what Nature had begrudged. Large masses of stone were piled at a suitable spot upon the sea-shore, and gradually the heap was carried seaward, just as at the present day a railway embankment is carried across a wide stretching valley. This system of barrier or breakwater building was that first adopted; and, strange to relate, it is the only one that the ingenuity of man has up to the present day been able to conceive; for although modern engineers have modified, varied, and improved the system, it is no exaggeration to say that in all essentials the last magnificent structure erected by our most eminent

engineers is not one step in advance from the primitive mole, the work of hands that had returned to dust before the British or the Roman name had been heard of. It is not the writer's intention to deny that improvements have been made, but so far as the main idea in the construction of breakwaters is concerned, it must be admitted on all hands that it was tumble-stone at the beginning and is tumble-stone to-day, excepting of course such a costly structure as Dover.

Nowhere has the daring of man been more visible than in his awful struggle with that most unstable yet most powerful of all agencies—water. To erect seaworks that stand at all against the terrific forces of sea-waves hurled in endless succession against them by a wind travelling at the rate of eighty and even a hundred miles an hour is an undertaking that might well shake the resolution of the boldest. Yet it has been done in all ages, and on almost every coast. History, that takes notice and bands down to future races the names of heroes who have been the scourges of mankind, has too frequently let drop into oblivion the names of the dauntless engineers who have by their mighty structures tamed even the ocean, and have offered to the shattered ship a refuge upon an exposed and inhospitable shore.

It may be well at this point to give a somewhat fuller description of the system of construction hitherto employed both by ancient and modern engineers before proceeding to consider in detail some of the typical breakwaters of the world.

As previously stated, large masses of tumble-stone or *pierre perdue* were tipped into the sea till the rubble mound reached the surface, where it acted as a sbringly beach to receive the impact of the waves. The continued action of the waves gradually lowered the top of the mound and flattened the sea-slope. Consequently, the surface of the mound had to be continually fed with fresh material until the sea had worn it away into a natural slope. When this slope has at last been made, very little alteration takes place from the bottom to a point near low-water mark; but from thence upwards the mound is always liable to destruction or at least great injury, and as a consequence always remains a subject of great expense in order that it may be kept in efficient repair.

The celebrated Cherbourg breakwater was first formed in this manner, but as, after every storm, the sea left the mound reduced to low-water level and the harbour fully exposed to wind and wave, it became necessary to erect upon it as a basis the present magnificent superstructure. Our own Plymouth breakwater was similarly constructed, and was found to be equally unable to bear the action of the sea. Pitching, or facing with flat stones firmly set in cement, was resorted to, and with fair success. But when once any displacement takes place in regard to these surface stones, unless the breach be immediately repaired, the sea rapidly enlarges it, and would in a short while carry away the whole of the protecting surface, one wave being known to have ripped up as much as 70 ft. Another development of the tumble-stone system was the employment of concrete blocks for the formation of the mound at places where suitable stone was not to be obtained. Types of the concrete mound are the Biarritz breakwater, that at Leghorn, and the major portion of Port Said. The varieties of the tumble-stone system are too numerous to be fully gone into; but, as approximating most closely of them all to the system which will shortly be described, it will be well to mention the pile-driving system, by means of which the waste of the mound was to a considerable extent prevented. But whatever has been done by different engineers, many of them men of the greatest eminence, nothing would appear to have been discovered which supersedes the system of making a foundation of rubble or *pierre perdue*, and building upon it structures of stone or concrete. And, moreover, it may be said that whatever improvements the ingenuity of man has devised, in the way of building together

these structures either with iron clamps or the dove-tailing of the stones one into another, they have all been failures in a greater or less degree; moreover, their cost has been tremendous, and, in the few instances where a fair amount of efficiency has been obtained, it has been gained at the cost of thirty or forty years of incessant labour, armies of men being employed daily in tipping vast quantities of material into the sea for the sea to arrange and re-arrange at its pleasure. The Cherbourg breakwater actually took seventy years in constructing, having been begun in 1783 and not finished until 1853. A very important point which must not be lost sight of is revealed by a casual glance at any of the diagrams representing the breakwaters referred to in this paper. It will be noticed that in order to secure a basis for a superstructure of comparatively small dimensions it is necessary to encroach upon the waterway to the extent in some cases of at least ten times the basis required. Where the entrance to the port is sufficiently wide to allow of this encroachment the only thing to regret is the enormous waste of money and material incurred, but where the entrance is narrow it is clear that it puts an end to the possibility of building a breakwater at all, for by the time there was a sufficient basis formed for its erection there would not be left any waterway for ships to enter the port. It is owing to this important drawback that marine works have not been carried out in many of our principal ports, especially in the Colonies, which greatly require them.

It will scarcely be necessary in this paper for the author to go into the question of the varying forces of wave-power, nor into the theories of wave-action. It will only be necessary to take their results, which are certain and defined. But one thing it is very necessary to bear in mind, and that is, the well-known fact that a breaking wave exerts more percussive and destructive force than an unbroken one. It is also an admitted fact that waves begin to break when they enter a depth of water roughly approximating to their own height. It therefore follows that the very foundations of our present breakwaters, built on the talus or *pierre-perdue* system, are themselves unceasingly assisting in the destruction of their own superstructures. This was very forcibly brought out at one of the sittings of the Select Committee of the House of Commons on the Dover Pier Harbour Bill in 1875. The Chairman (Sir Seymour Fitzgerald) put question 1,676 to Captain E. K. Calver, R.N., as follows:—"The stability of an upright wall must depend upon the thickness of the wall?" and the witness answered, "It must depend upon the inertia of the mass and upon the profile. If you put a long batter on to a marine work, and create a wave, you bring into operation a power for its own ultimate destruction. On the details of construction I would not say a word; but upon matters of general design my experience is directly applicable." Further proof as to the inefficiency of the present system of construction may be obtained from the minutes of evidence taken before a Select Committee of the House of Commons on June 15, 1883. In question 1,513 Sir John Coode was asked if he was aware that the great drawback to the formation of, and great hindrance to, harbours hitherto has been the great failures that have taken place in harbour construction? Sir John replied, "I know that that has been a drawback, it has probably made the authorities timid in incurring a large expenditure." Question 1,514 was then put to him as follows:—"Are you aware that ten millions sterling have been expended by the Government mainly in what are called harbours of refuge, and that, excepting that magnificent work of yours, the Portland Breakwater, you may say that probably nearly the whole of the other harbours have been failures: for instance, Alderney?" Sir John replied, "Alderney has not been satisfactory, certainly."

As additional proof that the field is open for a new system of construction it may be well to quote the following paragraph from

* From a paper read before the Society of Engineers, on the 5th inst.

the appendix to the report of the Select Committee on Harbour Accommodation, July, 1884:—

"The next important point deserving of attention is the remarkable diversity of designs put forward by different engineers for sea harbour works, and the often defective results as regards outlay and failure in the works. This may be viewed as the result of long years of delay in carrying out harbour works, where the engineers who commenced seldom have lived to witness the completion of the works; and, consequently, the defects in any particular harbour have rarely been remedied in another one designed by the same engineer. We have no hesitation in stating that there is hardly a single harbour at home which will not show some defect worthy of being avoided in all future works; and a wasted outlay which must be burdensome to the nation."

It would be difficult to sum up the absolute inefficiency of the present system of breakwater construction more tersely than is done in the above paragraph by a body of experts appointed by the highest authority in the land as being the best men the country could find for the purpose. The Chairman of this same Committee read the following paragraph of a letter from Provost Rae referring to the disastrous failure at Wick, "The unfortunate breakwater was an engineering experiment, and although a ruinous burden to Wick, it has been worth the money to the country in showing how *not* to do it again." Perhaps it is only fair to add that Provost Rae was writing with a view to getting the country to share the burden of the failure with Wick.

The author will now give a short sketch of some of the typical breakwaters of the world, beginning with some of the more ancient, and giving in connexion with each such details as may be of interest to the meeting, or may serve to illustrate the multifarious difficulties with which engineers have had to contend, and then proceed to describe a system by which it is hoped they may be successfully overcome.

One of the most ancient, if not actually the most ancient, breakwaters in the world is the famous mole of Famagusta, in Cyprus. It is formed of rubble-stone thrown loosely in. These stones weigh roughly between 2 or 3 cwt. each. The top is capped with a layer of squared stones averaging 3 ft. long and 18 in. wide, which are bedded and jointed in mortar. This top is now destroyed, and its debris has considerably narrowed the entrance. The difference in the ground-level on the sea side and harbour side is worth notice.

Another ancient breakwater which deserves mention is that at Civita Vecchia constructed by order of the Emperor Trajan about A.D. 100. From the account of it given by Pliny the Younger, it would appear that it was made in a very similar manner to that at Plymouth. That means to say, no progress in seventeen centuries.

Coming to modern breakwaters we have that at Alexandria, which has a depth of five fathoms and upwards, and shelters 1,400 acres. It was begun in 1870, and completed in two years. This remarkably short time in constructing a very large work was due to the enormous quantity of forced labour employed, and to the fact that there was no tide to contend against. The breakwater mole, quays, and other harbour works cost about 2,000,000*l.* The detached breakwater, which is 9,675 ft. long, is composed of concrete blocks which are 11½ ft. by 6½ ft. by 5 ft., and weigh 20 tons; they were kept for three months to harden before being employed upon the outside of the work, the inside of which is composed of rubble and large stones.

The Marsouilles breakwater was begun in 1845 and took thirty-six years in construction, being finished in 1881. Its total length is 11,930 ft., its width 59 ft., depth 6½ to 12 fathoms. One portion cost 75*l.* 11s. per lineal foot; the portion opposite the Lazaret and Arene basins, 2,050 ft. long in a depth of 55½ ft., cost 109*l.* 14s. per ft., and the portion in front of the Maritime basin in a depth of 52 ft., and having a length of 1,660 ft., a similar sum. This structure is composed of

a rubble foundation supporting placed masonry, faced seawards, with blocks of cement weighing from 20 to 30 tons.

The harbour at Algiers is protected by a rubble and concrete block breakwater of similar construction to those at Port Said, Biarritz, and Alexandria. It is perhaps unnecessary to remind this meeting that what stands very well in the tideless and fairly peaceful Mediterranean would probably prove worthless if exposed to the terrific forces of an Atlantic storm.

From an inspection of plans of harbours it will very readily be seen that the breakwater at Cherbourg is one of the largest marine works ever undertaken, and that it has not been exceeded as regards extent of area sheltered by any more modern works. The Alexandria Breakwater indeed approaches it in length, whilst the mattress jetties at Galveston and Charlestown even exceed it; but, considering the solid nature of the work, the powerful batteries which it supports, and the period of its construction, it must be admitted to be a marvellous monument of engineering skill and perseverance. It does not equal in depth and in section several other breakwaters, but it furnishes a perfect type of a breakwater formed of a rubble mound supporting a superstructure of concrete blocks and masonry starting from the low-water level. This famous breakwater was begun in 1778, stones being tipped in until high-water mark was reached. Waves and storms continually beat the top of the mound down to low-water level, the debris considerably enlarging the area of the tumble-stone foundation, while the sea action materially altered the shape it was intended to have taken by its engineers. In 1832 an upright wall was built on the top of the mound and the whole works were completed in 1853 at a cost of 2,674,491*l.* The superstructure successfully supplies the place of the weak part in the rubble mound and fulfils precisely the object for which it was designed, while the rubble is not carried higher than is just required for the protection of the foundation course of the upper works. Since the success of the system employed at the Cherbourg works has become known many other noteworthy and fairly successful structures have been similarly raised; but in some cases without allowing sufficient time for the settlement and changing of the mound before proceeding to raise the superstructure upon it. It is, perhaps, not surprising that but few engineers have the patience to wait thirty or forty years for their foundations to properly settle. With regard to the cost of Cherbourg it is only fair to state that the sum just named includes the cost for the foundation of the central battery and some other works not strictly incidental to the construction of the breakwater proper. M. Bonnin puts the actual cost of the breakwater at 2,000,000*l.*, which gives an average of 164*l.* per lineal foot.

A very fine specimen of the tumble-stone and superstructure formation is the famous breakwater at Colombo. Its foundations were laid in 1875. They are of tumble-stone or *pierre perdue*. It has a concrete block superstructure begun in 1874, the blocks being from 16 to 33 tons in weight, and were deposited diagonally by a steam Titan. During the "monsoon season," from May till October, the work had to be altogether suspended. In 1878, during a very severe south-west monsoon, a length of 150 ft. of the superstructure was considerably deflected. The maximum advance made with the works during any one month was in January, 1880, and amounted to 154 ft. The depth of water at the outer end of the structure is 6 fathoms. It is of interest to know that the breadth at the bottom of the wall is 26 ft., while at the top it is 24 ft., that is to say, the Colombo breakwater is a specimen of a nearly vertical breakwater, the great desideratum in such structures. When the harbour is completed the area sheltered will amount to 235 acres, having a depth of 20 ft. at low water, whilst the total acreage of sheltered water at low water will amount to 502. The concrete

blocks of which the breakwater is composed are formed of 6 parts of broken stone, 2 parts of sea-sand, and 1 part of Portland cement.

It may here be mentioned that since the introduction of Portland cement for the formation of concrete, another very valuable auxiliary has been introduced into the building of sea-walls, breakwaters, &c., and there are already many other structures, besides Colombo, of considerable note in which this material has played a very successful part, in fact so successful has it been that it has now become an indispensable factor in the construction of all sea masonry.

The total length of the Colombo breakwater is 4,150 ft., its depth is 40 ft. The works averaged a cost of 170*l.* per lineal foot.

The first type of an English breakwater that will be considered is the well-known one at Plymouth. The famous admiral, Nelson's old chief, Lord St. Vincent, first proposed the formation of a breakwater here to Lord Howick, in 1806, when Lord Howick was First Lord of the Admiralty. But it was not until 1812 that Messrs. Rennie & Whidby's plan was adopted and the work begun. The mode of construction was by depositing in mid-channel large blocks of limestone obtained from a neighbouring quarry. These blocks were conveyed to the site for the breakwater in vessels of peculiar construction having openings in their stern out of which the stones were dropped to the bottom of the sea. In all fifty-three of these vessels, each being of fifty tons, were employed in conveying stone for the construction of the breakwater. From one of these vessels a load of fifty tons of material could be discharged in about three hours. In the course of 1812 the whole of this fleet discharged 16,045 tons of stone; in 1813 the amount discharged had risen to 71,198 tons; in 1814 to 239,480; in 1815 to 264,207 tons; while in 1816 it dropped to 206,033 tons. By the time this portion of the work was finished the sum total of the amount of limestone deposited reached the high figure of 1,000,000 tons. The proportionate dimensions of the deposited blocks were nearly as follows:—

Of 5 tons and upwards	12,760 tons
" 3 to 5 tons	150,593 "
" 1 to 3 tons	309,706 "
" 1 ton and under	423,904 "

For quarrying this stone the sum of 2s. 5d. a ton was paid, while the charge for its carriage was about 1s. 10d. a ton. According to the most accurate calculations the cost of each ton of stone sunk for the construction of this breakwater was about 8s. 13d.

The total estimate for the completion of this breakwater was originally 1,524,000*l.*, but the sums hitherto spent upon the work amount upon the whole to 1,562,639*l.* Mr. Rennie, the eminent engineer of the breakwater, died long before its completion. Plymouth breakwater, which is thrown right across the middle of the Sound, lies nearly due east and west; it stands completely isolated, having a channel half a mile in width on either side of it. It has also two wings, each being 350 yards long. The central part, which is straight, is 1,000 yards in length; the wings incline towards the north at an angle of 120 deg. from the straight portion. The breakwater stands 3 ft. above the level of the highest spring tide, is 120 yards broad at the base, 16 yards at the top, and has an average height of 14 yards. It has already been remarked that the mole at Civita Vecchia, built seventeen centuries ago, is constructed on almost a similar plan.

As will appear when describing Alderney, the cost for the maintenance of Plymouth breakwater amounts to the enormous sum of 5,000*l.* a year.

The works at Portland consist of an inner and outer breakwater. Early in the century a breakwater was suggested at this spot by a Mr. A. Lamb, and Mr. Idle, a local member of Parliament, entered warmly into the matter, and was the first subscriber to the necessary funds.* The area sheltered is 2,130 acres.

* Lamb's Vindication is in the British Museum; a small pamphlet.

Although advocated at so early a date active work was not begun until 1847. The inner breakwater has a length of 1,700 ft., while the outer or detached breakwater extends to 6,400 ft. The work advanced at an average rate of 450 ft. a year. The total sum of money expended on it from the beginning until 1871 was 1,034,000*l.*, a sum equivalent to 127*l.* per lineal foot; but this amount does not appear to include the cost of convict labour.

Though the breakwater has had ample time to consolidate, and though the exposure is comparatively moderate, the slopes are still liable to injury from the action of the sea between high and low water levels. In both easterly and southerly gales the stones of the outer slope are displaced by the recoil of the waves, while under north-easterly gales the waves break right over mound and dash violently against the inner slope.

As much as from 500 to 3,000 tons of stone have been known to be disturbed during the continuance of a single gale.

The Harbour at Alderney is protected by a rubble mound supporting a superstructure founded below low-water mark. The depth of water varies from 21 ft. to 134 ft. at the outer end. The works were begun in 1847, were modified in 1849, and twice in 1858. The Western breakwater was carried out to a length of 4,380 ft. Its actual cost up to the period of completion in 1864 was at the rate of 235*l.* per lineal foot. It is worthy of note that from 1875 to 1883 the cost for repairs of breaches alone has amounted to the very large sum of 52,850*l.* This breakwater appears to have been strongly constructed in its upper and monolithic works, but to have been neglected in the matter of its rubble base. The large masonry blocks forming the outer wall are tied or "dowelled" together with huge bolts of gun-metal, while the rubble and dry masonry base is being continually worn away by attrition. The same defect is to be seen at Wick and Arklow also.

Sir Andrew Clarke, B.E., in giving evidence before a Select Committee of the House of Commons on the Harbour and Fortifications of Alderney (Session of 1872), reported that "the cost of Alderney had been 300,000*l.* less than the cost of Plymouth breakwater, which was being maintained at a cost of 5,000*l.* or 6,000*l.* a year, and he did not think that Alderney was likely to cost more." Not a very hopeful way of speaking of a breakwater which, when built at a vast expense, is supposed to be at least efficient. Breakwater construction must be in a very bad way when it appears to be a recognised thing that a finished structure should, as a matter of course, require 5,000*l.* a year to keep it in repair, such repairs being required so soon as the breakwater is supposed to be finished.

The Admiralty Pier at Dover is stone, built on a chalk basis, in a maximum depth of water at spring tide low water of 45 ft. This pier has a base of 92 ft., and a clear roadway of 30 ft. in width. Its sectional area is 4,736 square feet, and it cost 360*l.* per foot run. From a Government return of August 17, 1883, it would appear that the total cost reached 693,077*l.*; but in addition to that a sum of 22,827*l.* has been paid for repairing the damage done by a storm in 1877, and by others in subsequent years. The whole cost has been paid by Parliamentary grant. The original engineers of this magnificent structure were Messrs. Walker & Co., who were followed by Messrs. McClean & Stileman, and at a still later period by Mr. Edward Druce, C.E., who had previously acted as Resident Engineer.

Notwithstanding the immense cost and care bestowed upon this really excellent work it is said to now show signs of failure at the base. Dover is an example of a very expensive structure, in point of fact unequalled by any other breakwater construction in the world. Mentioning Dover brings prominently to mind the fact that the authorities themselves appear at length to have arrived at the same conclusion, and that they seem to be holding their hand awaiting some new development of engineer-

ing skill. For a long while Government has entertained the idea of building another breakwater at Dover in order to make it a harbour of refuge. Plans and estimates have been submitted during the past fifty years by such very eminent engineers as Mr. James Abernethy, Mr. Michael Scott, Mr. James M. Rendell, Mr. William Cubitt, Captain Vetch, R.E., Mr. Charles Vignolles, Lieut.-Col. Harry D. Jones, Sir John Rennie, and others. Yet not one of these plans has been considered suitable, and the matter still remains in abeyance, partly from the want of suitable material in the neighbourhood, partly from the great cost attending the preparation of foundations fit to support a superstructure capable of standing the action of the waves. The estimates which have been sent in vary from Colonel Jones's 1,100,000*l.* to Mr. Cubitt's 5,000,000*l.*

The breakwaters at Tynemouth are other instances of the destructive action of the sea, even at a depth of 12 ft. below low-water level, on small rubble supporting a high superstructure. These breakwaters, which are perhaps unequalled as monuments of engineering skill and perseverance, are formed of concrete blocks of peculiar shape built on shore and thoroughly well aired before being lowered by very powerful "Titans" (designed by Mr. Philip Messent) on to each breakwater, where they are set in position by divers. The operation is very slow and costly. The work was begun more than thirty-five years ago, and is not yet finished. Up to 1879 the north pier cost about 160*l.* per lineal foot, and the south pier about 75*l.* The north pier has a length of 2,900 ft. The breadth at the bottom is 52 ft. and 35 ft. at the top. Their height varies from 53 ft. to 61 ft. From time to time great damage has been wrought to their respective bases during heavy gales.

For the Holyhead breakwater an abundance of stone of excellent quality for the work was obtainable at the quarries on Holyhead mountain only about a mile off. The design adopted for the breakwater was that of a rubble base with a superstructure on the harbour side of the mound, springing from low water level, the building being a sea harbour wall of masonry composed of large blocks of stone set in lime mortar. This seawall not only provides an upper roadway or promenade at the top, which is 21½ ft. above high water, but also shelters the quay level, which is 11½ ft. below the upper level. The quay has been formed by the deposit of suitable small material on the mound above high water level between the sea and harbour walls. The breakwater has an average depth of 40 ft. and extends into a maximum depth of 55 ft. with a slope on the sea side of about 12 to 1 between high and low water, 5 to 1 from low water to a depth of about 12 ft., and about 2 to 1 from thence to the bottom. On the harbour side the slope is about 1½ to 1 throughout. The total amount of stone in this stupendous mound is 7,000,000 tons. Holyhead breakwater was begun in 1849 and finished in 1873, at a cost of 1,285,050*l.* As the length is 7,800 ft. this gives 163*l.* 10*s.* as the cost per lineal foot. The cost of a bay of 30 ft. of the staging alone amounted to 586*l.* 10*s.* The charge for the maintenance of the mound has hitherto been very slight for the most part. At the extremity, however, the mound tends to travel round the head and is not quite stable. It has, therefore, been found necessary to protect the rubble slope for the last 200 ft. on the sea side near low water mark. This was first attempted by throwing down concrete blocks; but, as there was no adequate machinery for depositing the blocks, they got broken by the fall. Eventually old chains, amounting in weight to 1,000 tons, were placed in long coils upon the foreshore. By their weight these chains keep the foreshore from shifting, while, at the same time, they do not offer a solid face to the blow of the waves. A breach occurred in the breakwater last November by which some hundreds of tons of work had been displaced, and it is now very liable at any time to suffer considerable damage.

The breakwater at Wick is yet another example of the rubble base with block and concrete superstructure. It was begun in 1863, and in 1867 the pier had been advanced about 820 ft., while the rubble base was carried some 230 ft. further. The first material damage sustained occurred in December, 1868, when the outer portion of the superstructure was seriously damaged—the whole of the foundation up to a level varying from low water-mark to 10 ft. under it being uninjured—but the rubble base had, in some parts, been washed down to about 15 ft. under low water; in 1869 the damage had been repaired and reconstructed in cement, and in 1870 a severe storm occurred and a length of 360 ft. was damaged seriously. In 1871 about 30 ft. of the outer end was damaged; large blocks were built on the beach of cement rubble of from 70 to 100 tons each, and floated out by barges at high water, and deposited on the rubble base in advance of the proposed forward work. In 1872 further damage was sustained, and Mr. Rendell, being called upon to examine and report, attributed the failures of the work in 1868 and 70 to its want of "sufficient unity." In December of that year it was again attacked by a storm of great fierceness. Once more the storm in December, 1872, though not so disastrous from a pecuniary point of view as the storms previously experienced, was far more serious as regards the character of the damage done. The end of the work was protected by large blocks of 80 to 100 tons deposited as a foundation by three courses of large stones carefully set in cement, and the whole surmounted by a large monolith of cement rubble weighing upwards of 800 tons. This block was built in situ and, as a further precaution, iron rods of 3½ in. diameter had been fixed in the uppermost of the foundation courses of cement rubble, carried through the three courses of stone work by holes cut in the stone and finally embedded in the monolithic mass forming the upper portion of the pier. Yet the whole of this enormous work, weighing not less than 1,350 tons, succumbed to the force of the sea. During the course of the storm it was actually seen, from an adjacent cliff, to gradually slew round beneath the force of successive wave strokes until it finally tumbled over into the bay, where it has since rested.

Another example that will be taken of an existing breakwater is that of Aberdeen. This was begun in 1870 and finished in 1873. Its length is 1,050 ft., and it is 35 ft. wide at the head of the roadway, having a uniform batter of 1 in 8. The landward end for 500 ft. in length towards the sea is founded on rock, and the remainder on a bed of boulder clay, which had been covered with a thin layer of stones and sand. Of course the sand was cleared away in order to secure a solid foundation before the works were proceeded with. The manner in which the natural inequalities of the foundation were overcome was by levelling up with a deposit of concrete in small bags, on which blocks of Portland cement were built without being cemented. These blocks, weighing from ten to twenty tons, were carried up to a uniform level of 4 ft. 9 in. above low-water spring tides, except at the seaward end, where they were terminated at 9 in. above low-water spring tides. The blocks are composed of one measure of Portland cement, four measures of pit sand, and five measures of stones. The concrete superstructure, 18 ft. in height, was built over the blocks in frames, in situ, a large number of blocks being incorporated with it. The superstructure is composed of 1 measure of Portland cement, 3 measures pit-sand, and 5 measures of stone or sbringle. An apron of concrete deposited in bags lies at the bottom along a part of the sea or east side of the foundation. It commences about 600 ft. from the shore, or about 100 ft. from the rock foundation, is then carried round the head of the breakwater, and returned along the harbour side for 110 ft. There are two rows of piles along the breakwater, placed at 18 ft. apart. Each pile is 2 ft. in diameter and

passes through the whole depth of the work. The piles are stepped into iron shoes at the foundations, and, where they pass through the substructure, are surrounded by blocks moulded to the form of the piles, the junction of the blocks being formed at the middle of the pile. The upper foundation courses of blocks have sustained damage along the whole length of the breakwater on the sea face, and along a part of the harbour face. The holes excavated in the upper courses have hitherto been repaired at low-water spring tides by filling up with small bags of concrete, and finishing the surface with a facing of Portland cement mortar. These patches have stood well, with the exception of the repairs at a point 500 ft. from the commencement of the breakwater. The breach at this point was further repaired during the summer of last year. These repairs, however, again gave way last winter, and the breach was enlarged by successive storms from the north-east to the dimensions noted in reports of February 6, March 10, and May 18. The survey made on February 6 showed the hole to be 22 ft. in length by 12 ft. deep, extending along one row of blocks, or 8 ft. into the breakwater; the survey of March 10 showed an increase to 72 ft. in length by a depth varying from 4 ft. to 12 ft., with part of the inner row of blocks removed; and on May 18 this breach formed a cavern 90 ft. in length by 12 ft. deep, and 23 ft. into the breakwater. On examination of the breach by divers, the foundation of small bags of concrete, on which the blocks rested, was found to be removed from under the blocks to the seaward of the hole for a length of 18 ft. The superstructure was split vertically 150 ft. along the middle of the breakwater over the hole, forming a separate mass of 2,500 tons weight, which rested as a flat arch entirely on the blocks at each end of the breach.

Mr. Smith, the resident engineer, explains this disaster as follows:—

"I am of opinion that the concentrated waves from the north-east, coming upon the junction of the rock foundation with the stratum of stones on boulder clay at this point, in a depth of 13 ft. at low water, swept over the concrete in small bags, relieving the concrete blocks from the weight of the superstructure. At low water the top of the breach was exposed to the air, the sudden compression of which, by the water flowing after the wave again covered the entrance, blew out by its explosive force the blocks on both the harbour and sea face of the breakwater."

The superstructure was also damaged on the sea-face close to the lighthouse tower, a breach being formed 54 ft. long by 22 ft. deep, and about 4 ft. into the breakwater. At a point on the sea face 100 ft. landward from the tower another breach was made, extending partly into the base of the superstructure and the upper course of blocks. The blocks composing the substructure are clipped and abraded on the sea-face, especially near the level of low-water. The piles where they pass through the superstructure have been eaten away by the sea-worm (*teredo navalis*), leaving spaces 2 ft. diameter between the blocks. The cost of repairs was estimated at 17,000*l.*

A great advance was made in the construction of breakwaters in the case of Wicklow Harbour Works. Mr. William George Strype, M.Inst. C.E., there adopted for the first time the bold method of erecting a seawall, in a very exposed position, by means of concrete entirely laid *in situ*. The following is Mr. Strype's own description of the method of construction as given in that gentleman's evidence before a Committee of the House of Commons:—

"We claim that the system we have adopted in the construction of the Wicklow works is a novel system. I have prepared a diagram that will show the Committee the system of construction that has been adopted there. In other ports, such as Newhaven, and I believe also in the exposed work at Fraserburgh, the part below water was laid by means of concrete in bags; the concrete is put in long bags contained in hopper barges. The hopper barge door is slipped, and the concrete bags drop to the bottom. These are piled upon each other and raise the structure to low-water

mark. At Wicklow we adopted no such expedient as that, but in constructing the work we first formed a great central staging on which the engine, the waggon, and the cranes ran. That was extended in advance of the work to about half the length of the breakwater, and the staging trestles secured by means of a pad of concrete, which is shown upon figure No. 1. We deposit a pad of about 70 or 80 tons of concrete; No. 1 shows that pad. We carried the trestles thus secured by pads of concrete (as will be seen by this elevation) a long distance in advance of the general progress of the work. As soon as the staging was secured by this means, we deposited a great mound of concrete, which is shown in figure No. 2. Figure 2 shows the mound of concrete, representing about two-thirds of the volume of solid structure below low water. That great mound steadied the staging considerably, and also admitted of very rapid progress in the construction of the works. We were able during the construction of the mound to lay about 2,000 tons a week, and for a little while that is considered a very remarkable pace at which to lay concrete. Upon the mound we added an outside deposit of concrete to the form of the breakwater, as shown by figure No. 3, by means of a panel rendered heavy so as to make it sink. We raised this deposit to within 3 ft. of low water line. The difficulty with this system of construction is more when you get near to the level of low water. At low water the disturbing waves are apt to wash the cement out of the concrete before it sets. By putting our inner stretch of panel within 3 ft. of low water we are able to deposit or form the first profile toe, as shown in fig. No. 3, to within 3 ft. of low water. As soon as that sets, which it does in a day or two, as shown in fig. No. 4, we put a panel from that above the level of high water, and then lay a further portion of the profile. For that further portion we select very calm water, so as to avoid disturbance of the work. That is the most trying part of the work while the structure is being formed, as shown in fig. No. 4. We carry up the inside to the height of low water. As shown in fig. No. 5, the work being over low water mark is quite easy, and figure No. 6 shows simply the building of superstructure, which can be readily accomplished. The volume of the breakwater is about forty cubic yards per foot run, and the cost of the work which we paid is 17*s.* 3*d.* per cubic yard, so that it comes to under 40*l.* I am satisfied we could carry out this work in water 20 ft. deep, by making modifications in the system. We found the least loss of timber and the least loss of concrete in every part of the work until we got within 3 ft. of low water. Up to 3 ft. of low water no trouble existed; we never lost a single cubic yard of concrete in that lower work, and the work was frequently visited by storms, and we frequently deposited concrete with a wave of 3 ft. undulation."

The author thinks that without wearying the meeting with any further examples (many more could easily be cited), a sufficient case has been established to show that the present system of breakwater construction is thoroughly inefficient. Even with the most generous exchequer to carry out designs and plans in the future he maintains that both money and time will be again spent in vain, and that fresh failures will result, unless a totally different system of construction be adopted.*

NOTES.

THE Railway Rates Inquiry terminated quietly last week,—so far as the examination of witnesses is concerned,—and the recommendations of the Commissioners will now be awaited with interest. Evidence was taken at the concluding sitting concerning a number of articles which had been reserved for further consideration,—a curious medley, comprising hay and straw, flowers and fruit, hardware (in detail), and telegraph wire and poles. There have been eighty-five sittings in all,—so that the inquiry has occupied just about two-thirds as many days as did the Parnell Commission; and Lord Balfour of Burleigh and his colleague, Mr. Courtney Boyle, have conducted it throughout in a most praiseworthy manner. It was once remarked of a Colonial Railway Commission that "the real value of the Railway Commissioners to the country depends on their ability to free the department from the trammels of 'use and wont,' and to conduct its affairs on common-sense and business lines." In this country "use and wont" in railway administration represents the result of long experi-

ence, our railways being happily free from the red-tapeism which would probably have fettered them had they not been the outcome of independent enterprise. Still, there is room for expansion and reform in some directions, and there is the possibility of "precedent" being too slavishly respected; and this Inquiry affords scope for selecting and adopting the best of the various suggestions offered, even though such a step may be somewhat of a departure from the old lines. It is too much to expect the result to be satisfactory to everybody, but we hope that the Commissioners' decisions will, in the main, commend themselves to the business instincts of the commercial community.

ALMOST an entire sitting of the London County Council last week was occupied by an academic discussion of the licensing proposals of the Government contained in their new Budget and Local Government Bill. The discussion was made on a motion by Sir T. Farrer, condemning the proposals, and asking for a petition to be presented against them. Such waste of time as this is lamentable. The Council is essentially an administrative body, and it is absurd to have a kind of second-hand Parliamentary debate on a question which not only affects the whole country, but is one of more interest to the small towns and rural districts of England than to the Metropolis. All moderate men desire to see the London County Council carry out their work with success, and it is, therefore, grievous to know that by such debating-society talk as this the Council discredits itself, and weakens its authority and position.

THE last issue of the "Antike Denkmäler" of the Berlin Archaeological Institute completes the first volume of the new series. It contains two plates, with accompanying text, of special interest to architects. The first of these is devoted to plans of the Cloaca Maxima, from the Forum Augustum to where it falls into the Tiber. To this work we have already referred. How little has been up to this time known definitely of this Cloaca may be seen by a comparison of the present plan with the account in "Jordan's Topography of Rome," l. i. p. 447. The Institute owes the plan to Signor Narducci, and its previous publication has been prevented owing to a scheme for publishing collectively the whole drainage system of Rome, from ancient down to modern times. As the Cloaca Maxima is of special importance for the study of ancient topography, archaeologists will welcome this separate issue. The second plate (38) contains coloured facsimiles of archaic architectural fragments, in which distinct traces of colour remain. They are fragments attributed to the archaic Temple of Athene on the Acropolis. The lion heads, which serve as spouts, are crudely coloured—the hair blue, the eyes a bright emerald green. They are clearly analogous in style to the lion head spouts of the Temple of Zeus, at Olympia. The third plate gives the most beautiful reproduction we have yet seen of one of the most richly painted of the archaic Acropolis statues. How difficult it is adequately to reproduce the delicate yet rich effects of this colouring may be seen in the disastrous recent attempts of the "Ephemeris." Plates 44-46 should be of interest in England, as, among other fragments of painted terra-cotta sarcophagi, they reproduce some that are now in the British Museum. These Clazomena sarcophagi, which have excited so much attention, are now divided between museums at Constantinople, Smyrna, Berlin, Vienna, and London, so that to bring them together is of great advantage.

DR. WALDSTEIN'S third lecture on recent excavations in Greece, delivered at the Royal Institution on Saturday last, was the most interesting of the three, and it is not often that so much of history and so much of "higher criticism" is condensed into an hour's lecture. The lecturer gave a short

* To be continued.

but admirably-expressed criticism on the distinction between the characteristics of the art of the great Attic period and that of the later period and of the Græco-Roman school: the former showing that precision and distinctness of aim and idea which belonged to a complete school, and especially the clear perception of the relation between the subject and the means of execution: while in the later schools we found attempts to give to sculpture an expression and a treatment essentially pictorial. The latter part of the lecture was occupied with a brief review of the work done in recent years in Greek exploration; but the point of most interest in the lecture, as referring to a great future chance of discoveries as yet almost unattempted, was in regard to the work which might be accomplished on "Delphi's sacred side," if only the required funds were forthcoming. The site of Delphi is now built over by the village of Kastri, and the Greek Government has very rightly made it a condition of granting powers to excavate there that whoever undertakes the work shall find funds for fully compensating the expropriated inhabitants, or providing them other residences. Under these conditions it is estimated that it would be useless to commence the work unless 20,000*l.* were first collected towards it. The American School at Athens has the claim to the concession up to October of this year, and if they are not by that time in possession of the necessary funds, we gather that the concession will be open to other claimants who may be able to provide funds. There may be a chance in that case of England, either through her Government or through some wealthy Englishman or group of Englishmen, doing something to recover the ground which she has rather lost of late years in the honours of successful exploration. The attempt would be well worth an exceptional effort. As Dr. Waldstein observes, what might not be found at Delphi?

THERE has recently been published a little pamphlet called "On Principle Strikes," by Mr. J. S. Ransome, containing four sketches which originally appeared in the *Alobe*. The author does not improve his chance of success by a title which at first sight puzzles rather than enlightens the reader. But the publication is nevertheless apposite: its object is "to point out how little the real interests of the working-man are studied by the leaders of the present-day unions." In order to do this, sketches are given of typical persons engaged in strikes. The third sketch is that of "The Shop Lawyer,"—in other words, the talking leader, who gradually stirs up discontent, and then gets the men to come out on strike. In this, as in the other sketches, there is a good deal of truth; but, like many sketches with the brush, these with the pen are somewhat over-coloured. Yet this is in many ways just the kind of literature to bring home some truths to the mind of the working-man. The "shop lawyer," whose object is to help himself personally as much as to assist his fellow-workmen, and who hopes to turn into a salaried Trades Union delegate sooner or later, has done much harm; and the general body of workmen is too much under the control of a despotism of Trades Union officials. Mr. Ransome's sketches will expose the true character of some of the persons engaged in strikes, and cannot fail to do good.

THE current volume (Vol. XCIX.) of the "Minutes of Proceedings of the Institution of Civil Engineers" contains an interesting paper on "The Water-supply of some Italian towns," by Mr. A. F. Bruce, Assoc.M. Inst. C.E. The author states that the city of Venice was for a long time entirely dependent for water-supply on the rain which fell within its own area, collected in cisterns in the piazzas and courts. This being found inadequate, in the sixteenth century the Seriola Veneta Canal was constructed, the water being brought thence into the city by means of

boats. As time wore on, this source too was found to be insufficient, and in 1883 the new works were finished, which now form the main supply of the city. These consist of a number of comparatively shallow artesian wells sunk into a water-bearing stratum, near the village of S. Ambrogio. The supply pipe is capable of delivering 3,000,000 gallons per day, or twenty-two gallons per head, which the author says is nearly three times the quantity considered sufficient in Venice. Filter beds have also been constructed at Moranzani in order to utilise the water of the Seriola, if required. Genoa was entirely dependent on its own internal resources for water-supply until, in the fifteenth century, the Government constructed a masonry aqueduct, which conveys the water of the Bisagno from a point ten miles from the city and 500 ft. above the sea; its tributary, the Concasca, was afterwards connected by a branch. This aqueduct is still utilised, though its dilapidated condition permits the escape of considerable quantities of water along the route. Mr. Bruce estimates that of the 4,000,000 gallons admitted daily, only about 3,000,000 gallons actually reach Genoa, and owing to the aqueduct being partly open (and to other causes) fruitful sources of pollution are created. About twenty years ago an additional supply was obtained from the River Scrivia, near Busalla, by means of an infiltration gallery, which is said to be able to deliver nearly 12,000,000 gallons daily. The works of the Gorzente or Deferrari-Galliera Company are of still more recent date. "They have their source at the Torrent Gorzente to the west of Genoa, where there is a storage reservoir holding about 220,000,000 gallons." About 13,000,000 gallons daily are capable of being delivered. In addition to these sources, an English company has commenced to make works in Genoa, which, when finished, are expected to yield another 4,000,000 gallons daily from the Bisagno and Concasca basins. Rome is said to have inherited from the most ancient times the best water supply in Italy. At present the city "receives water from four aqueducts; three of these are of great antiquity—namely, the Vergine, Felice, and Paolo; and from a more modern, or rather an old work reconstituted, called the *Aequa Marcie* or *Pia Aqueduct*." The three former yield nearly 34,000,000 gallons daily, whilst the latter is capable of delivering 19,750,000 gallons, together making about 200 gallons per head, which is truly an enormous quantity. Most of the houses have cisterns containing 400 to 500 gallons. Leghorn derives its water from an old aqueduct from Pisan Hills, which only delivers 3-20 gallons per head per day. Turin merely gets a daily allowance of 6-75 gallons per head, whilst Florence has about 20 gallons, and Naples 44 gallons. The author says that "work can be done in Italy at prices which, with the exception of ironwork, are considerably below those ruling in Great Britain, owing chiefly to the cheapness of labour; a mason receives about 3*s.*, a quarryman 2*s.* 3*d.*, and a navvy 2*s.* per day. . . . Good hydraulic rubble masonry can be built for 8*s.* 6*d.* to 12*s.* per cubic yard; ordinary excavation costs about 8*d.*; rock, 1*s.* 6*d.* to 2*s.*; and tunnelling, 3*s.* to 4*s.* per cubic yard." Perhaps the most striking part of Mr. Bruce's paper is the table at the end, showing the sources of supply of the chief towns in Italy, the quantity of water supplied, cost of works, &c. It seems almost incredible that civilised communities like those of Leghorn, Turin, and many minor places can put up with such comparatively small supplies as from 3-20 gallons to 6 or 7 gallons per head per day, especially when we consider the nature of the climate. Yet such is the case, and bearing in mind the fact that in many large towns the drainage is also very imperfect, it is not to be wondered that the "fair cities of the south" are not always as salubrious and health-giving as they might be. Without an adequate and wholesome water-supply and efficient drainage, it is impossible to successfully cope with the zymotic and other diseases which so often

appear in towns along the borders of the Mediterranean, impeding commerce, and dealing destruction and desolation on all sides. When will the people be sufficiently educated to perceive this?

IN looking through a list of some sixty reports on technical matters sent in to the Ministry of Public Works of Berlin, by the six technical attachés of the different Embassies at Vienna, Paris, Rome, St. Petersburg, Washington, and London, we find that Great Britain has been treated by far the worst, the attaché stationed here having only sent in two* papers as against twenty-two sent in on French affairs, and the fourteen and twelve sent in respectively from America and Russia. We do not know if there be a dearth of material for technical reports on our Island, which has caused this minimum quantity of "report," or if the fault perhaps is to be found somewhere else; but it appears that the authorities at Berlin do not consider the English post worth its cost, and have made known their intention of withdrawing it,—a great pity, we venture to say, as it is quite certain the right man might be able still to find a thing or two in the country which would interest his countrymen.

IN October last an international competition was opened at Lausanne for a collection of buildings in which the public library of the Canton, the academy, assembly rooms for scientific purposes, and halls for several collections were to be placed; the site chosen for this erection being a most ideal one, situated on an incline, topped by the cathedral and overlooking the Gulf of Geneva. The "programme," which was compiled in a most thorough way by an international jury which was elected especially for the purpose, showed that three prizes of 12,000, 8,000, and 5,000 francs were to be given away, and that the amount at the disposal of the Town Council for the carrying out of the project was 3,000,000 francs. The members of the jury were Professor Auer, of Bern; the architect of the New Law Courts at Leipzig, Regierungsrath-Baumeister Ludwig Hoffmann; Professor Lassius, of Zürich; the City Architect of Lyon, M. Hirsch; and the architect of the new Sorbonne at Paris, M. Nônot. On the 22nd inst. the jury came to the unanimous conclusion that none of the designs merited the first prize; that the second should, however, be awarded to M. André, of Lyon, and the third to M. Demierre, of Paris, whilst the 12,000 francs due to a first prizeman should be divided among the owners of the four designs next in order of merit. These four designs were by Messrs. Legrand & Leroy, Paris; Kuder & Mueller, Strassburg; Recordon, Lausanne; and Hadberg, Berlin.

THE picturesque old town of Hildesheim is undergoing changes which may be necessary from the inhabitants' point of view, but some of which will probably be regretted by visitors. It appears that an extensive restoration is going on among the old timber houses so abundant in the town; and an entire renovation of the old "Rathaus" is being gone through, the new decoration of the great hall, with its timber roof, its interesting woodwork, its frescoes (which are still being worked at), and the Town Council's room, with the adjacent Mayor's study, being especially remarkable. Among the public buildings completed within the last few years, the new railway station and the new post-office, both of brick, may both be considered worthy of note, and among those still in course of erection, the public slaughter-house is certainly worth a visit. The rebuilding of the Government House (Regierung) is perhaps the most interesting work at present being done in the town, not only on account of this building showing a practical plan and some interesting German

* One on hospitals for infectious diseases; the other on the burning of the petroleum ship *United* in Bristol Harbour.

Renaissance elevations, but also on account of the rebuilding being cleverly carried out in three portions, one after the other, without materially disturbing the business routine of the house. This building, the west gable of which is one of the few pieces of architecture bearing the "F.III." of the deceased Emperor Frederic (who reigned ninety days), is now nearing its completion, and will, when finished, cover some 25,000 square metres of ground, having cost nearly 35,000*l.* Among the new private houses which are unhappily finding their way in between the picturesque old ones are several fine shops and a new hotel.

THAT unique little capital, Brunswick, in which one finds the picturesque old work, the palatial Renaissance of the public buildings, and the work of the present day so well blended together, now boasts of a restoration of the main part of the old "Burg Dankwarderode," the castle hall of which, finely situated in close proximity to the Dom, showing a strict German Romanesque exterior, has been pretty well entirely rebuilt, and is now nearing its completion. Among the public buildings of the town finished during the last few years the New Museum is certainly worth mentioning, especially on account of the good planning of the whole, and the picture-gallery in particular, and the monumental design of the façades; whilst among those buildings still on paper the new "Stadthaus" and the new railway-station may be noted, especially the latter, which is now under consideration, and for which much preliminary work will have to be done before a decision can be arrived at.

THE alterations which are to be carried out by Mr. Rowland Plumbe at the London Hospital, by the recommendation of Dr. Louis Parkes, extend to a complete remodelling of the sanitary arrangements, at an estimated cost of 7,000*l.* New drains are to be laid, the present imperfect soil and waste pipes, sinks, &c., removed, and two turret blocks, cut off from the wards and bedrooms by ventilated corridors, will be built upon advanced hygienic principles for the general purposes of the hospital. The new buildings comprise a central block, 80 ft. wide, and projecting 50 ft. towards the road, thus affording a covered approach for vehicles from the street. Medical baths, store-rooms, and students' lavatories will be fitted in the basement, and on either side a students' waiting room, with rooms for the nurses and for patients on reception and examination. The chapel, on the first floor, will give place to a new operating theatre, capacious enough for 250 students, standing on platforms ranged in form of an amphitheatre. This theatre is to be two floors in height, lighted and ventilated in the roof, and will be supplemented by a new theatre, 40 ft. by 23 ft., for clinical instruction, to receive 150 students. This hospital was built in 1752; it has been considerably enlarged from time to time,—by a south-west wing for 100 beds in 1830; in 1840 by a south-east wing for seventy-four beds, reserved to Jews; and by the "Alexandra" wing, for seventy beds, in 1864; and, in 1876, by the "Grocers" wing, opened by the Queen, the accommodation being thus raised to a total of 776 beds.

PLAS NEWYDD, close to and overlooking Llangollen, is about to be put up for sale by auction. A residence of the late General Yorke, C.B., who largely added thereto, the original cottage was built in 1778 by Lady Eleanor Butler and the Hon. Sarah Ponsonby. Their retirement here, as the "Ladies of Llangollen," has been described by Madame de Genlis. Dying in 1829 and 1831 respectively, they are buried in the parish churchyard. The cottage was next tenanted by their no less eccentric imitators, Miss Andrews and Miss Lolly. This property, which covers about 11 acres, is situated near to the Cistercian Abbey of Valle Crucis, and the well-known vale of the

river Dee; it includes another house, newly built in the same style as that of Plas Newydd.

A ROOM at Messrs. Dowdeswell's is now devoted to an interesting exhibition of Indo-Persian pictures and manuscripts. There are only a few manuscripts, the majority of the exhibits being pictures, chiefly portraits and figure subjects. Many of these are marvels of careful draughtsmanship and detail, and the borders of gold and colour, which in a few cases surround them, are very fine, particularly beautiful examples being (2), (17), and (28a). Others are mounted on a sort of marbled paper touched up, or rather powdered, with gold. Although good in themselves, they rather detract from the importance of the portraits, none of which are on a large scale. The clever way in which large masses of figures are grouped is well shown in (10) a "Fight on the Banks of a River," and again in one of the manuscripts (2) illustrating the wars of Mahomet. There are a few strictly architectural subjects in the collection, the best being (5) "The Iron Pillar," a view looking across the court of the mosque of Kubul Islam; (15) "The Tomb of Shekh Salim, at Fathpir Sikri," the white marble of the tomb contrasting well with the warm colouring of the pavement and surrounding buildings; and (35) a careful drawing of the Emperor Humayan's tomb, with the Jumma river in the background,—the warm, clear atmosphere very skillfully suggested without an appearance of hardness. The view of Mecca (89) suffers from bad perspective, and both it and 73 are poorer in colour than those already noted; 31 has a richly decorated architectural background, but most of the backgrounds to the figure subjects are treated in a simpler manner, the decorative detail being lavished on the costumes and the carpets on which the figures are seated. From a decorative point of view, in fact, the exhibition has its chief interest.

SANITARY CONGRESS AT LEAMINGTON.

ON Saturday last a large number of the members of the Association of Public Sanitary Inspectors of Great Britain attended the fifth provincial congress of their body, Leamington being the town selected for the meeting this year.

The proceedings commenced in the Town-hall, where, at 11 o'clock, the Mayor (Mr. John Fell, a well-known builder and contractor,) received and welcomed the visitors. It was not long ago, he said, when anybody could get an appointment as sanitary inspector. Sometimes army pensioners were found occupying the position, although they had absolutely no knowledge of the science required by the post which they filled. They had absolutely no idea of the importance of the duties they undertook, and did not realise their responsibilities. It was only when this Association and others like it began to be formed that sanitary science took its proper place, and the general public began to recognise the important status of sanitary inspectors; and no doubt they would shortly be recognised as a very much more important and influential body than they were regarded as being at the present time. It was certain that in trying to raise the dignity of their profession the general public would back them up.

The Mayor then left the chair, and in the absence of Sir Edwin Chadwick, President of the Association, Mr. Hugh Alexander, Chairman of the Council, presided for the remainder of the meeting.

Mr. Alexander, after thanking the Mayor for his hearty welcome, expressed the hope that he would find an opportunity of enunciating in the House of Commons his views on the importance of sanitary improvements. The Association had made great strides since its formation in 1833, having now 500 members, and it had accomplished a great work in the interests of public health. No body of men knew more about the requirements of sanitary science than sanitary inspectors. Among the things they had done was to propose a deputation to the President of the Local Government Board. Mr. Ritchie, however, preferred to have their views in writing, and the Council had submitted them. The Council, in their report, stated that

the conditions under which sanitary inspectors were appointed were inimical to the interests of the public health, these conditions being due to the defective state of the sanitary law in the following particulars:—

(1) That there is no statutory definition of the qualifications of candidates for the position of sanitary inspectors; (2) that there is no satisfactory provision as to tenure of office; (3) that inspectors are not empowered to initiate proceedings by serving notices for the abatement of nuisances, however urgent they may be; (4) that there is no prescriptive minimum salary; (5) that the officers employed are not uniformly designated. The Council found that the first four of these defects originated in the Nuisance Removal Act of 1855; that they have not been remedied by any of the numerous amendments to that enactment; that, on the contrary, they have been reproduced in the Public Health Act of 1875, and that in many districts they constitute a permanent hindrance to sanitary inspectors in the discharge of their duty to the public. The Council therefore recommended that the influence of the Association should be directed to secure the following amendments in the sanitary law:—

(1) That every candidate for the position of sanitary inspector should have a general knowledge of the building trade, and, in addition, should possess a certificate in sanitary science; (2) that sanitary inspectors should be elected to a permanent tenure of office, and should only be removed for misconduct or proved incompetence, with a right to appeal to the Local Government Board; (3) that it should be the duty of sanitary inspectors to periodically inspect the dwellings of the district to which they are appointed, and to receive complaints of nuisances, and serve notices forthwith, require all necessary work to be done for the abatement of the nuisances, such notices to be as valid as though served by the local authority's order; (4) that in all appointments requiring the officer's whole time to be given to the duties of his office, an adequate minimum salary should be prescribed; (5) that the officers, now variously named sanitary inspectors and inspectors of nuisances, be designated sanitary inspectors. No doubt, the Chairman went on, these recommendations have been pigeon-holed, but when the position of sanitary inspectors came to be considered by the Local Government Board, the views submitted in writing would have good effect.

Sir Edwin Chadwick, the venerable President of the Association, who wrote regretting his inability to attend the Conference, also contributed a paper (read for him by Sir Douglas Galton). In it the author urged the necessity for improved measures for the sanitary welfare of the police. In London the men were compelled, by small wages, to live in unhealthy houses, and Sir Edwin advocated the provision of model dwellings on a large scale for their accommodation, maintaining that this could be economically done. He also referred to the use of machinery for cheap washing with tepid water, and its successful introduction in the German and French armies. The cost of washing 100 men with tepid water in France by Mr. W. Bartholomew's "improved jets, up as well as down," is about 4*d.* Turning to the necessity for good sanitary inspection, Sir Edwin said the chief obstacle to securing it was the inadequate pay given to inspectors generally, and incompetence to apply the necessary mechanical improvements. He emphasised the necessity for establishing a central authority on matters relating to health and sanitation—an agency for collecting for its own guidance, and communicating to each local authority for its guidance, the principles deduced from the experience of all other places from which information might be obtained; and in conclusion said that to secure such a central authority a Minister who could guide and direct sanitation in all its departments was necessary, and an object towards which every sanitarian should strive. The fact that a Minister of Agriculture had been appointed should only render them all the more determined to add to the Cabinet a Minister of Health. To them, as sanitary men, in the most practical of practical senses, the appointment was vital. They and their labours would never be understood until they had such an official exponent of what they were and what they did in one of the houses of Legislature, and he urged them to organise and agitate for this much-demanded public department until the thing was done. It must some day be done, and for the Association to take a

prominent part in the struggle to get it done would be a lasting honour, and a firmer surety of continued respect and prosperity.

Sir Douglas Galton read a paper on "The influence of recent legislation upon the duties of sanitary inspectors." He said this was a very appropriate time for considering certain questions relating to the status of inspectors and their functions in connexion with the wide attention which had been given to sanitary work in consequence of the passing of many Acts of Parliament. It was to be regretted that some of the recent Acts obtained by local authorities appeared to be directed to the regulation of small details of construction or management, rather than to lay down general principles. These details would more advantageously have been embodied in by-laws, as they could then more easily be varied to suit the requirements of particular districts. What would seem to be required was that there should be a new general Act of Parliament, embodying the principles of the Act of 1875 and subsequent Acts, and further enabling rural and urban authorities to give effect to them by means of by-laws dealing with details, which might be revoked or altered to suit requirements as they arose. When the scheme of decentralised local government was complete the County Council should settle the by-laws for each district. The advantage of legislating by means of by-laws was that it was necessary that the sanitation of the country should keep pace with increasing scientific knowledge and the improved education of the community in their knowledge of the laws of health. Their acquaintance with the causes of epidemic disease was daily widening, and as the people were becoming better informed upon sanitary questions the arrangements which were essential to-day would be found antiquated and insufficient in a few years. The subject connected with public health which had most frequently engaged the attention of Parliament during the last thirty or forty years was that of the housing of the poor, no fewer than thirteen Acts having been passed in that time. The laws were now sufficient, if they were duly enforced, to prevent the more wretched class of house property from being occupied, but there were some potent causes operating to prevent the full application of the law. In some cases the owners of the bad property themselves held positions in connexion with Vestries or on Local Boards or the bench of magistrates, which enabled them to prevent the enforcement of the Act. There were other cases in which the Medical Officer hesitated to carry out the law because the persons turned out would have no place to take refuge in, and in such cases it was difficult to avoid the conclusion that if the law as to sanitary dwellings was to be fully enforced the local authority must step in in some form or other. Probably the best form of relief would be the provision of common lodging-houses on the Glasgow principle, with separate sleeping accommodation, but the use in common of the cooking, eating, and washing places for a small payment. This accommodation should be wholesome, but intended only as a temporary refuge, and such as would induce the occupants to find suitable dwellings elsewhere; and where such lodging-houses were provided, the Acts of Parliament against insanitary dwellings should be most stringently enforced. The provision of water for the purposes of drinking and cleanliness had also been before Parliament several times. The Rivers Pollution Act was the most important of eleven passed during the past forty years, but it had never been adequately enforced. Streams and water-courses were still being polluted by refuse of various kinds, but very scanty efforts were made to prevent the evil. Manufacturers treated the rivers worst, and many streams had been allowed to become no better than foul sewers. On these two questions—the housing of the poor and the purifying of our water-courses—practical action was urgently needed. Another important matter was the compulsory notification of infectious diseases. The few local authorities that had decided to adopt the recent Act were governed by good sense. Its general adoption must necessarily lead to more systematic treatment of disease. Turning to the Local Government Act, 1888, which created the County Councils, he said it made an important advance towards systematising the sanitary administration throughout the country. Of the importance of bringing the sanitary administration of the counties to

a focus there could be no doubt. It might be said that as a rule the towns were well administered, but if they examined the Registrar-General's returns they would see that, while the death-rates of the urban populations had decidedly diminished within the past fifteen years, the death-rate of rural populations had remained stationary; and yet a large proportion of that rural death-rate arose from zymotic or preventable disease. The diminished rate in towns was the result of the careful system of sanitary administration, whilst the stagnant condition of things in the rural districts was mainly due to an absence of desire for good administration. The owners of property, often members of sanitary boards, had not encouraged the sanitary inspectors to bring forward cases of defective water-supply, or the prevalence of any other insanitary conditions which would involve them in expense, and it was upon this account that he looked upon the provisions of the Local Government Act as a most important advance. It empowered the Councils to appoint Medical Officers of Health, who would study the reports sent in by the district officers of health, and be able to advise what steps should be taken for preventing the pollution of streams, and, where necessary, for compelling local sanitary authorities to enforce the Public Health Acts. With the increased vigilance then enforced on all public bodies, the functions of the sanitary inspector would extend, and in proportion as the public were better educated in the laws of health, so would his duties become more onerous. He also desired to say a few words as to the qualifications of inspectors. He had had some opportunity of considering this question in connexion with the examinations held by the Sanitary Institute, which had passed hundreds of candidates. They had been asked to embrace in the examination a knowledge of building. When they looked at the large number of subjects which constituted the special business of the sanitary inspector, and which he should know thoroughly, he doubted the wisdom of requiring him to learn matters which more properly appertained to the duties of a clerk of works or Borough Surveyor. The subjects on which he must have sound knowledge were so extremely important, and in the cases of many of those who presented themselves for examination had been so little mastered, that he hesitated for the present to extend the examination to any subjects which would divert attention from more essential studies. With the recommendations of the Council as to securing stability in their appointments, remuneration, and retirement, he thoroughly agreed. Their position and duties were most important. They were the duties of the practical prevention of disease. The inspectors had access to every household, and they could point out beneficially many matters of insanitation before they had culminated in the production of fever or some other danger to health. If they performed these duties earnestly, strictly, and honourably, they would help to educate the public in sanitary knowledge, and thus obtain the esteem and retain the confidence of the public.

Subsequently, Mr. W. de Normville, C.E., the Borough Engineer, read a short paper describing the sanitary arrangements of Leamington, and the visitors during the day inspected the waterworks and the sewage works.

The English Iron Trade.—As was to be expected, business in the English iron trade is as yet very quiet after the holidays, and the market has not gained in strength. There has only been sparse buying of pig-iron, and, where any orders are taken, they are at lower figures than those quoted by manufacturers. There is very little demand for Scotch makers' iron, which is irregular in price. The hematite market in the North-west looks, on the whole, more cheerful. Although hematite warrants are 9d. a ton lower compared with last week, makers are holding more firmly to their present quotation of 57s., while a week ago they were selling, in isolated instances it is true,—at 54s. Manufactured iron is still dull, and prices are again lower. Steel has somewhat improved as regards inquiry, but values do not rise, the tendency being still the other way. Ship-builders are booking a few fresh orders, but the general situation remains unchanged. The same may be said of the engineering trade.—*Iron.*

Illustrations.

FEVEREY, SHROPSHIRE.

HIS house is being erected for Sir Offley Wakeman, Bart., on an estate near Beschurch, and is being built of local red sandstone and English oak, and covered with green Westmoreland slates, the chimneys being partly brick and partly stone.

The house contains on the ground-floor large living-ball, out of which open drawing- and morning-rooms, boudoir and billiard-rooms, and a small private chapel. Beyond is a business room, and the usual housekeeper's-rooms and kitchen offices, and, in addition to the principal and servants' stairs, there is also one for the family use, the staircases and principal rooms being finished in wainscot.

On the upper floors are some thirty bedrooms, grouped together for the convenient accommodation of guests, the family and nurseries, the men - servants, maid - servants, and stranger-servants.

The garden front, with terrace, faces nearly due south; the stables lie to the north-east, and the kitchen - gardens to the west; the main entrance being on the north, and the family one on the south.

A long, low stone house has been aimed at, with some half-timber work on the south front only.

The builder is Mr. John Bentley, of Waltham Abbey, Essex; and the clerk of works Mr. Urwin.

The gardens and grounds are being laid out by Mr. H. E. Milner.

The drawings illustrating the house are hung at the Royal Academy. Mr. Aston Webb is the architect.

LEEDS AND COUNTY LIBERAL CLUB.

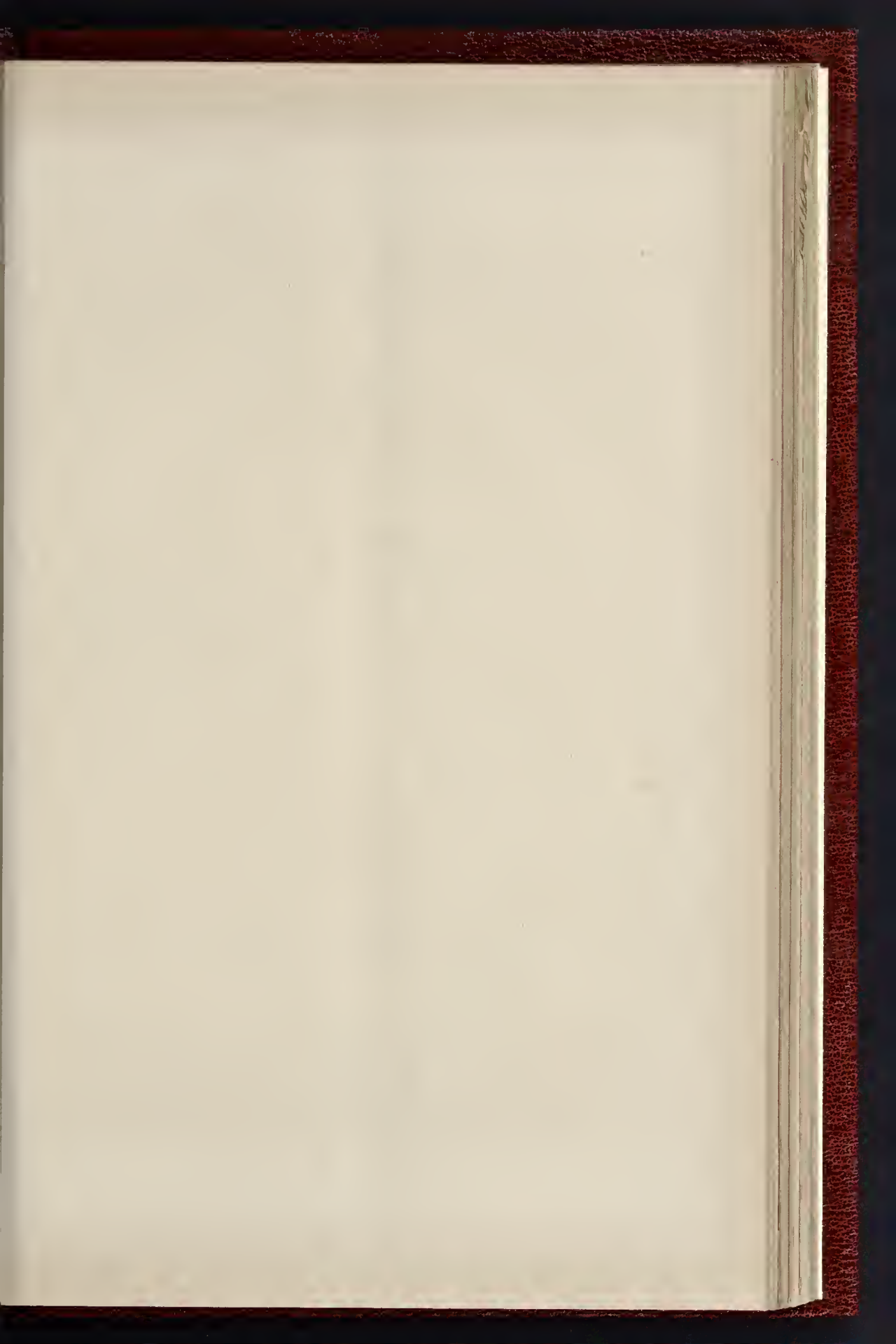
This building, now in course of erection, provides for an increase of membership, which has caused the premises now held by the Club to be inadequate for the comfort of those using it. Its position is in the very centre of the town of Leeds, opposite to a site recently acquired by the Postmaster-General for the erection of a new post-office. The materials of which the building will be erected are, for the exterior, red and buff bricks and terra-cotta dressings, covered with green slates. The interior will be finished with some degree of elaboration with hardwood staircases and general joinery, and a considerable extent of ornamental plaster-work. The architects are Messrs. Chorley & Connon; the different builders as follows:—For terra cotta, Mr. J. C. Edwards, of Raubon; brickwork, Mr. Charles Myers; joiners' work, Messrs. Tomlinson & Sons; plumbing, Mr. J. Lindley; ironwork, Messrs. C. Anty & Co.; slating, Messrs. Sharp & Harper; plastering, Mr. T. Moore; and painting, Messrs. Jackson & Co.; all of Leeds.

The drawing from which the illustration is taken is in the Royal Academy Exhibition.

SCULPTURE AT THE ROYAL ACADEMY AND THE SALON.

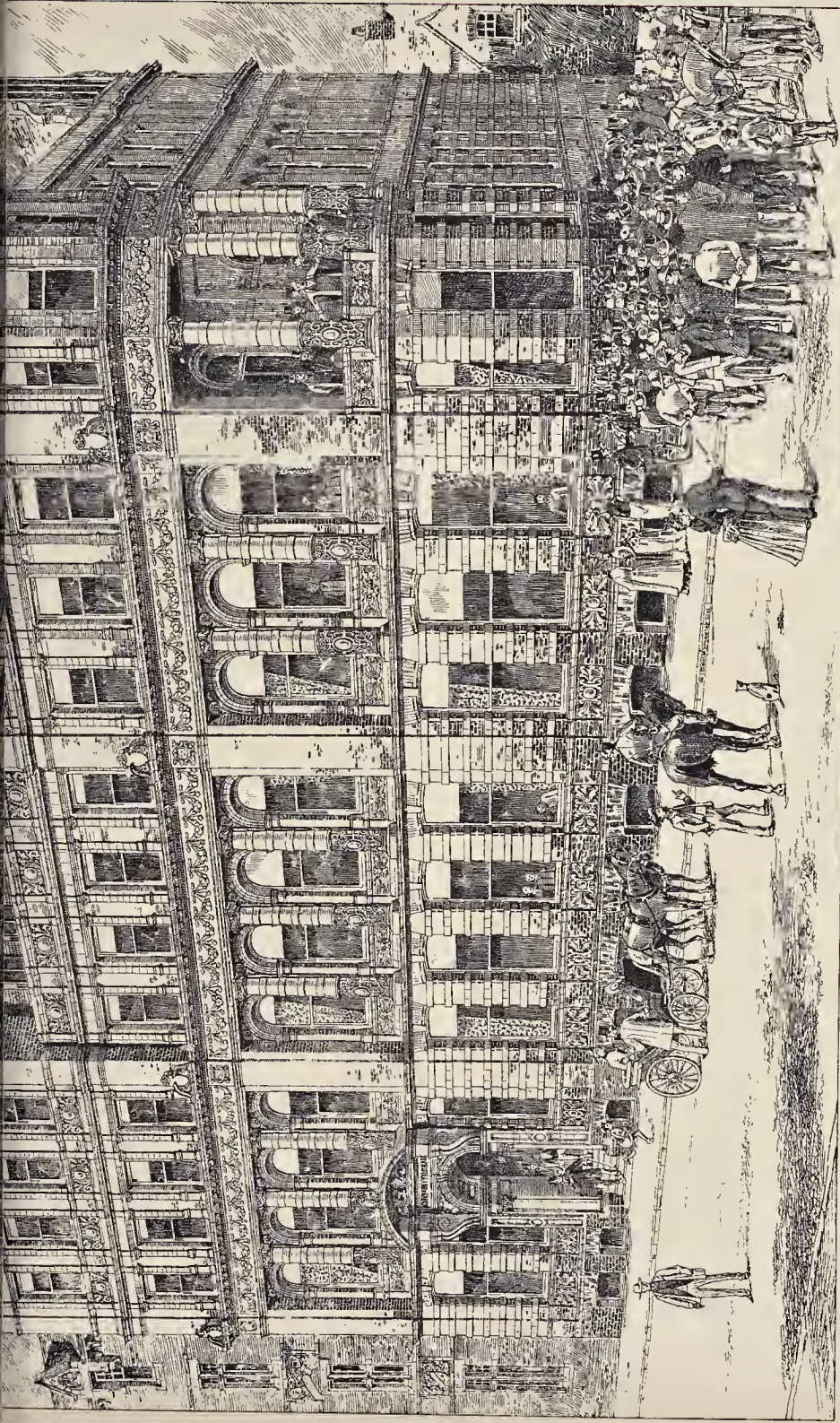
The four sculpture subjects given in this number, from works exhibited at the Royal Academy and at the Paris Salon, are all referred to and described in the first article of the present issue.

Scottish Properties for Sale.—At the Mart, on June 24, (1) Durris, on Deeside, Kincardineshire, extending over 17,000 acres, whereof 8,000 are arable, and yielding a net rental of 9,000l. per annum. Durris parish lies on the river's south bank, and slopes upwards to a ridge of the Grampians, where Lord Peterborough laid out some extensive plantations of larch and Scots fir; (2) Dunalastair, with some adjoining estates,—20,000 acres in all,—situated in the Rannoch district of Perthshire, in the Lyon and Tay watershed, between Loch Tummel and Loch Rannoch, famed for its sporting advantages, and the Peak of Schiehallion. On July 22, (3) Ballalulish, on the western coast of Argyll, being 6,000 acres, mostly pasture, with the slate and granite quarries at the foot of Ben Naveay. In Ballalulish lies the Levin Loch, whilst but four miles distant lies the Pass of Glencoe; and (4) the whole of the river Thurso, in Caithness-shire, from its rise to the North Sea, well frequented by salmon, and the neighbouring grouse-moors (40,000 acres) of Braal, Dalnawallan, and Strathmore.



THE BUILDER. MAY 31, 1890.

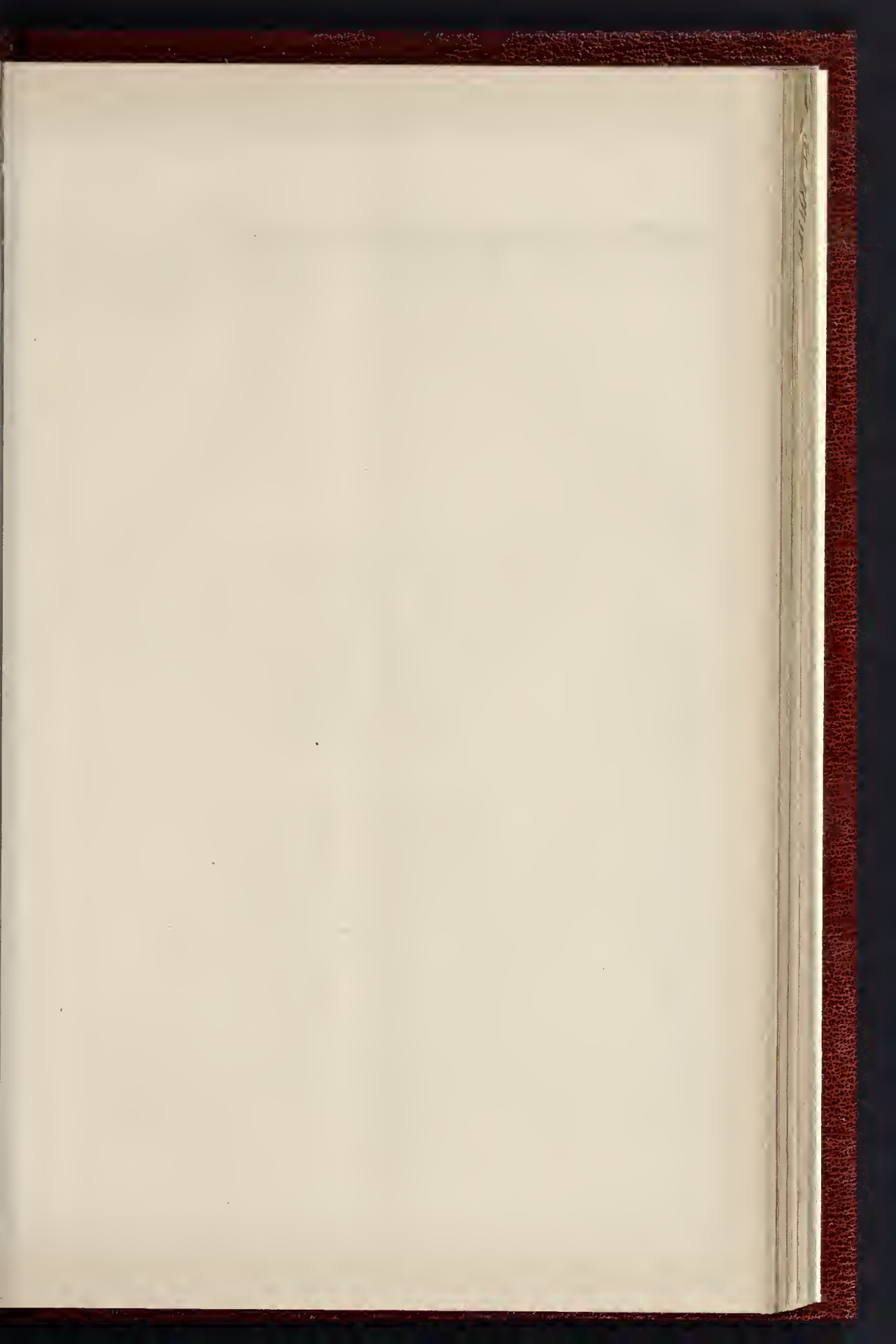


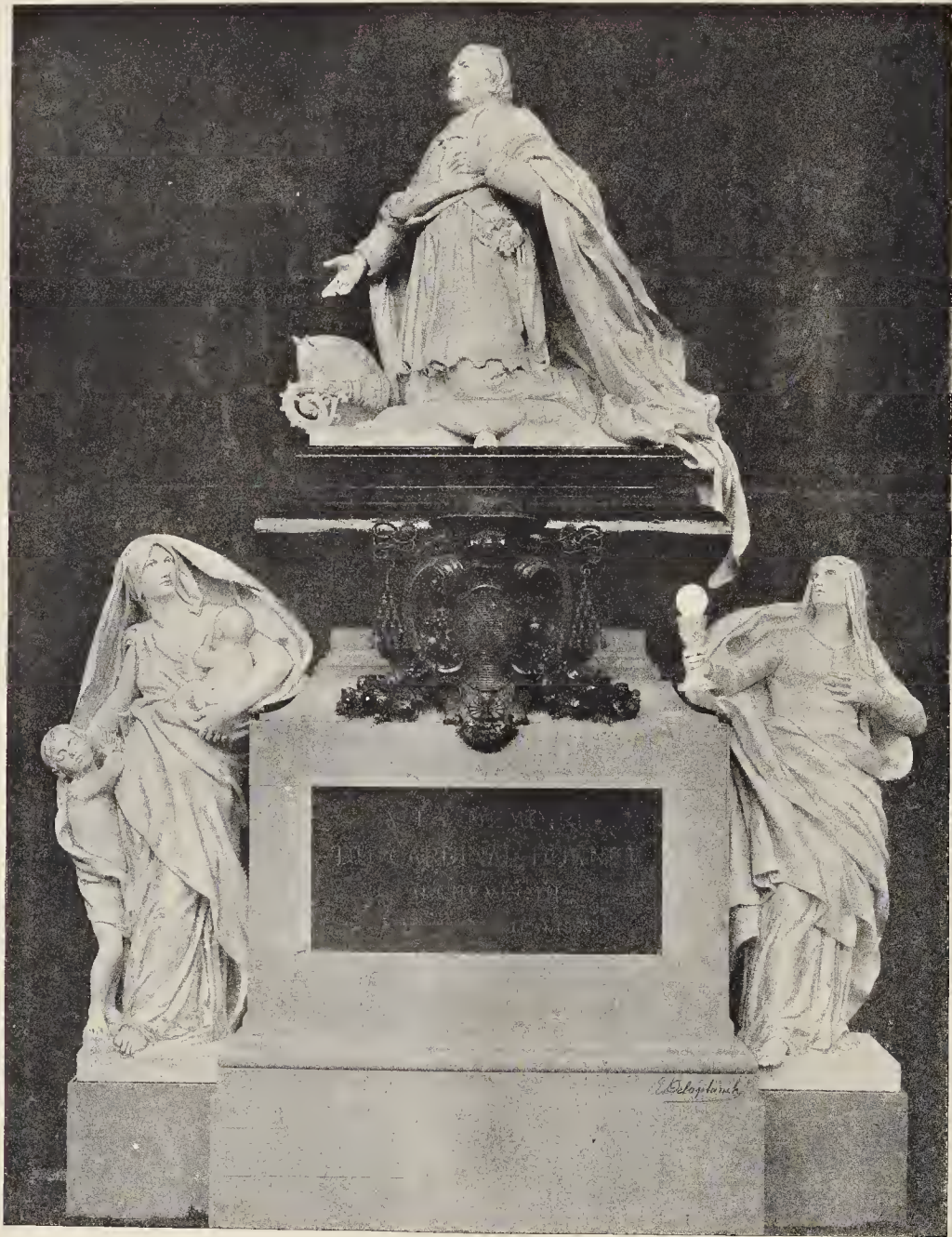


PHOTOGRAPH BY MR. J. C. B. MARSHALL, 10, CHURCH LANE, LEEDS.

THE LEEDS LIBERAL CLUB.—MESSRS. CHORLEY & CONNOR, ARCHITECTS.

No. 1890 Royal Academy Exhibition, 1890.



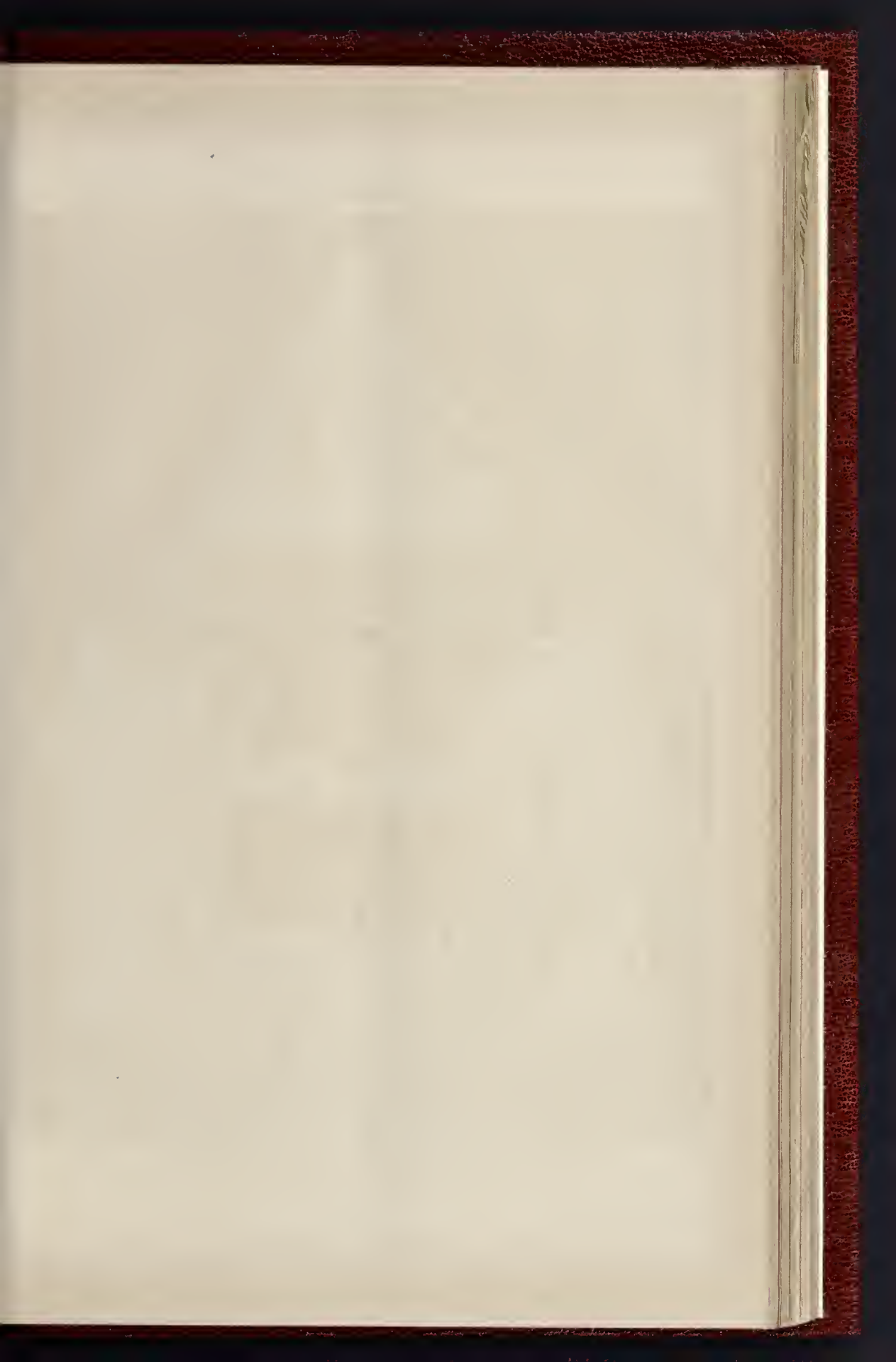


INK PHOTO, SPRAGUE & CO 22, MARTINS LANE, CANNON ST. LONDON, E.C.

MODEL OF MONUMENT TO MONSIEUR DONNET, ARCHBISHOP OF BORDEAUX.
M. DELAPLANCHE, SCULPTOR

No. 3762, Paris Salon, 1890.

FROM A PHOTOGRAPH BY BLOCK ET CIE., PARIS.





INK PHOTO: SPRAGUE & CO., 22, MARK LANE, CANON ST., LONDON, E.C.

DESIGN FOR A RELIEF.—MR. CHARLES LAWES, SCULPTOR.



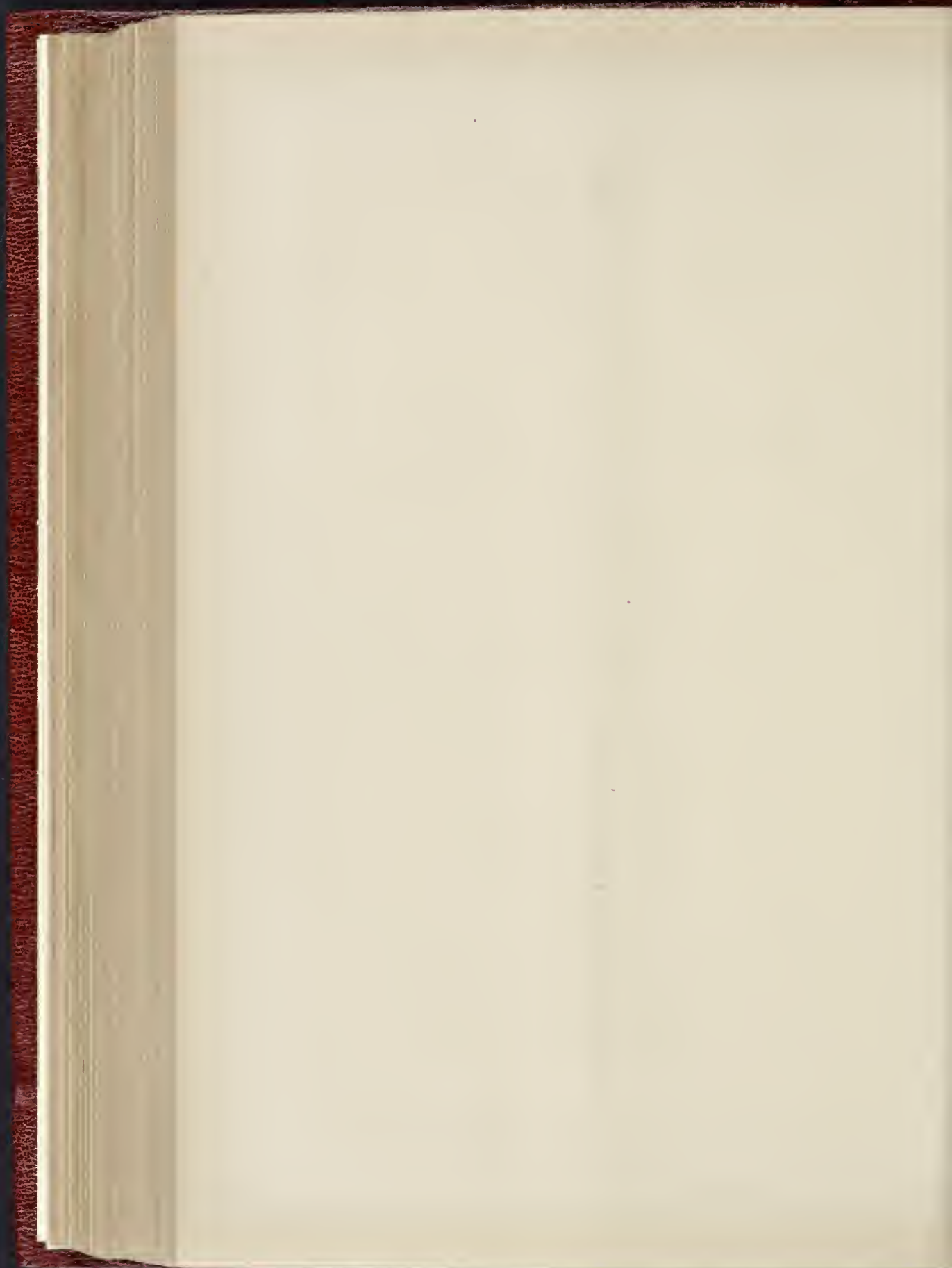
INK PHOTO SPRAGUE & CO 22, MARTIN LANE, CANON 57 LONDON E.C.

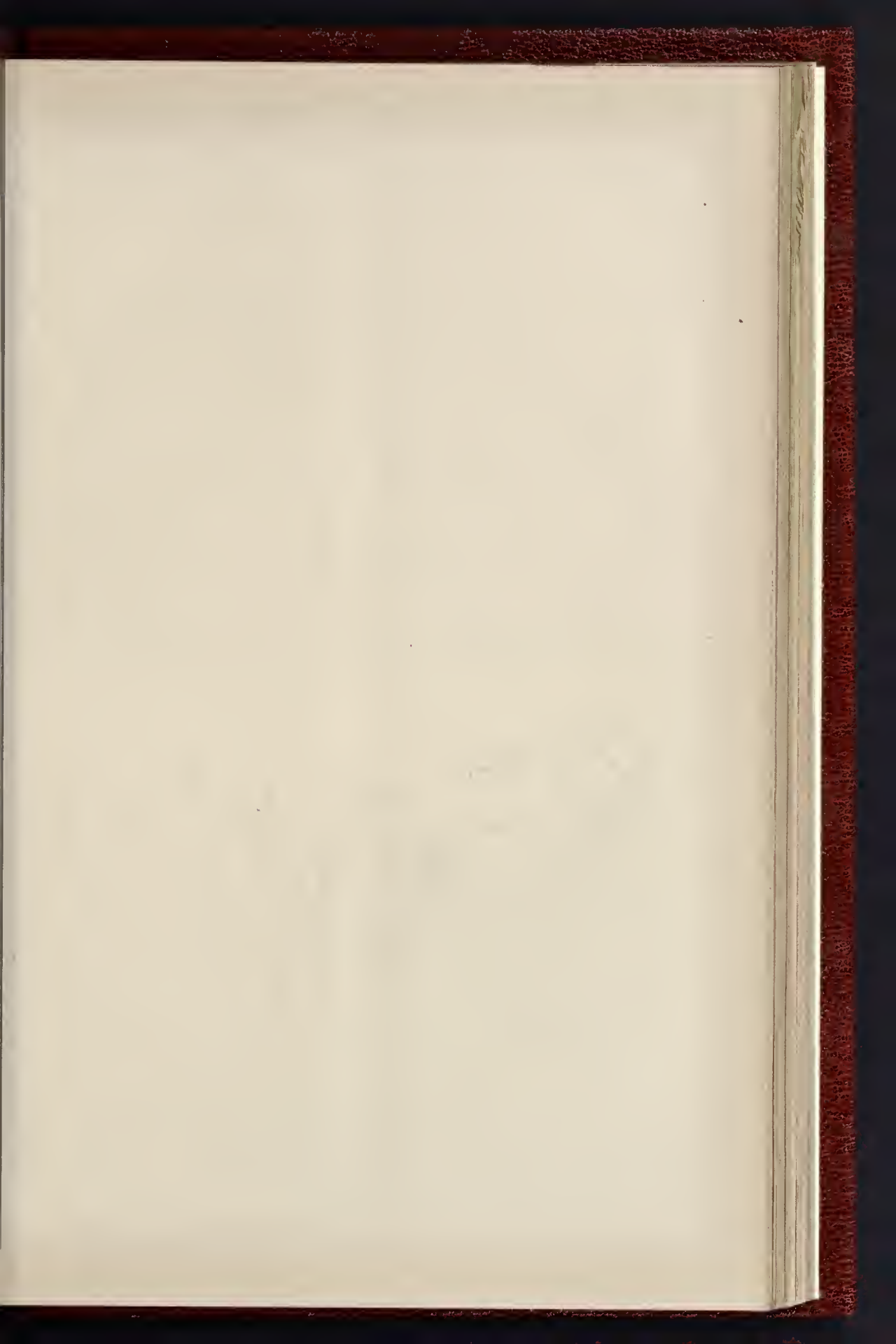
THE GUARDIAN ANGEL: RELIEF.—MR. H. H. ARMSTEAD, R.A., SCULPTOR.

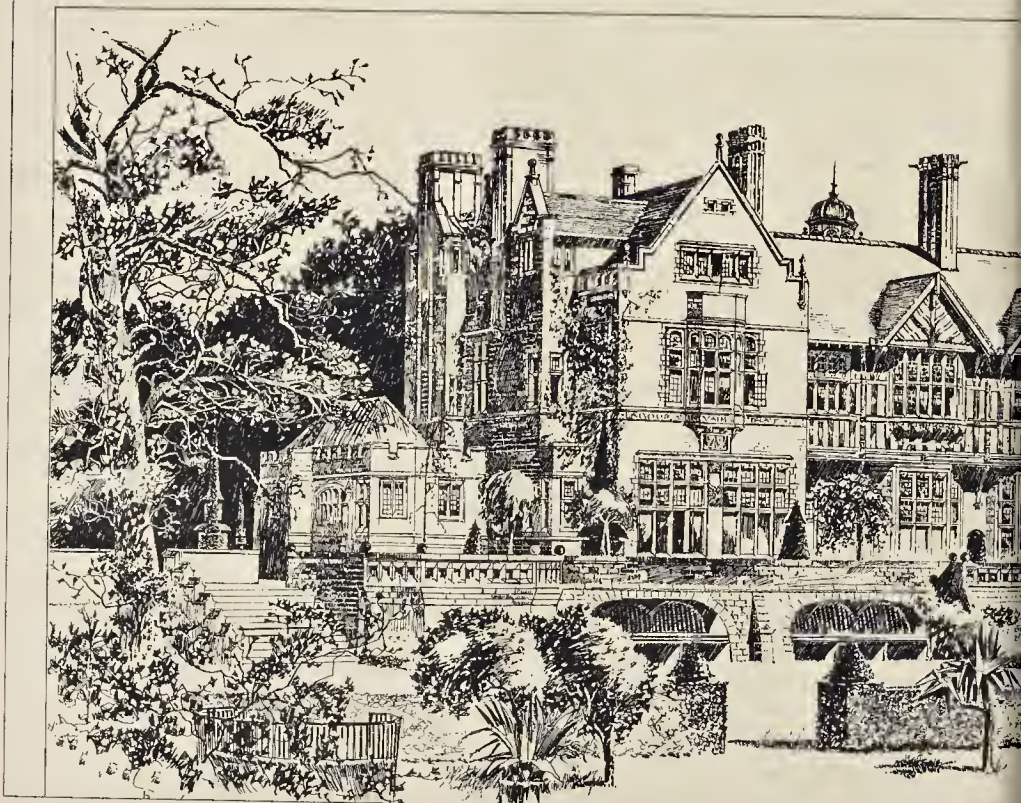


DU GUESCLIN.—M. LEMAIRE, SCULPTOR.

THE PHOTO REPRODUCED BY THE MARTIN LANE ARTISTS ST. LOUIS E.







PEVEREY; PROPOSED NEW HOUSE FOR SIR OFF

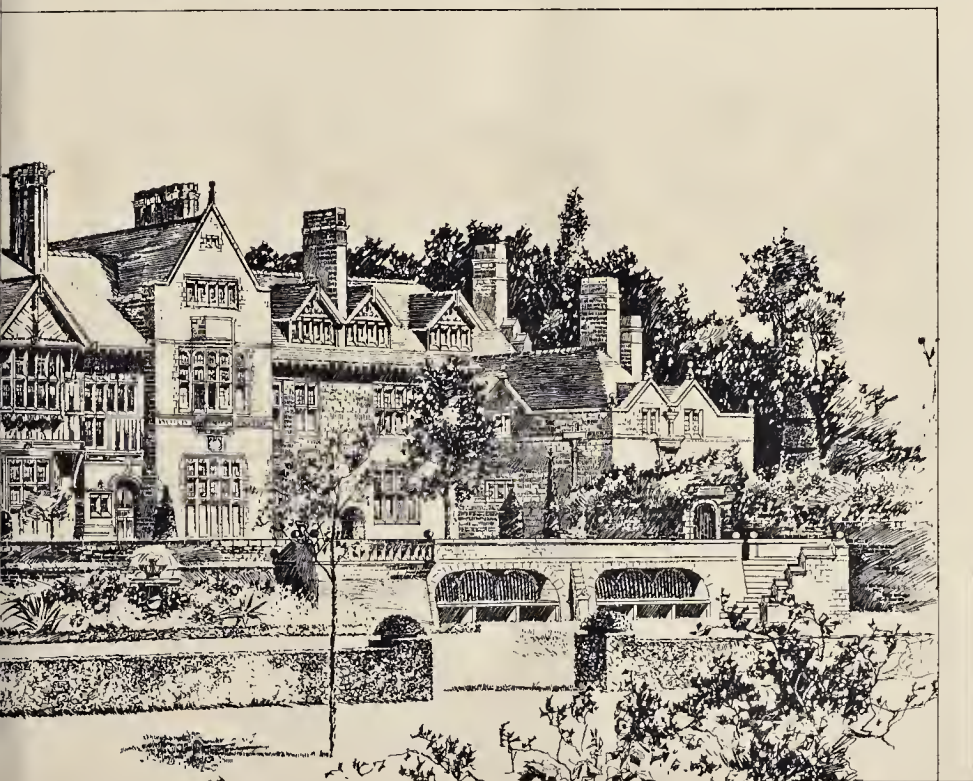
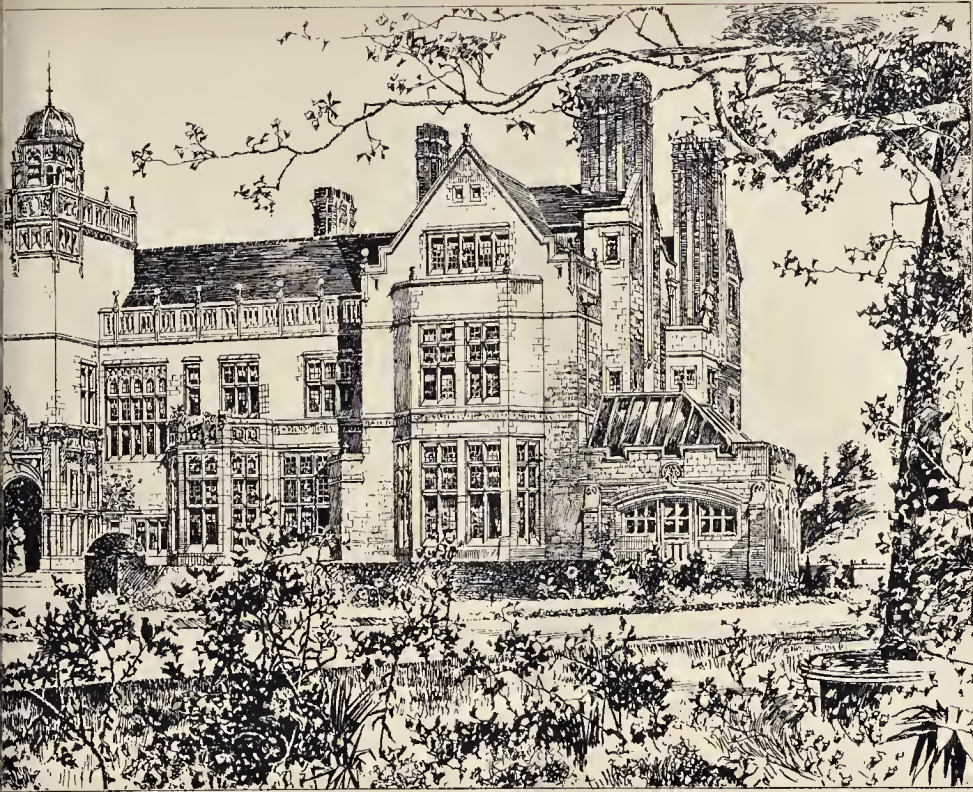
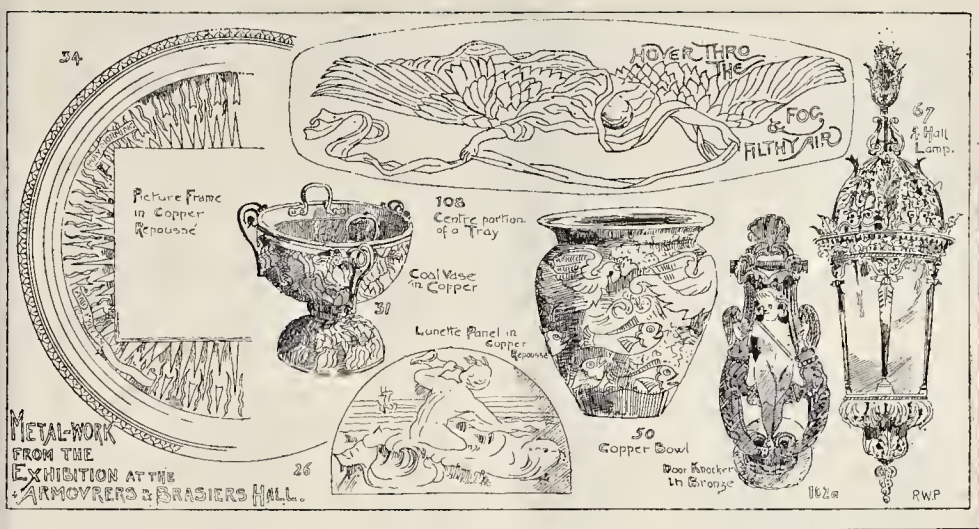


PHOTO-LITHO. SPRAGUE & CO. 22, MARTIN LANE, CANON ST. LONDON E.C.



THE ARMOURERS' COMPANY EXHIBITION.

By the kind permission of the Armourers' Company we are enabled to give sketches of some of the chief objects in the Exhibition of Metalwork held in the Company's Hall, to which we referred in a "Note" last week.

THE INSTITUTION OF CIVIL ENGINEERS.

At the concluding ordinary meeting of the Session, on Tuesday, the 20th inst., Sir John Cooke, K.C.M.G., President, in the Chair, the Paper read was on "The Keswick Water-Power Electric-Light Station," by Messrs. W. P. James Fawcett and Edw. W. Cowan, Assoc.-M.M. Inst. C.E.

This was believed to be the first attempt to utilise available water-power in this country for the purposes of a public supply of electric light. Early in last year, the directors of the Keswick Electric-Light Company instructed the authors to prepare plans, and to procure tenders for the erection of a central supply station in or near Keswick. As the area proposed to be lighted was large and sparsely populated, it was seen that the only feasible system to adopt was an overhead high tension one. The alternating-current transformer system was finally selected, and a site on the River Greta, about 2 miles from Keswick, was chosen for the erection of the station, the river being here available at 20 ft. head. The saving effected in using this water-power was considerable. The rent paid for the water was 10s. per horse-power per annum. Taking the number of horse-power hours required per annum as 100,000 for the present output of the station from a 50-horse-power turbine, the cost per horse-power came out as 0.06d. On the other hand, taking the price of steam-coal at 15s. per ton, and the quantity burnt per horse-power per hour as 6 lb., the cost per horse-power hour came to 0.48d., or eight times the cost of the water-power. In addition to this, the attendance required for a turbine was, of course, less than that necessary for a steam-engine and boiler; the first cost, maintenance and depreciation, were also considerably less, and the chances of a breakdown much less likely. As there was a possibility of partial failure of the water-supply during extreme drought in summer, it was decided to provide steam in addition to water-power. The turbine was of American design, and was called the "Victor." It was of a "mixed-flow" type, the wheel being 20 in. in diameter. Its speed was 273 revolutions per minute; this was at least 70 per cent. greater than the speed of an "inward," an "outward," or a "parallel-flow" turbine would have been, working under a similar head. Its design was exceedingly compact, and the regulation, which was effected by opening and closing a cylindrical sluice working between the guide-passages and the wheel, was

all that could be desired. As the turbine was 16 ft. above the level of the tail-race, a draught-tube was necessary to give full effect to the head of 20 ft. This draught-tube was of wrought-iron, 14 ft. long and 3 ft. in diameter. The maximum velocity of water flowing through it was a little over 4 ft. per second. The engine was a Westinghouse of simple type, having two single-acting cylinders, 10 in. in diameter by 9 in. stroke; it gave with 50 lb. of steam, at 350 revolutions per minute, 50 H.P. brake horse-power. The floor-space taken up by the engine was 7 ft. by 4 ft. The boiler was a 20 nominal horse-power Hyde duplex, 4 ft. 6 in. in diameter, and 11 ft. 6 in. in height. Its working pressure was 120 lb. to the square inch. The alternator, which was designed by Mr. Gisbert Kapp, and manufactured by Messrs. Johnson & Phillips, the contractors for the electrical plant, was a 30-kilowatt separately-excited machine, giving an output of 15 amperes at 2,000 volts. Its speed was 750 revolutions per minute, and the frequency 75. The armature had a cast-iron supporting-ring, 28 in. in diameter and 2 1/2 in. wide, provided with six arms. The armature-core was of charcoal-iron strip, 2 1/2 in. wide, wound with paper insulation to a depth of 8 in. There were nineteen coils, each containing 100 turns of 0.072-in. wire, covered to 0.092 in. in two layers. The resistance of the armature, after working some hours, was found to be 7 ohms. The magnetic field consisted of twelve magnets on each side of the armature. The cores and pole-pieces were of wrought-iron, the yoke-rings of cast-iron. The former were cylindrical, 3 3/4 in. in diameter. The latter were 4 in. by 7 1/2 in. Each core was wound with six layers of 58 turns per layer, with 0.102 in. wire covered to 0.117 in. The total resistance of the field after working some hours was 11.2 ohms. At full load the energy of the field was 3 per cent. of the output of the machine. The framework was of substantial construction, and the machine, when running, was remarkably free from vibration. Its open design admitted of the free passage of air to the armature, which would carry 20 amperes without overheating. The magnets could be racked aside for access to the armature. The exciting dynamo was a 1-kilowatt machine of the gramme type, giving 10 amperes at 100 volts. Regulation was effected by varying by hand the resistance in the field-magnet circuit. Two circuits left the station, both of which were double-pole fused, and provided with double-pole switches and lightning-arresters. There were some special features in the method of carrying out the overhead mains. If wire of high insulation had been used, the expenditure would have been considerable, and it did not appear that any great advantage, other than increased durability of the mains, would have resulted. It was, therefore, determined to use a lower insulation for the mains, and to rely upon the points of support for insulation, also to use special arrangements for

cutting off all surface leakage where the wires entered the consumer's premises. The authors were not aware that attention had been paid to this point before, yet it would seem that in wet weather, upon a long line of overhead mains, even with the best insulation, the surface leakage, when high-tension currents were employed, would be considerable; and if devices were not adopted for cutting this off where the wires entered buildings, leakage to earth must result, which might be a source of danger as well as of loss. The mains at Keswick were being insulated from earth, and from each other, by oil throughout the system. The house leading-in wires were insulated with vulcanised india-rubber of the highest quality, and were threaded through a shackle oil-insulator, the wire being cemented in with Chatterton's compound. Such an arrangement should effectually cut off surface-leakage from the mains. The leading-in wires entered the roof through a stone-ware pipe, provided with a covering-piece to keep out rain and cover a reservoir of oil in the mouth of the pipe. The sizes of the mains were fixed for a current density of 500 amperes to the square inch. The fall of potential, between the generating station and the town, was only slightly above 1 per cent. at full load. Steel suspension-strand was used for supporting the mains for all circuits, consisting of three strands, each strand being 14 B.W.G., and galvanized. One short run of underground mains was being tried, the Brooks fluid-system being used. This system had much to recommend it; it was simple, cheap, and durable, and did not take long to lay down. The transformers were Kapp's patent, and they transformed the high-tension current of 2,000 volts to 100 volts. A double-pole, quick-make and quick-break switch, with double-pole fuse and lightning-arrestor, was used in the high-tension circuit with each transformer. Both the transformers and the switches were enclosed in cast-iron water-tight cases. A series of experiments had been made to test the efficiency of the machinery, with the result that the total efficiency of the generating-plant at the station came out at about 40 per cent. at 1/2 full load, and over 70 per cent. at full load. In connection with the arrangement of this central-station scheme, the authors had occasion to make a comparison between the illuminating power of the glow-lamp and gas; the results showed that the relative values usually given were misleading, and they almost invariably dealt with a standard London Argand, a burner seldom used for ordinary lighting. This burner was generally taken as giving from 15 to 16 candle-power for five cubic feet of gas consumed per hour; whereas out of a large number of ordinary burners taken haphazard, and tested where they were in use, in Chester, Manchester, and Keswick, at various times, it was found that the light given by five cubic feet of gas per hour was more frequently

equal to eight candles or less. This would show that, in practice, one 16-candle-power glow-lamp gave approximately the same degree of light as two ordinary burners, each consuming five cubic feet of gas per hour. This conclusion seemed to be borne out by the result obtained by Dr. Hopkinson, who, experimenting upon some ordinary burners, found the average candle-power to be 1.76 per cubic foot of gas. As regarded glow-lamps, Sir David Solomonson found that 100-volt 16-candle-power Edison-Swan lamps averaged 17-candle-power at 100 volts. The light had been received with great favour at Keswick, and already the demand was equal to the supply of the present plant. Supply was commenced at the beginning of the year, and the station had run without hitch up to the present time—a man and a boy being found sufficient for tending the machinery.

It was announced that the Council had recently transferred Messrs. A. W. D. Bell, J. S. Brown, M. Grant-Dalton, H. B. Harvey, G. R. Lynn, H. A. Purdon, and W. J. Wilson, F.C.H., to the class of *Members*; and had admitted Messrs. N. P. Anderson, H. T. Ashton, E. S. Burrough, P. V. McMahon, R. W. Newman, H. E. Newton, J. Perez-Seoane y Villalobos, W. J. A. Watkins, and C. E. Wolf as *Students* of the Institution.

The last ballot of the session resulted in the election of Messrs. J. B. Allott, W. P. von der Hörst, and T. H. Wickes as *Members*; and of Messrs. G. E. Abrahams, P. Allan, O. Archer, W. Banks, Stud. Inst. C.E., W. F. Barry, B. R. Beale, B.A., Stud. Inst. C.E., G. W. Budd, H. A. Caffin, Stud. Inst. C.E., G. B. Dunn, M. Elliot, H. T. Foord, Stud. Inst. C.E., H. Hinds, A.K.C., Stud. Inst. C.E., G. H. Holden, A. H. Kingsley, B.A., T. E. Laing, C. Law-Green, J. Lee, M.A., T. S. McCallum, H. W. Prince, Stud. Inst. C.E., H. W. Ravenshaw, A. Stewart, V. de Timonoff, and W. H. Todd as *Associate-Members*.

The annual general meeting, to receive the report of the Council, session 1889-90, and to elect the Council for the ensuing year, will be held on Tuesday, June 3, at 8 p.m.

THE EMPLOYERS' LIABILITY BILL.

The Joint Parliamentary Committee of the Institute of Builders, the Central Association of Master Builders of London, and the National Association of Master Builders of Great Britain, requested the Home Secretary to receive a deputation from the Joint Committee to lay before him the objections which the building trade, as large employers of labour, and specially affected by the proposed amendment of the law, entertain to the provisions of the Employers' Liability Bill. The Home Secretary has caused the following letter to be sent to the Secretary of the Institute of Builders:—

"Home Department, May 23, 1890.
Dear Sir,—I have laid your letter of the 23rd inst. before Mr. Matthews, and he desires me to say that, though he would have been glad to have conferred with the members of your Institute, yet he feels that under all the circumstances, and in consideration of the fact that the views of your Institute were fully laid before him last session, and are now present to his mind, no useful object would be served by his receiving another deputation on this subject at the present time.—Yours faithfully,

(Signed) R. RUGGLES-BRICE.
R. S. Henshaw, Esq."

THE ARCHITECTURAL ASSOCIATION VISITS:

NEW PRINTING-OFFICES IN BREAM'S-BUILDINGS.

The last of the visits for this session took place on Saturday afternoon, when a party of members of the Association, under the guidance of the architects, Messrs. Satebell & Edwards, paid a visit to the new printing and publishing offices in Bream's-buildings, Chancery-lane, of the *Field*, the *Queen*, and the *Law Times*, which are now almost ready for occupation, and will supersede the well-known building in the Strand.

No expense has been spared to make the new building structurally sound, and if the result externally is not an aesthetic success, the blame need not be wholly attributed to the architects. The site is a rectangular one, and has been almost covered with buildings, every part of which is thoroughly well lighted, and in this respect cannot be too highly commended.

Heavy machinery occupies most of the basement, whilst the ground-floor contains the publishing and general offices. The first floor is occupied by the manager's and secretary's offices and other centres of administration, including editors' rooms. The second and third floors contain large printing and compositors' rooms, with manager's offices, foundry, and other necessary departments in contact therewith. The walls of the workshops are lined with glazed bricks of varying colours, whilst the floors are covered with pitch-pine wood blocks.

The construction of the floors and also the roof is fireproof throughout. The latter is flat and is covered with Claridge's asphalt, which forms an excellent finish.

The front and side elevations are treated with Portland stone, relieved by Fareham red bricks. Messrs. Dove Brothers are the contractors for this carefully-planned and well-erected building. Mr. Fisk is the clerk of works and Mr. T. Pratt the general foreman.

"THE TIVOLI," STRAND.

The new building for the "Tivoli" Concert-hall and Restaurant, in the Strand, close to the Adelphi, has a frontage of about 90 ft. The buildings are of fireproof construction. The following description has been sent to us:—
"The elevation is after the style of the old houses in the market-place of Hôtel de Ville, Brussels, the pilasters in the front being composed of marble and bronze, and the front itself of Corsham stone."

The entrances to the concert-hall are on three sides of the building. The area is entered by a broad staircase, and is provided with three exits. The balcony is entered from the grand entrance-hall, and has two exits.

The first balcony is approached by a wide staircase, and also has two exits, the exit accommodation being equal to over 5,000 persons, whereas the actual seating accommodation is calculated at about 1,000, and the promenade, lounges, &c., about the same. On each tier ample space has been set apart for promenade purposes. The staircases throughout are composed of concrete, which is imperishable. On each level retiring-rooms for both sexes have been provided. The interior decoration is Indian in style.

Sprinklers on the non-automatic system have been placed over the stage, and are controlled by valves fixed near the artistes' door, where is also placed a hydrant, the whole being under the control of the fireman. The whole building is provided with hydrants. The artistes' rooms are well ventilated, and are fitted with every accommodation, the lady artistes being on one side of the stage, and the gentlemen on the other. There are two exits from the stage.

The restaurant consists of a buffet on the Strand level, the 'Palm Room' on the first-floor, the 'Flemish Room' on the second-floor, and the private dining-rooms on the floor above, with the kitchens and offices on the top floor. The restaurant is entered from the corner of the Strand and Durham-street by a grand staircase, and a lift enables diners to reach every floor without trouble. The floor of the 'Palm Room' will consist of tiles of marble. The dado, which is paneled, is also of alabaster and marble. The room was to be divided into sections (so as to partially screen each table) by carved figures representing Cupids driving swans, supporting real palms intermingled with leaves of bronze palms, the latter rising to the ceiling supports, and dividing the wall surface above the dado into panels which are filled with Venetian mirrors to correspond with the windows, but this design has been somewhat modified, the Cupids and swans being omitted. The ceiling is divided by groups of palm-leaves, forming pendants, from which hang globes representing the fruit of the palm, the ceiling being lighted from these points. The colouring will be enamel, ivory-white, and gold. The room is about 60 ft. long by 25 ft. wide.

On the second floor, the 'Flemish Room,' another large dining-room of the same size, is decorated in the old Flemish style with carved oak. The walls and ceilings are paneled in oak, with tapestry panels to walls and polished oak floor.

On the third floor are the private dining-rooms, decorated in the different styles: Moorish,

Whatever merit the *facade* might have possessed as an architectural composition is marred by the gigantic letters TIVOLI which have been fixed on the top story.—ED.

Japanese, Louis XV., Pompeian, &c. On this floor is also provided a Masonic Temple, decorated in the French Gothic style in paneled oak, with all the necessary ante-rooms. Each floor is provided with lavatory accommodation.

The electric light will be used throughout the entire buildings, although gas will be laid on for use in case of emergency.

The whole of the restaurant is heated by hot water.

The building has been designed by Mr. Walter Emden, architect; Messrs. Kirk & Randall are the contractors; Messrs. Heighway & Depree have executed the marble work and decorations, the sculptors being Messrs. Goyer, of Louvain; Messrs. Shand, Mason, & Co., the fire appliances, for which Mr. George Harrison, A.M.I.C.E., is the engineer; Messrs. Hackford & Farthing are the surveyors. The lifts are by Messrs. Waygood, the gas and special Indian gas fittings being by Messrs. Vanglian & Brown, the beating by Messrs. Cowan.

As to the heating arrangements, we may add that the diameter of the boiler is 40 in.; height 64 in. The number of "flows and returns" employed in this theatre is ten of each. The total number of feet of pipe used, exclusive of bends and elbows is 3,440 ft., of which 1,150 are 2 in., the remainder being 1½, 1, and 1 in. Of this quantity, 2,260 ft. is run horizontally. There are also heated by this boiler 41 radiators, containing 608 loops, each radiator averaging 14½ loops, and in height 36½ in. The system is a low-pressure one.

A PLEA FOR IMPROVEMENT OF SIX- AND EIGHT-ROOMED HOUSES.

SIR,—In these days of improved dwellings for the poor and superior planning of the houses of the rich, it seems inconsistent that the houses rented by persons of smaller means should be comparatively neglected. Houses of six and eight rooms are built on one stereotyped plan, and the sooner this is attacked and improved, the better.

As we judge of all things by contrast and comparison, I propose to do so in this case by examining the defects of the everlasting plan (fig. 1) upon which these small houses are erected. The door on one side, staircase beyond in centre of block, lighted by two square feet of glass over front door, and about 12 ft. distant; the room behind lighted by a hybrid French window squeezed into one corner, and looking down an alley overshadowed by back addition, making this (the usual sitting-room) so cheerless and sunless as to force upon us the remembrance of that dreary passage in Scott's "Rokeby,"—

"Although the sun was on the hill,
In that deep dell 'twas twilight still."

Then up the dark staircase we come to a drawing-room on first floor, a back-room in rear, and on second-floor two bedrooms and a sort of dressing-room. The back addition sometimes has a passage-way out to side alley, sometimes not; then come kitchen, with door opening opposite front door, that every one who calls may see what is going on; beyond, a scullery, and outside this a w.c. and dustbin, so that where there is a garden the scullery and water-closet have the privilege of it; the children being relegated to a sunless room, although air and sunshine are of vital importance to juvenile life. Above this block are frequently two rooms, one beyond the other, and one a passage-way to the other, that is to say, the privacy of each is destroyed; sometimes a bath and w.c. are provided on this floor. To this antiquated arrangement I propose an alternative, adding little to the cubic contents, but improving the distribution of the rooms; *vide* sketches (figs. 2, 3, 4, and 5). By any of these arrangements, the two best rooms in the house have the best outlook,—one over the road in front, the other over the garden (the usual position selected for a drawing-room). Neither of these rooms need be dominated or overshadowed by other parts of the building, whilst the working rooms (kitchen and scullery) have a central position, with side-alley set apart as a kitchen court, the staircase being lighted and ventilated by a tall window, which may also light the passage. If the tenants can afford it, the front room on first floor could be set apart for a drawing-room, and the room on ground-floor overlooking the garden might be used as an ordinary living-room, being bright and sunny and available for children, enabling the other

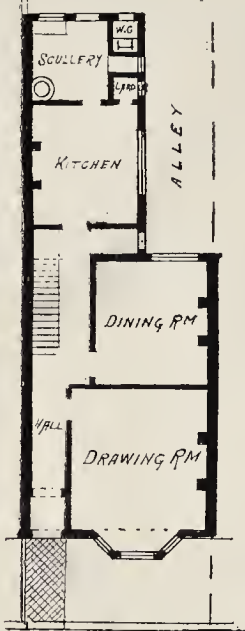


Fig. 1.
"The Everlasting" Plan.

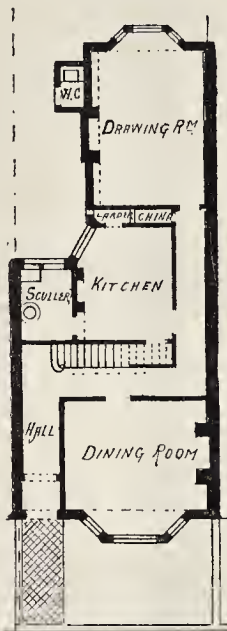


Fig. 2.—Ground Floor.
Stairs lighted over Scullery.

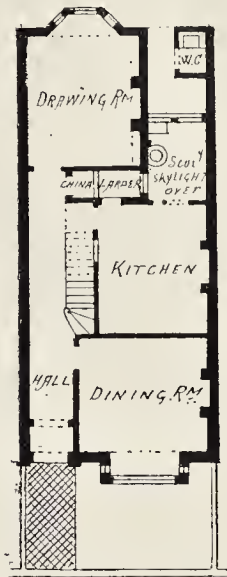


Fig. 3.—Ground Floor.
Stairs lighted over China Closet.

parts of the house to be kept neat and tidy. On the first floor there can be four bedrooms, a bath-room, w.c., and rooms in roof. Again, if the tenant should sublet a moiety, the arrangement would be found most convenient, one family occupying the front portion, the other the back.

I appear not to be alone in this my advocacy for improved planning, as houses have been built something on this plan in several parts of London, and in neighbourhoods that are ripe for building they are taken with avidity. I have treated of houses of two and three stories only, without basements, as basements for such property are not popular.

Reference to the several plans will demonstrate the convenience recommended.

T. E. KNIGHTLEY.

106, Cannon-street, E.C., May 19, 1890.

ARCHAEOLOGICAL SOCIETIES.

British Archeological Association.—At the meeting of this Association held on May 21, Mr. J. W. Grover, F.S.A., in the chair, a series of flint implements found during the progress of sewerage works at Forest-gate and Wanstead, Essex, were exhibited by the chairman, among the objects being a singular flint knife, very smooth and thin. Two bronze celts were also exhibited, which were recently found near Mitcham Junction, 6 ft. deep in drift gravel. Mr. Macmichael described several articles of Roman fibulae wares which have been found in some excavation works in Bow-lane, among them being an almost perfect mortarium and a fragment of a very large vase of Upchurch ware. A paper was then read by Mr. W. J. Davis on an altar-slab which exists at Sheepscombe, Gloucestershire. After referring to many curious evidences afforded by ancient place-names in the locality he indicated their bearing upon the recorded history. Many of the old names are similar to those found in Scandinavia, and there are many indications of the presence of the Danes, Deadcombe being the site of a battle in which the invaders were routed. The Earls of Shrewsbury had an extensive mansion in the parish, and the altar-slab which formed the subject of the paper belonged to the private chapel of the mansion. This has long since been demolished, the ruins being used as a

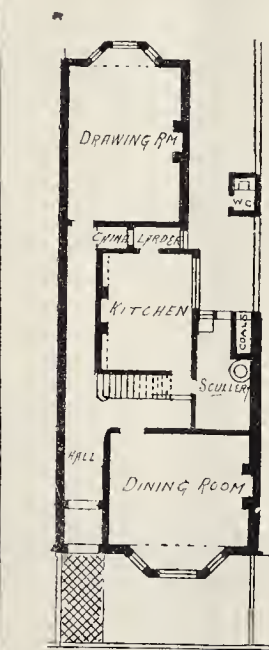


Fig. 4.—Ground Floor.
Stairs lighted over Scullery.

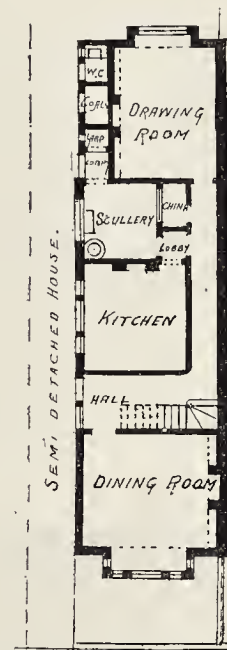


Fig. 5.—Ground Floor

quarry. The slab is now built up over the door of a pig-sty. It bears an inscription recording that it was consecrated by Nicholas, who was Suffragan Bishop of Worcester, 1392-1421, and dedicated to the Holy Trinity and All Saints. In the discussion which ensued, Mr. E. Walford referred to the very few examples which remain

of inscribed altar-slabs. The second paper was by Mr. E. P. Loftus Brock, F.S.A., who described some curious features of Saxon architecture at Sterrington Church, Beds. The western tower has been found to be of Saxon work. This was revealed during the restoration of the church in 1872. Still more recently,

the Rev. J. R. H. Duke, Vicar, observing some indications of openings in the north and south walls (now within the later aisles), had the plaster removed, with the result that a south doorway has been found, and two windows played on both sides alike. In one of them a thin oak slah, in which an opening had been cut, still remains, but very greatly decayed.

Essex Archaeological Society.—On the 22nd inst. a quarterly meeting of the Essex Archaeological Society was held at East Tilbury. The visitors alighted at Low-street station (which is the site of the discovery of a Roman burial-place, whence many urns have been obtained), and drove to East Tilbury, where a meeting was held in the schoolroom. The Rev. H. J. E. Barter, the Vicar, read an interesting paper on the place and neighbourhood, with an account of the more recent discoveries and evidences of the remains of Roman and other early occupation of the district. Mr. F. C. J. Spurrell, the well-known archaeologist, also read a paper. East Tilbury Church, a highly-interesting structure, with Transition-Norman north arcade and early English chancel, was described. It suffered greatly by having been battered by the Dutch fleet which passed up the Thames in 1667, when the tower was destroyed, and, probably by the same attack, the south aisle of the Decorated period was demolished. In anticipation of the meeting, the Vicar had kindly caused the site of the tower and south aisle to be excavated, which had led to the discovery of their foundations. A visit was afterwards made to the Roman Causeway across the marsh to the margin of the Thames, which corresponds with Higham Causeway on the opposite side of the river. Extensive Roman potteries appear to have existed in this district. One kiln has recently been discovered close to the churchyard wall.—*Essex County Chronicle.*

Royal Society of Antiquaries of Ireland.—A largely-attended meeting of this Society (until lately known as the Royal Historical and Archaeological Association of Ireland) was held in the Town-hall, Kilkenny, on the 20th inst., Lord James Wandersford Butler, President, in the chair. The President, in his address, said it gave him much pleasure to preside at the first meeting of the Royal Society of Antiquaries of Ireland, a title which her Majesty had thought well to grant them, he believed, he might say, in consequence of the exertions made by members of the body formed in Kilkenny as far back as the year 1849 by his (the President's) brother, the late Lord Ormonde, who was aided by the late Rev. James Graves. Though not a native of the city of Kilkenny, he had resided there for a long time, and was deeply interested in all that concerned it, more particularly in the subjects which more especially concerned that society. Having touched on the objects and scope of the Society, he expressed himself as feeling peculiarly honoured by being chosen as the first President of the Royal Society of Antiquaries.—Twenty-five new members were declared elected.—Mr. Cochrane mentioned that he understood the Irish Government were bringing in a Bill to give them increased powers for repairs, and Kilmallock Abbey would be specially mentioned and specially dealt with. He hoped that before long the Government would take the Abbey in hand, but in the meantime they proposed to spend a little money on the place themselves.—The report on the matter laid before the meeting by the hon. sec. was unanimously adopted.—Mr. D. H. Creighton, hon. sec., read a list of objects presented to the museum, which included several articles of great interest.—In the evening a meeting was held for the reading of papers, and on the following two days there were excursions to various places of interest. We understand that the following resolution, proposed by Mr. P. M. Egan, seconded by Colonel Vigners, has been unanimously adopted by the Society:—

"That, in view of the announcement recently made that the Irish Government are at present engaged in drafting a Bill to amend the National Monuments Act and the Ancient Monuments Protection Act, 1882, the Council of this Society be requested to place themselves in communication with the authorities, and to point out the necessity that exists to make the proposed Act sufficiently comprehensive to enable the Government to take into its custody any church, monument, tower, or other building of a like character, and of archaeological interest, such as are scheduled in either of the above Acts, provided satisfactory title cannot be obtained. We trust the legislation on the subject will empower the Treasury to contribute an amount equal to the local aid for maintaining any monument which the Board of Works may approve of."

PROVINCIAL NEWS.

Billesdon (Leicestershire).—Mr. J. T. Harrison, M. Inst. C.E., an Inspector of the Local Government Board, recently held an inquiry at the "Castle," in Leicestershire, with respect to the application of the Billesdon Union Rural Sanitary Authority to borrow 6,203*l.*, for works of street improvement and storm drains. The money intended to be spent in making the storm drains is 1,266*l.*, and for street improvements 4,937*l.* Mr. J. B. Everard, M. Inst. C.E., of Leicestershire, produced plans, and explained the former, and Mr. William F. Ault, Assistant Surveyor to the Board, produced plans, and gave evidence as to the street improvements. There was no opposition.

Birmingham.—A large block of buildings, consisting of residences, and having a frontage of about 500 ft., is now approaching completion at Edghaston. The houses have good reception-rooms, kitchens, &c., entrance and back halls, and vestibules, bedrooms, bath-rooms, and other conveniences. They have large gardens both at front and back. The front elevation is Gothic in character, with bay windows, two-light windows above, with stone columns, arches, labels, and tympana. The total cost is about 10,000*l.* The architect is Mr. J. Statham Davis, and the builder Mr. Edward Airey, both of Birmingham.

Brighton.—An important addition to the sea-side improvements at Brighton, in the shape of a terrace, shelter-hall, and lift, were opened on Saturday last at the eastern end of the sea front. The erection of extra groyne, more especially a great groyne of concrete, has led to an extensive accretion of shingle, and has enabled the Corporation, who now own the foreshore, to lay down several grass lawns similar to, though not quite so large as those which flank the beach at West Brighton. The development of this undercliff roadway, known as "Madeira-road," has had the effect of making this part of the sea-front increasingly popular, so much so that the Corporation at last found themselves impelled to give effect to the suggestions that had been repeatedly offered to provide a shelter to a large portion of the roadway, and to afford some more ready means of reaching the top of the cliff than has hitherto been furnished by the long flights of steps which have done duty since the sea-wall was constructed, half-a-century ago. The work comprises a raised terrace, 1,304 ft. in length, projecting from the sea-wall and carried on massive iron girders supported by iron columns. This will serve as a promenade, and will also afford shelter for many thousands of persons. In the centre of the terrace a shelter-hall, reading-rooms, and lavatories have been provided, as well as a lift worked by hydraulic power, large enough to be used for the raising of handcars. The cost of the work will be about 14,000*l.* We gave a detailed description of the work in the *Builder* for May 18, 1889.

Bromley (Kent).—New baths, public hall, and theatre at Bromley, Kent, have lately been opened, so far as completed. The entire scheme is described as unique, the building being cut into a hill in the rear of the High-street, and 35 ft. below the level of the High-street, so that although the baths are under the theatre, the floor of the theatre is about level with the pavement in the High-street. The building is executed entirely of concrete up to the floor of the theatre. The total height of the building is 110 ft. by 55 ft. wide; the size of the bath is 80 ft. by 35 ft., and is lined with white glazed bricks. The floor over the bath is of compound iron girders, 250 lbs. to the foot, resting on 9-in. cast-iron columns. The whole of the ceiling upon the bath is rendered in Robinson's cement upon wirework, thereby making it fireproof. There is box accommodation for forty bathers, while the lavatory accommodation here, as in other parts of the building, has been carefully considered. The method of emptying the bath into the sewer is by a receiver, 30 ft. deep, below the bath, from whence it is pumped into the sewer. Machinery has been fitted for heating the bath to 70 or 75 degrees, pumping all the water-supply from a well which has been sunk upon the site to a depth of 300 ft., emptying the receiver into the sewer, in addition to heating the bath. This part of the work has been carried out by Messrs. Russell, of Oxford-street, W. The spacious hall and theatre, 80 ft. by 35 ft., is brick-built, lofty, and has a domed ceiling; the lighting and ventilation being by Messrs. Vaughan & Brown. The main entrance

from the High-street is by a wide corridor and crush room, 35 ft. by 22 ft., with efficient doorways to hall, with additional exit doors on each side, for which a verandah of iron has been erected at one side leading to the road and fields in rear of premises, all the doors being fitted with "panic" fittings. There is a large and lofty stage, with arrangements for working the scenery, and a fire-resisting curtain; while a large orchestra is provided at the other end to meet the requirements for orchestral entertainments, serving as a gallery during the theatrical performances; underneath this is a green-room, with exit doors at each end, the entire being rendered fireproof with Robinson's plaster on wirework. In connexion with the stage there is every accommodation for the artists, together with a large property-room under the stage. Fire-hydrants are provided in the hall, bath, and stage, and connected with the water company's high-pressure main. Mr. W. A. Williams, A.R.I.B.A., is the architect. The works were executed by Messrs. Thomas Gregory & Co., of Clapham Junction.

Gloucester.—On the 23rd inst. the foundation stone of the new municipal buildings for Gloucester was laid by the Duke of Beaufort, Lord High Steward of the City. The new buildings, which are expected to cost from first to last about 30,000*l.*, were designed by Mr. George H. Hunt, architect, London. The site, which was formerly occupied by Sir Thomas Rich's School, offered special difficulties to the architect, and though it was originally hoped that at least some portion of the existing building might be utilised, Mr. Hunt found this impracticable. In his design he placed the offices, for easy access and facilities of working, on the ground-floor; the Council Chamber and committee-rooms on the front part of the first-floor; and a public hall at a slightly lower level to the rear. The Town Clerk's, Surveyor's, Accountant's, rate-collectors', School Board, and other offices, are commodious, and Mayor's parlour, retiring-rooms, kitchen, and other departments are provided. The Council Chamber is 45 ft. by 31 ft., exclusive of a public gallery; and the public hall is 78 ft. by 40 ft., with a platform and gallery. The main front of the building is designed in a phase of the Renaissance style, and will be executed in stone; the floors in the entrances, halls, and gallery, in vitreous mosaic; the remainder of the galleries paved. The internal fittings will be of wainscot oak and red deal. We gave a detail elevation of the principal front, a perspective view, and two plans of the building, in the *Builder* for July 13, 1889.

Ipswich.—We are informed that a theatre is about to be erected by a new company in Ipswich, under the patronage of the leading men of the district. In the old theatre of this town David Garrick made his first appearance; and Mrs. Keeley, then Miss Goward, a native of Ipswich, began her dramatic career, whilst in later years Mr. J. L. Toole made his debut on its boards. Ipswich has greatly increased in latter years and has now some 60,000 inhabitants. The new theatre will be constructed to hold about a thousand people. The site is in the middle of the town, in Carr-street, which, under the town improvements, has been widened; it should prove an admirable site. The theatre will be fireproof, and will be lighted by electricity; it will also be isolated from other buildings. Mr. Walter Emden has been appointed architect, and Mr. Arthur Pearce, F.C.A., is secretary.

Manchester.—The new "Palace of Varieties," Oxford-road, Manchester, will soon have the Salvation Army for a very close neighbour. The opposite corner site to the above, facing Oxford-road, with 90 ft. frontage and the new 60 ft. thoroughfare called Whitworth-street, with 120 ft. frontage, has been secured by General Booth for close upon 15,000*l.* Preliminary sketches of the buildings proposed to be put upon the site,—viz., a large "citadel" accommodating 3,000 persons, temperance hotel, and several shops and offices, are being prepared by Mr. J. Williams Dunford, architect, of 101, Queen Victoria-street, E.C. The cost of the buildings will be about 12,000*l.*

Newcastle-on-Tyne.—The first contract in connexion with the erection of "Citadel" buildings in Westgate-road, Newcastle-on-Tyne, for the Salvation Army, has lately been let to Messrs. Middlemiss, Bros. of the same town, for 3,125*l.* The block comprises a large hall seating 3,000 persons, Divisional Headquarters, shop, and other usual appearances. The total outlay will be about 8,500*l.* Mr. J. Williams

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—XXII. DISTRIBUTION—DIRECT SUPPLY.

IF a current C pass through mains of resistance R , and e is the electromotive force used in driving the current through them, then $e=CR$, and eC is the power absorbed for this purpose. If E is the electromotive force producing the current, EC is the total amount of power generated and $EC:eC=E:e$. The value of E may now be increased while that of C remains unchanged; this will increase the total power in the same proportion without in any way adding to that lost in the mains. The higher the electromotive force employed the better must be the insulation of the circuit, but it is much less costly to reduce the proportion of the loss in the mains by increasing E and improving the insulation than by using larger mains for the purpose of reducing R . In the various systems now adopted for the distribution of a large amount of power over extended areas, the one object kept in view is to avoid the necessity of carrying large currents for any distance. The descriptions of the various systems of distribution will be made shorter and clearer by supposing that small electric lamps only, requiring a constant E.M.F. of 100 volts, and a current of 0.5 ampere, are in circuit. When plant is used for which the E.M.F. or current must vary, special regulating devices have to be added to enable such modifications to be made without interfering with the rest of the circuit.

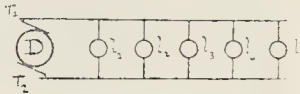


Fig. 58.

When none of the lamps are at a great distance from the generating plant, as in the case of a building which has its own engine-room, a dynamo-machine D , fig. 58, compound-wound to give a constant E.M.F. of 100 volts, is connected to the mains, and all the lamps, l , placed abreast between them.

Any lamp l_1 can be turned off by opening its circuit, without affecting any of the others, since the machine maintains a constant difference of potential of 100 volts between the points T_1 and T_2 . The current given by the machine is always proportional to the number of lamps in use, being 0.5 multiplied into this number, and since the E.M.F. is constant, the exact amount of power required for lighting is sent into the mains without waste. For a large number of lamps this arrangement, known as the Simple Parallel System, is impracticable: for, say, 10,000 lamps, 5,000 amperes must be passed through the mains from the machine, and though the distances may be small, the cost of the cables is prohibitory. As each lamp or group of lamps is passed, going along the mains, from the machine, the current becomes less, and the size of the conductor may therefore be reduced, but sufficient saving cannot be made to render the distribution of a large amount of power by this system a commercial possibility.

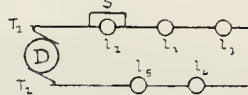


Fig. 59.

In a Simple Series System of distribution all the lamps are placed in series, as in fig. 59, with a constant current dynamo-machine. No matter what the number of lamps, the current never exceeds 0.5 ampere, and a lamp l_1 can be extinguished by a short circuiting switch S . On such a circuit it is the E.M.F. between T_1 and T_2 , which is proportional to the number of lamps in use, and, as in the previous case, the power supplied depends upon the lamps actually giving light. It will be seen, however, that should a lamp break, the current through all the rest would be stopped; a piece of apparatus called a "cut-out," for the purpose of automatically filling the breach, must therefore be

unford, of Queen Victoria-street, London, is he architect.

Oxford.—The Academy states that Mr. S. B. Vorthington, a member of the committee, is instructed to prepare plans for the new buildings of Manchester New College. The works re-estimated to cost 49,000*l.*, of which nearly three-fourths have been already subscribed. The College was founded in 1786, for "free-teaching and free learning in theology." After successive settlements at York, Manchester, and University Hall, Gordon-square, London, it has recently been removed to Oxford, where it is temporarily housed in the former quarters of Mansfield College, opened in October last.

Peterborough.—The Salvation Army has recently purchased a very prominent site in Cowgate, Peterborough, and intend erecting on it some a large "Citadel" capable of accommodating 1,000 persons, and two large shops. Mr. James Wenlock, builder, of Peterborough, has secured the first contract, but the main portion has not yet been tendered for. The architect is Mr. J. Williams Denford, of Queen Victoria-street, London. The scheme will cost about 5,000*l.*

Purley (Surrey).—The "John Bentley Gymnasium," in connection with the Warehousemen, Clerks, and Drapers' School at Purley, has been opened by Mr. S. Hope Morley. The gymnasium is the gift to the Institution of Mr. John Bentley, and has been built from plans prepared by Mr. J. Kingwell Cole, architect, London.

Ramsgate.—At a recent meeting of the Ramsgate Town Council, held at the Town-hall, the Mayor in the chair, the following recommendation of the Sands and Cliffs Approaches Committee was unanimously adopted:—"That Mr. W. A. Valon, C.E., Engineer to the Gas and Water Department, be appointed the Engineer to the Corporation for the purpose of preparing the plans and specifications to be annexed to the proposed agreement with the Board of Trade relating to the improvement of the sea-front."

The Committee recommended that the plans and specifications relating to the proposed front improvements, as now submitted by Mr. W. A. Valon, be forwarded to the Board of Trade for their approval. The improvements may be summarised as follows:—The north side of the inner harbour is to have a new sea-wall extending from the corner of Harbour-street to the West end, which gives an opportunity of building the front walls of the ornamental arches on the present wall of basin, and forms a good wide road in front of them. On their completion it is intended to clear away the Harbour-custos, Customs-house, and Harbour Master's-ouse at present in the Pier-yard, and throw it open to the sea, thus widening and improving the approach to the London, Chatham, and Dover Railway Station, making the road in one place 75 ft. wide. On the completion of his work the Albion Hotel will be removed, and a road formed rising at a regular gradient from Harbour-street, so that when the whole is finished there will be an easy and improved approach to both cliffs. By the deepening of the basin, coal vessels and merchant ships will unload alongside the New Military road and Cross Wall opposite, leaving that part immediately facing the hotels and streets clear for gentlemen's yachts. The total cost of the improvements, including compensation, but without recoupments, which will be considerable, amounts to about 65,000*l.*

St. Helen's.—The foundations for the new public baths here having been completed, the contractor, Mr. John Whittaker, of St. Helen's, has commenced to erect the building. Messrs. Thomas Bradford & Co., of London and Manchester, have the contract for plumbing, &c. The building contains a large swimming-bath, 100 ft. by 20 ft.; one for ladies, 8 ft. by 24 ft.; and thirty-nine private baths. The whole building is to cost 10,000*l.*, and is being erected from the design and specification of Mr. Geo. J. C. Broom, the Borough Surveyor. Mr. John Sadler, of Widnes, is the clerk of works.

Walsall.—Mr. W. H. Westwood, of the Gaiety Theatre, Walsall, is about to demolish his present premises and those occupied by Mr. J. Greenslade, outfitter, adjoining, and to erect a new and far more commodious theatre at the corner of Station and Park-streets. The auditorium of the new building will comprise stalls, pit, dress-circle, private boxes, and gallery, and is promised that from all parts of the house an uninterrupted view of the spacious stage will be obtained. Externally the building is stated to be an entirely new departure from the accepted forms of this class of structure, and

is designed in an adaptation of the Romanesque style. The wallings will be principally of red brick, plentifully relieved with stonework, and enriched with carving and sculptured Shakespearian figures, whilst at the angle of the two streets a large carved panel will represent a scene from "The Play in 'Hamlet.'" Towering above the roof at the angle of Station and Park-streets will be a lofty turret, partly covered with lead and copper, richly embellished, and with lunettes for electric light, and finished on top with gilded figures representing Painting, Music, and the Drama; these figures support a gilt canopy, surmounted with a high flag-staff. The side next Station-street will be of a plainer character. The ground floor of the building will be occupied principally by commodious halls, smoke-rooms, and their accessories. The total cost of the building and fittings, complete, it is estimated will be about 14,000*l.* The architect is Mr. Daniel Arkell, Birmingham.

CHURCH BUILDING NEWS.

Bournemouth.—Designs by Messrs. Cox, Sons, Buckley, & Co., have been approved for decorating the chancel of St. Michael's Church, Bournemouth, and the works are in progress under the superintendence of Mr. R. G. Pinder, F.R.I.B.A. The upper part of the east wall is to have a representation of the Lamb upon the Book with Seven Seals, and the four Evangelists. The retables is to be finished in gilt and colour. On the north and south sides of the chancel a procession of apostles, prophets, martyrs, and fathers of the Church, is to be represented, to embody the idea of the Te Deum. There will be emblems of the Passion near the altar-rail. Praise is to be represented by groups of angels above the organ-chamber, and other groups will occupy corresponding positions on the opposite side.

Heavitree (near Exeter).—The dedication of the new tower of Heavitree parish church took place on Saturday last. The new tower stands on the site of the old one. The latter was condemned some years before its demolition in 1887 as being unsafe; but it was found, after about 10 ft. had been removed, that the masonry was solid, especially on the south side. Mr. Phillips, of Exeter, the contractor, had to resort to dynamite in order to separate the masonry of the old pile, which was about 45 ft. high, and succeeded in doing so without serious injury being done to the church. In an open competition for designs for rebuilding the tower, the plans of Mr. E. H. Harbottle, architect, Exeter, were selected by Mr. Ewan Christian, of London, the adjudicator. From those plans the new tower has been built, in the Perpendicular style. The foundations are of concrete, and the tower is built of limestone from the Babbacombe Quarries, the main quoins being of Chudleigh limestone with Bath stone dressings. Great care had to be exercised in selecting the stone, some of the blocks being of exceptional dimensions. The height of the tower from the ground to the battlements is something like 101 ft.; the total height to the top of the vane is about 133 ft. Besides being an inauguration of a scheme for extending the church, the new tower is also a memorial of her Majesty's Jubilee. The foundation-stone was laid on August 28, 1888, by Lord Poltimore. The large west window of the tower is to be utilised for the erection of a memorial to the late Rev. R. Barnes, for many years the Vicar of the parish. The memorial is to take the form of a stained-glass window, the artists being Messrs. Clayton & Co. It is also intended to have a peal of eight bells put in the tower. There has not been a single accident during the progress of the work. Mr. F. S. Mitchell, of Heavitree, has acted as clerk of works; and Mr. E. T. Rogers, of Exeter, has executed the carving. The cost of the work is about 3,000*l.*

London Water Supply.—The Vestry of St. James, Westminster, have invited the other Vestries and district boards of the metropolis to appoint delegates to a conference shortly to be held for the purpose of considering the whole subject of the metropolitan water supply, and especially the desirableness of asking the Government to introduce a Bill (1) either to confer on the County Council power to acquire the present undertakings or to establish a competing supply; and (2) to require the water companies to supply water by meter at a fixed tariff.

attached to each lamp, and so run up the cost of the installation. Nor does a cut-out entirely get over the difficulty, for should it fail to act, or be tampered with, every lamp on the circuit would be extinguished; but, apart from these objections, the E.M.F. required soon renders this system impracticable, though with lamps of special construction taking a much larger current and a reduced E.M.F., it may sometimes be used with advantage for small straggly installations.

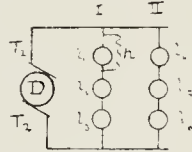


Fig. 60.

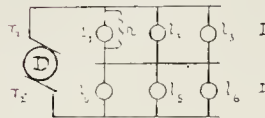


Fig. 61.

Figs. 60 and 61 need not be discussed at length, as they are modifications of figs. 58 and 59 respectively, in which groups of lamps, placed in series in the first case and abreast in the second, are substituted for single lamps. Both systems possess, to a less degree, the advantages and disadvantages of the single-lamp arrangements, but they also have this additional drawback, that, unless a whole group of lamps be turned off, no power is saved, although the wear and tear of the individual lamps turned off in any group may be thus lessened.

In fig. 60, if l_1 is simply open-circuited all the lamps in its group go out; if l_1 is short-circuited the remaining lamps in Group I. are submitted to the full E.M.F. of the mains, and the current through them will be excessive. To turn off l_1 , therefore, the current must be diverted through a path of equal resistance, r ; the rest of the lamps in the group will not then suffer, but as much power will be used in driving the current through the new path as was previously absorbed by the lamp.

In fig. 61, if l_1 is short-circuited, all the lamps in Group I. are short-circuited also; if, on the other hand, l_1 is open-circuited, the remaining lamps in the group have to divide the whole current from the machine among them, and their life is shortened. In this case also, therefore, an equivalent resistance r must be substituted, and power wasted.

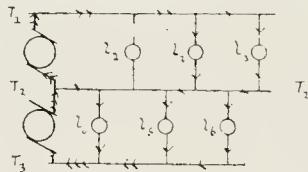


Fig. 62.

The Three-Main System, fig. 62, closely resembles that shown in fig. 61; instead, however, of a single constant current dynamo-machine being used, two constant E.M.F. machines are put in series, and the intermediate main joined to their intermediate terminals. It would, perhaps, be more accurate to describe the three-main system as two complete parallel systems, machines and all, put in series, by which means one intermediate main is made to serve instead of the two in the pair of simple Parallel Systems I. and II. It will also be seen that if a third machine and group of lamps are added, only one additional main is required. If there are the same number of lamps in each group, no current at all flows along the main T_2 , but if a lamp l_1 is open-circuited, then a current of 0.5 ampere starts from T_2 along the main, as the current from Group I. falls short by 0.5 ampere of that required by Group II. The currents actually flowing in the case drawn are indicated in direction and magnitude by

arrow-heads, one arrow-head representing 0.5 ampere. If all the lamps in Group I. are turned off, then machine I. gives no current, and the main T_2 has to carry the whole of the current for Group II.

As it is not likely that all the lamps in one group would be turned off while all in the other would be on, the outer mains only need be of sufficient size to carry the maximum current. It is claimed, in America, that 60 per cent. saving over the simple parallel system has been effected by this means, but 40 per cent. is about what would be saved in this country.

Whatever system of distribution may be adopted the short leads to the lamps, no matter how they may be arranged, will be the same; in estimating the saving effected by any of the above systems over the simple parallel system the mains alone need be considered, and the relative costs can be easily calculated in the following way:—Measure up the length of main L in each case and find the maximum current C it will have to carry. If P is the amount of power allowed to be lost in distribution, a quantity which, for the sake of comparison, will be the same in each case, then $R = \frac{P}{C^2}$ is the resistance the mains may have. If ρ is the specific resistance of the conductor and s the cross-section, then, $s = \frac{\rho L}{R} = \frac{\rho L C^2}{P}$ and the bulk

of conductor used is $s L = \frac{\rho L^2 C^2}{P}$ but ρ and P are the same in all cases, hence the cost is proportional to $L^2 C^2$ or $(L C)^2$. The precise way in which L will vary can only be determined by actual measurement for each arrangement of lamps.

When distribution has to be made over wide areas, so-called "feeder-mains" or "feeders" are used. In any of the systems described above, except in the case of the simple series, a certain variation of E.M.F. is experienced by the more distant lamps as the currents in the mains rise and fall. If this variation is excessive, a feeder,—that is, a main from which no branches are led throughout its whole length—is taken from the supply station to a distant point in the circuit, and the distant point is kept at a constant potential. The far end of a feeder, therefore, acts like a little local supply station. A feeder-main is, in fact, rather a valuable adjunct to other systems than a system in itself.

VARIORUM.

We have received the first quarterly part of the current year's volume of the "Journal of the Proceedings of the Royal Society of Antiquaries of Ireland, formerly the Royal Historical and Archaeological Association of Ireland" (Dublin: Hodges, Figgis, & Co. London: Williams & Norgate). It is a very interesting number, and contains, amongst other illustrated papers, three which are of special interest, viz., (1) on "Celtic Remains in England," by Mr. John L. Robinson, A.R.H.A.; (2) on "The Ancient Chapter House of the Priory of the Holy Trinity, Dublin," by Mr. Thomas H. Drew, R.H.A.; and (3) on "Ancient Mural Inscriptions," by Mr. J. G. Barry. "Picturesque Wales," by Godfrey Turner (London: W. J. Adams & Sons, and Simpkin, Marshall, & Co.), is a sixpenny "handbook of scenery accessible from the Cambrian Railways," and although it is published mainly in the interests of the railway companies, and is therefore little more than a tourist's itinerary, it is clearly and pleasantly written, and, as far as we have examined it in detail (we have sampled a great many of its statements, and tested them by comparison with information derived from other and more pretentious handbooks, as well as from personal acquaintance with some of the places), it appears to be tolerably free from errors. In saying this, we must not be supposed to endorse all the archaeological theories which the author has adopted (with due acknowledgment in most cases) from other writers. Nor do we necessarily endorse the author's criticisms as to some modern buildings: it would have been more to the purpose if instead of amateur criticism of the style of important modern buildings of a public character he had recorded the names of their architects. Although Strata Florida is mentioned, there is no reference to the important excavations made on the site of the Abbey there within the last two or three years (see *Builder* for October 13, 1888, and May 4, 1889). The book

contains two or three maps of the Principality, and a great many wood-cuts of the picturesque scenery traversed by the Cambrian Railways. It is very nicely printed on good paper, and will be found exceedingly useful by visitors to those parts of Wales which are served by the Cambrian Railways.—"London in 1890" (London: W. H. Allen & Co.) is this year's edition of the well-known guide-book originally compiled by Mr. Herbert Fry. It is illustrated by two maps and by twenty bird's-eye views of principal streets and claims to be revised and corrected to date. These claims seem to be fairly well sustained, but we would point out that the correct official title of the body spoken of as the "Metropolitan School Board" is "The School Board for London." The book is also behind the time in saying that the "debates" of the London County Council are held in the Guildhall Council Chamber: they ceased to be held there nearly two months ago. In other respects the book is lacking in information,—for instance, there is no mention of Ravenscourt, Clissold, Waterlow, and Brockwell parks, four considerable additions to the public parks of London,—the first three of which have been actually acquired, while powers to acquire the fourth are being sought in Parliament by the London County Council. But the book contains a fund of information about London, and is copiously indexed. This is its ninth year of publication.

Trade Catalogues.

Messrs. J. Tylor & Sons, of Newgate-street send us the fifteenth edition of their Illustrated Catalogue (1890), now being issued. It differs from many other catalogues of the kind in being contained within a small compass, though it consists of 500 pages. It is well printed and illustrated, and provided with a convenient index. Its contents, we need hardly say, include descriptions of a great variety of articles required by architects, contractors, and house-owners. The "Compound" wash-out closet described on p. 118 has some good points, the force of the flush being exerted on the water remaining in the trap without change of direction; it is trapped above floor-level, easily cleaned, and available both as a urinal and slop-sink. The catalogue also includes some good lavatory and bath apparatus. The water-meters manufactured by the firm are fully described; they consist of the "Rotary," the "Positive," and the "Bascule," they have been extensively used for many years. The "Positive" meter registers with great accuracy, and the "Bascule" meter is designed to give a meter-supply at small costs to cottages, &c. It appears to be particularly well adapted to the supply of small communities in the East or other countries abroad. A great variety of pumping apparatus, suitable for both large and small supplies of water, is described, and to those engaged in the work of laying water-mains, a simple appliance, called the "Patent Elastic Clip," will be of interest; it is calculated to effect a great saving in men's time, and makes a perfect joint in less than half the time required when clay is used. Turner's apparatus for tapping mains under pressure (p. 453) is also well worth attention.—Messrs. John Gibbs & Son, of Liverpool, send us their new illustrated descriptive catalogue of warming and ventilating appliances (third edition) it will repay perusal. One of the illustrations is a section of the new wing of the Children's Infirmary, Myrtle-street, Liverpool, showing Messrs. Gibbs's combined system of warming and ventilating.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

8,961, Window Fastenings. E. Hauff. This invention consists in fixing upon the upper edge of the lower sash at the side a frame with two cheeks, with a pawl and spring so fixed, that it engages with a plate fixed on one of the upright side frames of the top sash. There are recesses in the plate, and to lock the device a pin is inserted in a hole on one side cheek to another cheek opposite side. The effect of this is that when the sashes are so fixed they can only be moved up or down together, and it is claimed to be a secure fastening.

9,305, Water-closet Basins and Traps. J. Johns.

According to this invention, a combined box up or enclosed water-closet basin and trap is made in two parts, capable of being detached. The top piece is formed with projecting flanges or lugs, fit with recesses or sockets on the piece on the underside. The two are then joined by screws, bolts, or cement.

9,760, Ceilings, A. Katz.

According to this invention, wires are stretched across upon the beams or rafters. Upon the wires are supported blocks or plates of papier maché, cement, plaster, &c. When the blocks are in place the joints are filled in, and the under surface of the ceiling is coated with a comparatively thin coat of plaster.

10,044, Warming and Ventilating. Reeve & Hatchell.

A filtering medium or baffle plate, a swing plate, and regulating valve are used by the inventor to check the heat, and when necessary these plates, &c., are controlled by counter-weighted levers.

10,120, Rising or Falling Hinges. S. H. Wormald.

The hinge which is the subject of this patent is composed in two parts, the parts which form the joint in each half being made so that when they are brought together they form two helical screws, and, so, so that it is impossible to separate one from the other, disposing with a centre pin. The half fixed to the door-frame remains stationary, the other half rising up on it.

10,348, Tipping Carts or Wagons. T. Hill.

In carts or vans which are mounted on side runnions, an improvement is effected by this inventor, who provides an elastic pedestal for the runnions, and an elastic buffer to support the forward part of the van.

NEW APPLICATIONS FOR PATENTS.

- May 12.—7,333, W. Phillips, Combined Sash and Casement Window.—7,342, W. Cox, Ventilation of Buildings, &c.—7,360, G. Evans, Fixing Sash Cords, &c.—7,363, C. Boune, Clamps or Vices.—7,387, A. Boulton, Chimney Pot or Cowl.
May 13.—7,401, M. Webb, Floral Decoration for Diversed Plate Glass.—7,403, W. West, Moulding and Pressing Bricks, Tiles, &c.—7,410, C. & E. Woodfill, Window Fastening.—7,416, T. Kennedy and W. Wright, Door-Handle.—7,427, R. Knickerbocker, Brickmaking Machines.—7,434, A. Bowerman, Sewer Traps.—7,437, B. Stewart, Portable or other Buildings.
May 14.—7,494, W. Harris, Substitute for Tiled Hearths for Fireplaces.
May 15.—7,577, D. White, Filler for French Polishing.
May 16.—7,610, T. Woodward, Eccentric Weather-bar.—7,637, W. Gale, Ferrule or Collar for Fateners.
May 17.—7,707, D. Bostel, Flushing Water-closets, &c.—7,718, E. Wethered, Fastening Windows.—7,745, L. Lambert, Nails.

PROVISIONAL SPECIFICATIONS ACCEPTED.

- 4,718, A. Govan, Hanging Window Sashes.—7,747, A. Richards, Draught Excluders for Doors.—7,756, A. Lallemand, Doors, &c.—5,929, J. P. Peltonig & J. Westaway, Fire-proof Curtains or Theatres, &c.—5,112, T. Colten & R. Wilson, Opening and Closing Window Sashes.—5,175, J. Shanks & others, Stock and Fitting for Brick Moulds.—5,515, F. Justice, Material for Building purposes.—5,554, G. Salter & H. Trubshaw, Locks and Latches.—5,627, J. Rome, Metallic Trough Flooring for Bridges.—5,745, T. Gear, Water-closets.—5,746, C. Watts, Ventilating Apparatus for Opening Continuous Lengths of Lights, &c.—7,753, H. Loggott, Operating Sights, &c.—7,757, R. Hance, Roping and Railing.—5,995, J. Goodman, Wash-out Closets.—6,089, J. Eckersley & others, Discharge Valves for Water-closet Cisterns.—1,151, W. Clark, Stores and Fire-places.—6,288, V. Tanner, Fire-places.—6,548, W. & H. Stephens, Draining Baths Water-closets.—7,069, B. McTeun, Kilns for Bricks, &c.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

- 8,071, F. Moore, Self-acting Exhaust Ventilators.—8,225, S. Smith, Cottage Ranges.—8,428, M. Day, Artificial Polished or Ground Stone.—8,772, H. E. Meaurio, Exit Doors for Theatres.—8,904, A. Hogan, Machine for Cutting Laths.—10,069, W. Bird, Fanlight Adjustment.—8,025, G. West, Plastering Material.—4,408, F. Adels, Ceiling and Wall Coverings.—4,407, Colthrust, Symons & Co., W. Harco, Roofing Tiles.—5,270, G. Jennings, Fan-hole Covers, &c.

RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

- MAY 10.—By NASH & SON and J. G. ROBINSON & SON (at Saffron Walden).
Saffron Walden, High-st.—F. house and malting, 2875
F. house and shop, r. £18 p.a. 290
F. premises in Church-st., r. £10 130
F. cottage in Church-st., r. £10 35
Deben-rd.—Four c. cottages, r. £14. 14s. 145
Thaxted-rd.—F. and c. land, 10 a. 12 p. 475
Audley End—F. cottage and enclosure of land, r. £8 170
MAY 15.—By BAXTER, PAYNE, & LEPPER (at Bromley).
Bromley—The residence "Weston", r. £84 1,600
Tweedy-rd.—A plot of f. land 410

MAY 16.—By Mr. G. H. BREADMORE.

- Kew—Enclave-rd.—"Ormesby House", u.t. 36 4795
yrs., g.r. £10 690
Wandsworth—1 and 2, Nottingham-villas, f. 650

MAY 17.—By DANIEL SMITH, SON, & OAKLEY (at Canterbury).

- Stingbourne (near)—"Fowley Island", 39a. gr. 2sp. f. 250
Whitstable (near)—A plot of f. land, 1a. 3r. 29p. 950

MAY 19.—By MULLETT, BOOKER, & CO.

- Hyde-pk.—31, Albion-st., u.t. 32 yrs., g.r. £3. r. 1,300
12, Westbourne-ter., u.t. 47 yrs., g.r. £10. 2,000
5, Somers-news, u.t. 42 yrs., g.r. £5. 410

By G. F. FRANCIS.

- Chelsea—10, Christchurch-st., u.t. 62 yrs., g.r. £10 515

By H. C. NEWSON.

- Tavistock-sq.—Nos. 41 and 42, u.t. 38 yrs., g.r. r. £20. r. £245 2,850

By ROGERS, CHAPMAN, & THOMAS.

- Hyde-pk. Leinster-ter.—L.E.T. of £152. 10s., g.r. £27. 18s. u.t. 60 yrs., g.r. £24. 10s. 2,710

By CHARLES & TURNER.

- Marlybone—22, Hatley-st., u.t. 70 yrs., g.r. £1. 10s. r. £30 250

By CHARLES & TURNER.

- Paddington—7 and 8, Haverhill-st., u.t. 29 yrs., g.r. £32 360

By H. C. NEWSON.

- 33, Elnathan-brooks, u.t. 70 yrs., g.r. £5 320

By HASLAM & SON.

- Plastow, Mews-rd.—I.g.r. of £77, u.t. 45 yrs., g.r. £25 290

By HASLAM & SON.

- Brixton—9, Mayall-rd., u.t. 78 yrs., g.r. £5. 5s., r. £40 290

By HASLAM & SON.

- Harwell, Berks.—"The Bishop's Manor Farm" of 106a. 2r. 22p. f. 5,500

By HASLAM & SON.

- The Manor of Bishops Harwell, with its rights, &c. An enclosure of f. land, 14 acres 1,350

By WEATHERALL & GREEN.

- Kingsland—14, 18 to 32 (even), Laburnum-st., f., r. £34 p.a. 4,270

By WEATHERALL & GREEN.

- F.g.r. of £5, with reversion for 31 yrs. 645

By WEATHERALL & GREEN.

- Stoke Newington—39, Howard-st., f., r. £42 p.a. London-fields—15, The Broadway, u.t. 62 yrs., g.r. £3. 10s., r. £33 1,200

By WEATHERALL & GREEN.

- Kingsland—2 and 4, Laburnum-st., u.t. 14 yrs., g.r. £3. r. £67. 12s. 205

By WEATHERALL & GREEN.

- 6 to 12 (even), Laburnum-st., u.t. 29 yrs., g.r. £30. 14s. 670

By WEATHERALL & GREEN.

- 14, Westfield-rd., u.t. 77 yrs., g.r. £6. 6s., r. £33. 10s. 150

By WEATHERALL & GREEN.

- Stoke Newington, Park-lane—"Abillon Lodge", u.t. 32 yrs., g.r. 2s. 560

By WEATHERALL & GREEN.

- South Croydon, Ledbury-rd.—A plot of f. land 90

By TABERNACLE & SON.

- Lavender-hill—14 to 20 (even), Beaufoy-rd., u.t. 79 yrs., g.r. £20 1,180

By TABERNACLE & SON.

- 21, 23, 25, and 27, Beaufoy-rd., u.t. 79 yrs., g.r. £20 1,160

By CHESTERTON & SONS.

- Kevington—47, Campden-st., u.t. 33 yrs., g.r. £20 930

By CHESTERTON & SONS.

- 7, Pembroke-sq., u.t. 25 yrs., g.r. £4. 4s. 390

By WALFORD & WILSHIN.

- Anerley—108, Croydon-rd., u.t. 74 yrs., g.r. £12. 10s. 315

By WALFORD & WILSHIN.

- Crawley, near—"Aksford Farm", 21a. 2r. 31p., f., r. £40 900

By WALFORD & WILSHIN.

- Haggerston, Dove-row—f., g.r. £50, with reversion in 11 yrs. to £300 a year 2,090

By WALFORD & WILSHIN.

- 3, 5, and 7, Dove-row—f., r. £34. 10s. 265

By WALFORD & WILSHIN.

- Nicholl-st., "Vine Cottage", f., r. £33. 10s. 265

By WALFORD & WILSHIN.

- Bethnal-green—46 and 48, Cudworth-st., f., r. £33. 10s. 670

By WALFORD & WILSHIN.

- 1 to 4, Carlton-pk., f., r. £33. 10s. 1,630

By WALFORD & WILSHIN.

- Essex—f. rent-charge of £84. 12s. 6d. p.a. 1,760

By RUSHWORTH & STEVENS.

- Oxford-st.—No. 325, and 84, New Bond-st., City Parish 7,150

By RUSHWORTH & STEVENS.

- Sunbury-on-Thames—The Hawke Villa, and a 1a. 3r. 29p. f. and c. 1,250

By RUSHWORTH & STEVENS.

- Maida Vale—18, Warwick-rd., u.t. 48 yrs., g.r. £12 650

By RUSHWORTH & STEVENS.

- Soho—15, Church-st., f., r. £60 p.a. 1,170

By NEWBORN & HARDING.

- Hoxton—60, Gospsall-st., u.t. 46 yrs., g.r. £6. 10s., 79 and 83, Felton-st., u.t. 29 yrs., g.r. £4, and a g.r. of £3 p.a. 110

By NEWBORN & HARDING.

- Bermondsey—106 and 108, Southwark Pk.-rd., u.t. 47 yrs., g.r. £11. 17s., r. £70 780

By NEWBORN & HARDING.

- 42, Dockley-rd., u.t. 46 yrs., g.r. £5. r. £32 320

By NEWBORN & HARDING.

- 154, Fort-rd., u.t. 52 yrs., g.r. £2. r. £22. 10s. 330

By NEWBORN & HARDING.

- Rotherhithe—41, Clarence-st., f., r. £15. 12s. 185

By NEWBORN & HARDING.

- 79, Adam-st., f., r. £16. 18s. 195

By DANIEL SMITH, SON, & OAKLEY.

- West Norfolk—The freehold residential estate known as "Middleton Towers", 727a. 2r. 36p. £23,000. Potter's-bar—F. building land, 22a. 1r. 31p. 1,750

By R. J. COLLIER.

- Finsbury-pk., Lordship-rd.—"Howdale" and "The Cottage", u.t. 77 yrs., g.r. £20, also a l.g.r. of £21, u.t. 77 yrs. 1,570

By R. J. COLLIER.

- Westminster—109, Hyde-rd., u.t. 29 yrs., g.r. 6d., r. £30 p.a. 255

By R. J. COLLIER.

- Kingsland—160, Hertford-rd., u.t. 12 yrs., no g.r., r. £28 p.a. 120

By VENTOM, BULL, & COOPER.

- Broadstairs, St. Peter's-rd.—"St. Ann's Cottage", f., r. £30 480

By HOBSON, RICHARDS, & CO.

- Anerley—4 and 5, Weigh-ton-ter., f., r. £50 1,205

By J. F. HOME.

- "The Mitre Tavern", f., r. £100 p.a. 1,580

By J. F. HOME.

- Acton—Nos. 2, 3, 4, and 5, The Parade, u.t. 87 yrs., g.r. £40 1,325

By BAKER & SONS.

- Hampstead—1, 3, and 4, Fitzjohn's-promenade, u.t. 98 yrs., g.r. £105 6,230

By BAKER & SONS.

- 5, 7 to 11, Fitzjohn's-promenade, u.t. 98 yrs., g.r. £210 11,700

By BAKER & SONS.

- 12, 13, 14, and 15, Fitzjohn's-promenade, u.t. 98 yrs., g.r. £140 7,000

By BAKER & SONS.

- 20 and 21, Fitzjohn's-promenade, f., r. £350 p.a. 7,000

By EASTMAN BROS.

- Forest-hill—161, Devonshire-rd., u.t. 78 yrs., g.r. £6 400

By EASTMAN BROS.

- Inglemere-rd.—A plot of f. land 350

By WYATT & SOX (at Chichester).

- Chichester, near—Enclosures of f. land, 18a. 0r. 25p., r. £15 600

By WYATT & SOX (at Chichester).

- "Heath's Farm", and 42a. 0r. 11p., r. £70 p.a. 850

MAY 22.—By E. & H. LUMLEY.

- Oxfordshire—"Shooter Lodge", and 31a. 0r. 2p., f. 4,000

By E. & H. LUMLEY.

- F. farm, 20a. 1r. 22p., at Wheatley 1,000

By E. & H. LUMLEY.

- Leves, Sussex—"The Shelleys", with grounds, f. 3,250

By GLASIER & SONS.

- Mayfair—2, Deanery-sq., f. 5,250

By GLASIER & SONS.

- Westminster—3, 9, and 10, Broadway, f., r. £218 3,500

By NORTON, TRIST & GILBERT.

- Camberwell—6a, 6 to 16 (even) Coldharbour-lane, f., r. £118 p.a. 1,570

By NORTON, TRIST & GILBERT.

- South Croydon—1 to 24, Holder-rd., u.t. 79 yrs., g.r. £25. 15s., r. £347. 2s. 1,950

By NORTON, TRIST & GILBERT.

- Regent's Pk.—11, Pk. Village East, u.t. 32 yrs., g.r. £12. r. £60 p.a. 300

By DYER, SON & HILTON.

- Lee—"The Residence" Hillside, u.t. 48 yrs., g.r. £10 1,050

By DYER, SON & HILTON.

- Belgravia—2, Gerald-rd., u.t. 16 yrs., g.r. £30. r. £55 150

By G. HEAD & CO.

- Eaton-sq.—52, Chester-st., u.t. 31 yrs., g.r. £7. r. £65 670

By G. HEAD & CO.

- City-rd.—27, 28, and 20, Britannia-st., f. 780

By HUMPHREYS, SKITT & CO.

- Greenwich—2, The Circus, f., r. £60 p.a. 790

By HUMPHREYS, SKITT & CO.

- 60, Royal-hill, f., r. £32 p.a. 350

By HUMPHREYS, SKITT & CO.

- Blackheath, The Grove—"La Bagatelle", u.t. 31 yrs., g.r. £5. r. £45. r. £40 340

By H. TILLEY.

- Camden Town—2, St. Paul's-rd., u.t. 52 yrs., g.r. £7 350

By H. TILLEY.

- Shepherd's Bush—42, Warbeck-rd., f., r. £30 p.a. 335

By C. C. & T. MOORE.

- Clapton—3 and 4, Mount Pleasant-lane, u.t. 40 yrs., g.r. £7 565

By C. C. & T. MOORE.

- 10, York-sq., and 3 and 4, Henry-sq., u.t. 22 yrs., g.r. £7 120

By C. C. & T. MOORE.

- 60, Royal-hill, f., r. £32 p.a. 350

By E. SIMSON.

- Commercial-rd.—5, 6, 7 and 8, Bromley-st., u.t. 71 yrs., g.r. £3. 10s. 585

By E. SIMSON.

- 10 to 18 (even) Bromley-st., u.t. 71 yrs., g.r. £10 810

By E. SIMSON.

- 210, York-sq., and 3 and 4, Henry-sq., u.t. 22 yrs., g.r. £7 120

By E. SIMSON.

By RUTLEY, SON, & VINE	
Spitalfields, Duke-st., &c.—F. area of 1,750 ft., r.	250 p.a.
Oakley-sq.—6, 7, and 13, Crawley-mews, u.t. 57	470
Yrs., g.r. £10, r. £110. 10s.	670
By BARKER & SON.	
Byfleet, Surrey—"The Model Farm," &c.	3,750
61a. Br. 38 p. f.	2,300
Enclosures of l. land 23a. 1r. 27p. f.	2,300

Constructions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.t. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

MEETINGS.

SATURDAY, MAY 31.

St. Paul's Ecclesiastical Society.—Visit to the Churches of Stone and Northfleet. Train leaves Cannon-street (for Greenhithe) at 2.47 p.m.

Association of Municipal and Sanitary Engineers and Surveyors.—Lancashire and Cheshire District Meeting, to be held at Burnley.

Edinburgh Architectural Association.—Annual Excursion to Dunfermline, Inverkeithing, &c.

MONDAY, JUNE 2.

Royal Institute of British Architects.—(1) To receive the report of the Scrutinisers as to the election of Council, Standing Committees and Auditors, and to declare the names of those elected. (2) Paper by the Comptroller-in-Chief on "The Arab House in Cairo." 8 p.m.

Surveyors' Institution.—Annual General Meeting to receive the Report of the Council, and the Announcement of the Result of the Election of Officers for the ensuing year. 3 p.m. Annual Dinner, Holborn Restaurant. 6.30 p.m.

Society of Engineers.—Mr. P. F. Nursey on "Pick's System of Manufacturing Salt in Vacuum." 7.30 p.m.

Clerks of Works' Association (Carpenters' Hall).—Mr. T. Edmond on "Eddystone Lighthouse." 8 p.m.

Royal Institution.—General Monthly Meeting. 8 p.m.

TUESDAY, JUNE 3.

Institution of Civil Engineers.—Annual General Meeting to receive the Report of the Council and to elect the Council and Officers for the ensuing year. 8 p.m.

Society of Biblical Archaeology.—8 p.m.

WEDNESDAY, JUNE 4.

British Archaeological Association.—Mr. J. T. Irvine on "Bartholme Church, Lichfield, and its bearing on so-called Saxon Architecture." 8 p.m.

THURSDAY, JUNE 5.

Royal Institution.—Professor Dewar, M.A., F.R.S., on "Flame and Explosives."

Society for the Encouragement of the Fine Arts.—Third Conversation. 8 p.m.

Royal Archaeological Institute.—Four papers to be read, including one by Mr. H. S. Cowper on "Brasses in the Parish Churches of Willesden, Great Greenford, and Acton." 4 p.m.

FRIDAY, JUNE 6.

Royal Institution.—Professor W. Boyd Dawkins, M.A., F.R.S., on "The Search for Coal in the South of England." 9 p.m.

Miscellaneous.

"Fortis"—Under the name of "fortis," a new blasting agent is about to be introduced into practical use in this country. Fortis belongs to the class of high explosives, and was invented some three years since. As soon as the invention had assumed a practical shape, a factory was started at Herenthals, Belgium, where it can be turned out at the rate of about seven or eight tons per week. The powder finds in Belgium a ready sale with mine and quarry proprietors. It is composed of nitrate of potash, sulphur, tan, glycerine, and some few other ingredients, and is made of five different strengths and qualities to suit the varied requirements of mining. Fortis No. 1 is less strong than gunpowder, while No. 5 is equal in strength to dynamite. It was tested last year at the Bolehill Limestone Quarries, near Sheffield, by Mr. Perry F. Nursey, C.E., the results being in every way satisfactory. The modified action of the various numbers of the powder was demonstrated, and the strength of the powder of the quality suitable for limestone was shown to be about three times that of ordinary English blasting-powder. Its action on granite was successfully tried by Mr. C. Napier Hake, F.I.C., at the Mount Sorrel Granite Quarries, Loughborough. It was there proved that Fortis developed about two and a-half times the power of ordinary blasting-powder, the work being done in a very satisfactory manner. It would appear to be well adapted for all purposes of coal-mining, quarrying granite, stone, and slate, and it can be used with greater advantage and economy than gunpowder.—*Iron.*

The late City Architect of Glasgow.—The Council of the Glasgow Institute of Architects have agreed to place upon record their deep sense of the loss sustained by the city, the architectural profession, and the Institute, by the death of Mr. John Carrick, the Glasgow City Architect.

Smoke Abatement.—A meeting was held last week at the Mansion House, under the presidency of the Lord Mayor, for the purpose of bringing before the public the subject of smoke abatement.—Mr. Fred Scott, the secretary, read a number of letters of apology and sympathy with the object from noblemen and others, including the Duke of Westminster, the Earl of Rosebery, Lord Egerton of Tatton, Earl Percy, Viscount Cross, Lord Rayleigh, the Mayors of Manchester, Nottingham, Sheffield, and Leicester.—Mr. A. E. Fletcher, Chief Inspector of Alkali Works and Chairman of the Executive Committee for Testing Smoke-preventing Appliances, explained the objects the Committee had in view, which were, he said, to test the various known appliances thoroughly by going where they were in operation, and reporting on the kind of coal used and the conditions under which the appliances were used, and when they had found out all ascertainable facts, they would publish a report that would give all the information that could be required by any person who wished to rid his chimney of black smoke.—Lord Derby moved a resolution approving of the objects of the Committee, and in doing so said the diminution of smoke and the necessary accompaniment of dirt was a matter that concerned everybody. He wished he could say that it interested everybody. He regretted to say that it did not. Indifference was the real evil which they had to encounter. His lordship proceeded to point out the waste of coal itself that at present prevailed, and the injury to property caused by perpetual dirt; and in regard to the important subject of injury to health, he remarked that an oak would not flourish near London or Manchester or Liverpool, and he would leave them to judge if an atmosphere that killed an oak could be beneficial to a child. He believed that three-fourths or even nine-tenths of the smoke was absolutely unnecessary and preventable. They must produce a strong public feeling on the subject.—Lord Howard of Glossop seconded the resolution, which was carried unanimously.—Sir H. E. Roscoe, M.P., proposed, "That it is necessary to raise a fund to meet the expenses of this work, and this meeting pledges itself to use its best efforts to this end."—Earl Fitzwilliam seconded the resolution, which was carried.

Surveyorship, Chelmsford.—At a special meeting of the Chelmsford Town Council last week, the following letter was read from Mr. Charles Pertwee, the Borough Surveyor:—

"Surveyor's Office, May 12.

Dear Mr. Mayor,—I regret to say that, having lost nerve and vital power, I am compelled to seek, under medical advice, recuperation in rest and change of air. I intend leaving home to-morrow. My clerk, Mr. Mayhew, will attend the committee and other meetings in my absence, and render such assistance as, in conjunction with Mr. Batten, he may be able. I should be glad if you would ask the Council to take into their consideration the question of the relieving me of my official duties, as it is my intention, at such date as may suit the convenience of the Corporation, in the near future to place my resignation as Surveyor in the hands of the Council. At the same time I am most anxious, if circumstances permit, to complete the new water scheme, various details of which remain still to be carried out, so that the town may be in possession of the increased water supply so much needed.—I am, dear Mr. Mayor, faithfully yours, CHARLES PERTWEE."

—Councillor Chancellor said that this was one of the most important communications they had received for some time past. The office of Borough Surveyor had become very important, and he thought the time had now arrived when it should be looked at in all its bearings. He proposed that the matter should be referred to the General Purposes Committee, who should thoroughly thresh it out, and put before the Council some definite proposition.—The motion was seconded by Councillor Gepp, and carried unanimously.

Value of New River Shares.—Last week Mr. Bousfield (of the firm of Edwin Fox & Bousfield) submitted to auction at the Mart, Tokenhouse-yard, a King's freehold share in the New River Company. Not for three centuries had a King's undivided share been offered for sale, and the event naturally drew together a very large number of gentlemen. This share came to the market through the death of the late owner. The only guide to the value of the share was furnished by the sale in July last of an entire Adventurers' Share, which realised 122,800l. The bidding commenced at 80,000l., and went on slowly to 95,100l., at which price the hammer fell.—*Standard.*

Hucknall Torkard Drainage.—Some time ago (says the *Nottingham Guardian* of the 23rd inst.) the Hucknall Torkard Local Board invited competitive designs from engineers for dealing with the disposal of the sewage at the various outfalls, and for the best means of effectually treating the same. After considerable discussion the scheme submitted by Mr. Herbert Walker, Assoc.-M.Inst.C.E., and Mr. W. H. Radford, Assoc.-M.Inst.C.E., were selected for further consideration with the result that the scheme submitted by Mr. Walker was eventually selected by the Local Board. The system advocated by Mr. Walker is that known as the "international process," and consists of (1) the precipitation and deodorisation of the sewage by means of a magnetic precipitant and deodorant called "ferozone," which is produced from polarite by a chemical process; (2) the removal of the organic matter in solution, and the aeration of the tank effluent by passing it through a specially-constructed filter-bed containing polarite, a pure and absolutely insoluble mineral substance, very hard, porous, and absorbent. The sewage will be conducted into precipitation tanks of a capacity to suit the hourly flow of sewage. Immediately before entering the tanks the sewage will receive a dose of "ferozone" by means of a patent automatic sewage-mixer. After remaining in the tank a short time it will be drawn therefrom by a floating arm and conducted over the surface of the polarite filters. These filters are formed of 6 in. of broken stones (in which 4-in. agricultural drain-pipes are embedded), 3 in. of gravel, 6 in. of sand, 12 in. of sand and polarite in equal quantities, and 9 in. of fine sand, making a total depth of filtering material of 3 ft. The sludge deposited in the tanks will be inoffensive, having been deodorised by the ferozone. This sludge will be forced into filter-presses, and pressed into cakes ready for sale as a fertiliser. The effluent, after being passed over and through about four acres of land, will be conducted into the river Leen. Storm overflows will be arranged at various points, so that the storm-water will find its way direct into the river, and only the sewage will be conducted to the tanks for purification. The estimated cost of this scheme is about 4,000l.

Defective Sanitary Condition of Derbyshire Infirmary.—At a meeting of the Governors of the Derbyshire Infirmary, at Derby, on the 22nd inst., a report was presented from Messrs. Young & Hall, architects, London, who had been specially appointed to examine the building owing to the discovery of sanitary defects, which had led to an epidemic of typhoid fever amongst the nurses. The report disclosed a very serious state of affairs, the drainage being so bad that work was recommended which would cost 50,000l., and as an alternative the architects suggested the entire reconstruction of the Infirmary, at a cost of about 60,000l. The President, Sir William Evans, said all the in-patients who could be sent away had been removed, and no fresh ones were being admitted. A house had been hired for the nurses to sleep at, and a temporary wooden hospital had been erected in the grounds for cases of accident or emergency. It was proposed to erect hospital tents in the grounds for the treatment of those who could not be accommodated in the wooden building. A strong committee was appointed to consider the best course to pursue in this serious crisis. It was stated that the institution had been regarded as a model hospital. The older part of it was built about seventy years ago.—*Leeds Mercury.*

Discovery of Wooden Water-Pipes in Belfast.—While workmen were engaged excavating for the foundations of an addition to Messrs. Lindsay's wholesale premises, now extending from Donegall-place to Fountain-street, Belfast, they came upon a curiosity in the shape of a number of wooden water-pipes. The *Belfast Newsletter* says that the main pipe is in the form of a square log of solid wood. In the centre of this a round hole is cut, through which the water flowed. At several points in the main there are holes for the joining of smaller pipes, a number of which have also been discovered. The wood, which of course is in an advanced stage of decay, having, it is believed, been embedded since 1678, is a species of menul. It is assumed that these are some of the pipes which supplied the fountain which at one time played there, and from which the street took its name. Mr. Wm. McCammond, J.P., the builder of the new premises, transferred the find to the Museum.

Edinburgh Architectural Association.

Saturday afternoon last the members of the Edinburgh Architectural Association proceeded to Bathgate, and thence went to Bridge side, which they inspected under the leadership of Mr. Thomas Bonnar. In pointing out interesting features of the building, Mr. Bonnar described it as a Baronial mansion of a regality of Ogidale, in the parish of Torphichen, situated in a beautifully-wooded dell up from the Barhauch Burn, a small tributary of the Avon. The castle was originally of the L plan, but a smaller block containing a kitchen has been added to the south of the wing. It has been considerably altered from its original construction, and has been converted from a ruin into a comfortable mansion within the memory of living persons. The whole of the ground-floor vaulted in the larger block. On the second there is a kitchen with two bars, and on the first floor of the south or smaller block there is another vaulted kitchen with a fire-arched fireplace, having a recess at the end. After having inspected the building and other objects of interest, a cordial vote of thanks was accorded to Mr. Thomas Hope, of Bridge Castle, for his courtesy in permitting a visit. The party then proceeded to Torphichen, which Mr. Bonnar said was historically interesting from its association with the once powerful and famous order of military churchmen, the Knights of St. John of Jerusalem, who were also known as the Knights of Malta of Rhodes. The Preceptory at Torphichen as established by King David I., that "Saint for the Crown," and was by him richly endowed. Of the cruciform church of the Preceptory, the chancel and nave have entirely disappeared, and there is only left a portion of the transept or "quier," which is Early Second pointed in style, and the site of the nave is now occupied by an edifice of a very different character from it—the plain modern parish church. Mr. Bonnar briefly sketched some of the incidents connected with the order and its preceptors from the date of its establishment in 1153 until the final suppression and extinction of the Knights of St. John in 1560, when Sir James Sandilands, the last on the list of Grand Priors, became Protestant at the Reformation, and joined the Reformers, and was rewarded by his adherence to the new order of things by receiving possession of the remaining estates of the order for a payment of 10,000 crowns and small annual rent. He was also raised to the peerage under the title of Lord Torphichen. In the conclusion of Mr. Bonnar's remarks, a hearty vote of thanks was awarded to him for his interesting papers. The party afterwards proceeded to Lanlithgow.

Western Infirmary, Glasgow.

By the munificence of Colonel Horner of Mauldsheie Castle, a convalescent home, with land attached, situated in the Lanark district, has been given to the infirmary. The building in question was originally fitted, at a cost of 5,000l., for use as military store-house.

TIMBER (continued).

Table with 4 columns: Item, £ s. d., £ s. d., £ s. d. Includes Cedar, Cuba, Honduras, Turkey, etc.

METALS.

Table with 4 columns: Item, £ s. d., £ s. d., £ s. d. Includes Iron-Bar, Welsch, Stafforshire, etc.

METALS (continued).

Table with 4 columns: Item, £ s. d., £ s. d., £ s. d. Includes LEAD-Pig, Spanish, English, Sheet, etc.

OILS.

Table with 4 columns: Item, £ s. d., £ s. d., £ s. d. Includes Lined-seed, Coconut, Cocosnut, etc.

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 Public Library, New Buildings.

CONTRACTS.

Table with 5 columns: Nature of Work or Materials, By whom Required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page. Includes Purchase and taking down Curtain Wall, Roadmaking Works, etc.

PUBLIC APPOINTMENTS.

Table with 5 columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Includes Surveyor of Nuisances.

PRICES CURRENT OF MATERIALS.

Table with 4 columns: Item, £ s. d., £ s. d., £ s. d. Includes Greenheart, B.G., Teak, E.I., etc.

TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

Table with 2 columns: Item, £ s. d. Includes ACTON—For the erection of the Beumont Park Board Schools, etc.

BRIGHTON.—For alterations to No. 31, Edward-street, to adapt the same for the purposes of the Salvation Army. Mr. J. Williams Dunford and Mr. W. Gilbee Scott, joint architects:—

Table with 2 columns: Name, £ s. d. Includes F. J. Coxhead, Leytonstone, £295 0 0.

CHESTER-LE-STREET (Durham).—For further alterations to premises for Mr. J. W. Luccock. Messrs. Plummer & Burrell, architects, Newcastle-on-Tyne:—

Table with 2 columns: Name, £ s. d. Includes Thompson & Sons, Chester-le-Street, £232 17 2.

DOLGELLEY.—For raising the Penmaenpool Embankment. Mr. Thomas Roberts, Assoc.-M. Inst. C.E., engineer, Penmaenpool, Chester-le-Street:—

Table with 2 columns: Name, £ s. d. Includes James Roberts, Dolgelly, £290 0 0.

LONDON.—For new boiler-house and engine-room at Acre-street, Wandsworth, for the Projectile Company Limited. No quantities. Messrs. Tolley & Son, architects, 66, Cannon-street, E.C.:—

Table with 2 columns: Name, £ s. d. Includes Shepherd, London, £3,300 0 0.

BRANDON COLLIERY (Durham).—For alteration to premises for Mr. T. Lamb. Messrs. Plummer & Burrell, architects, Newcastle:—

Table with 2 columns: Name, £ s. d. Includes J. Sell, Durham, £144 11 10.

LONDON.—For building chimney-shaft at Acre-street, Wandsworth, for the Projectile Company, Limited. Revised specification. Messrs. Tolley & son, architects, 66, Cannon-street, E.C.:—
Waddington & Co., Limited, Sydenham (accepted) £1,193 0 0

LONDON.—For constructing roads and sewers at Hampstead, for Sir Spencer Mayson Wilson. Messrs. Farebrother, Ellis, Clark & Co., surveyors:—
Neave £2,190 0 0
Nowell & Robson 2,170 0 0
Ballard 2,164 0 0
Killingback & Co. 2,135 0 0
Watts 2,075 0 0
Rogers (accepted) 1,990 0 0

LONDON.—For the rebuilding of the "King's Arms" public-house, Abney-street, Bethnal Green, for Mr. J. Johnson. Messrs. Hammack & Lambert, architects, 59, Bishopsgate-street:—
W. J. Lister & Co. £2,315 0 0
F. & E. J. Wood 2,253 0 0
S. Goodall 2,240 0 0
Gould & Brand 2,219 0 0
Charles Cox 2,150 0 0
J. Hearle & Son 2,145 0 0

LONDON.—For constructing pipe sewers with flushing tanks, manholes, &c., for the Hampstead Vestry:—
Killingback & Co. £723 0 0
Ballard 715 0 0
Neave 684 0 0
Nowell & Robson 684 0 0
Wall 673 0 0
Rogers (accepted) 667 0 0

LONDON.—For alterations and repairs to No. 1, Kensington-garden-square, Bayswater, W. Mr. W. Jacobus Gibson, architect, 35, Great James-street, Bedford-row, W.C.:—
Ware Bros. £896 0 0
Chapman 887 0 0
Nunn 772 0 0
Macfarlane 750 0 0
Oldrey & Co. (accepted) 694 0 0

LONDON.—For alterations to hall and vestibule of 101, Queen Victoria-street, to Form Post-office, &c. Mr. J. Williams Danford, architect:—
F. J. Coxhead, Leytonstone" £265 0 0
Accepted.

PORTMAIDOC.—For retaining wall, Garth-road, Portmadoc. Mr. Thomas Roberts, Assoc.-M. Inst.C.E., engineer, Portmadoc:—
Cuthbert Williams, Harlech £250 0 0
Rowland Humphreys, Merfalyddan 230 10 0
Evan Humphreys, Borth (accepted) 152 10 0
Robert Williams, Harlech 149 0 0
[Engineer's estimate, £182. 8s.]

SWANLEY JUNCTION (Kent).—For new Post-office, &c. at Hextable. Mr. William Hunt, architect, 5, York-buildings, Adelphi, W.C.:—
Cahoon & Co. £819 0 0
E. Saunders 730 0 0
Knight 689 0 0
Smith & Bullied 680 0 0
Poulter 665 0 0
J. Saunders (late) 643 0 0
Seyers & Son (accepted) 630 0 0

Factory at Hurrow.—Messrs. John Allen & Sons, builders, Palmerston Works, Kilburn, write under date May 23 to say that the list of tenders for this work which appeared in our last was incorrect. They say that the work is in their hands, but the amount is not yet settled.

SUBSCRIBERS IN GREAT AND THE SUBURBS, by prepaying at the Publishing Office, 19s. per annum (or 4s. 9d. per quarter), can ensure receiving "The Builder" by Friday Morning's post.

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TO CORRESPONDENTS.

W. R. (the building is an interesting relic, but unless we knew the precise circumstances under which it was proposed to remove it, we should hardly like to express an opinion one way or the other).—W. F. A.—J. K.—W. R.—M. S. (no address).—S. & R.—E. V.—E. K.—(no address).
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 publishing out books and giving addresses. Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.
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The Builder.

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SATURDAY, JUNE 7, 1890.

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An "Art" or a "Profession" ?



It is gratifying to find that in spite of the rather illogical side issues which were raised at the penultimate meeting of the Architectural Association in regard to the educational programme that has been under discussion, the programme as in all essentials adopted at the last meeting of the Association. But while this subject of architectural education is prominent in the minds of those who are in earnest in the cause of architecture, it is a suitable time to suggest that there is a further side of the subject to be considered; not only how an architect is best to be educated, but for what he is to be educated. It is to be qualified to carry on a profession in the same sense that law, for instance, is a profession, or surveying; to look after the business and practical interests of those who consult him; or is he to be educated with the special view of evolving his artistic powers and perceptions for the production of buildings which shall be a contribution to the stock of artistic beauty in the world? On the spirit in which this question is regarded by the younger generation of architects the future of English architecture to a great extent depends.

There are not a few, on both sides of the question, who will be ready to answer it with no hesitation of any kind. On the one side there are those who regard architecture as a mere business of making plans and passing accounts, with (to quote an expression which is likely to become unhappily proverbial) "a little art added on, more or less." On the other hand there are those who regard architecture as a pure art, and who do not scruple to say that an architect "should have nothing to do with surveying," not by any means in any derogation of that profession, but because they would consider that the art of architecture in its highest sense is enough, and more than enough, for any man's intellectual energy, and that the division of aim between two occupations which, though often classed together, are so radically distinct in nature, is certain to lead to the inadequate performance of one or other of them. And in this case there is no doubt whatever which

side of the dual profession will be neglected. Surveying is a kind of work which must be accurate or it is nothing; but the accuracy or inaccuracy, the right or wrong, of architectural design cannot be logically demonstrated, and the client who will feel injured by a careless or incompetent survey will for the most part contentedly accept such architectural design as is offered to him. The inevitable result is that the "architect and surveyor" will tend continually to become less of an architect and more of a surveyor, and the natural consequence is the erection of buildings of mechanical and commonplace design, in which no one can take the slightest interest, and the combination perhaps of convenient plans with elevations which, as we heard remarked one day in regard to the successful design in a large competition, the best possible plan could not justify the erection of.

As to the wrong position of the first-mentioned party, of those who regard architecture merely as a business avocation, there can be no doubt whatever, unless the word architecture is to have a different meaning from that which it has hitherto borne in all history. The word has stood, in all time up to the present century, for the art of producing beautiful buildings with beautiful detail. It has nothing to do with business. There was a book published two or three years ago, an able one within its lines, entitled "The Consulting Architect," and one likely to be very useful to those involved in difficulties or disputes arising out of building operations, or those who might be called on to arrange such disputes. But the title of the book, as we ought to have pointed out at the time, was a complete misnomer. The architect, in the true sense of the word, has nothing to do with such matters. The book should have been called "The Building Arbitrator." As long as this merely business view of the architect's occupation is prevalent, so long shall we see the unhappy spectacle of buildings growing up in every street which are absolutely dull and commonplace; at the best, vain repetitions of worn-out and stereotyped forms; at the worst ugly, tawdry, and vulgar. It is under this "business" influence that architecture in the true sense has almost disappeared from our modern streets except in isolated instances, happily now a little more numerous than they were a few years ago. Public indifference is of course to some extent to blame for this. If the mass of the people felt the burden of this

architectural dulness and want of character as those few feel it who really care for architecture, it would be impossible for the "business architect" to go on; he would disappear by a process of natural selection.

The proposition of the opposite party is not quite so easily disposed of. We fear that some of those who say "an architect should not trouble himself with surveying" really include under that term whatever belongs to the practical part of building. That will never do; and perhaps there is hardly any one who would admit that view in so many words; but we are inclined to think that among the decidedly artistic section of the profession, among the younger men especially, some are too much inclined to practically adopt it, and to confine their interest entirely to design. To say that this is a mistake is not to call in question the supreme interest of the artistic element in architecture. It is only to say that architecture is not an art absolute but an art relative; it is artistic treatment in relation to certain practical conditions, or we might in some cases say, arising out of those conditions. The merely convenient planning of a house is not art; but after all questions of mere convenience are considered there is an artistic element in plan, and perhaps there can hardly be a really good plan which does not include the artistic element. Some of our best architectural designers are admirable planners, some it must be confessed are not; but the more frequent defect is to find those who can produce an admirable plan but who entirely fail to impart any artistic interest to a building, except that degree of artistic interest which is inseparable from a good plan, and who produce, as before observed, elevations the erection of which no plan could justify. So again with construction, which is so far from being in any sense a separate or antagonistic study to design, that in fact architectural design cannot be fully developed or appreciated apart from a perception of the constructive system which is its basis, and an architectural artist who neglects the study of construction is in fact only studying half his art. There are a small number of exceptional types of work, such as commemorative monuments, in which the importance of the constructive and practical element is reduced to a minimum, or at least becomes so simple a nature,—merely the provision for endurance in a structure not hampered by any restrictions as to plan,—that it almost

take care of itself, and the purely artistic element of design is left far more unfettered than it can possibly be in erections intended for practical use. But these are exceptional cases, and cannot be taken as in any way converting the general truth that the art of architecture must be treated in relation to plan and construction, and that the two elements are inter-dependent.

Assuming however that all whose opinion is of any value are agreed in thinking that architecture is art, and that artistic beauty is the principal aim of the architect, there may be and are differences of opinion among earnest men as to the means of developing and fostering the art of constructing with beauty. And it is in regard to these differences of opinion that the question of the direction of architectural studies in the future becomes important. Is the architect of the future to be a man in an office at a drawing-board, or a modeller and craftsman with a studio, or directing the work on the spot? There are those, startling as it may seem to men of the quantity-surveyor type of mind, who strongly believe in the transformation of the architect into the artist pure and simple, as the hope of modern architecture, and who think that no really living architecture will be produced until the drawing-board and the T-square have been eliminated. If we ask how the plan is to be made, they reply by asking if there is necessarily any occasion for drawing plans, and whether buildings cannot be set out on the spot. Those who are called practical men would of course dismiss this theory with a laugh; but those who know a little more than the practical man know that many of the finest buildings of the Middle Ages were in all probability set out on the ground without a full plan being drawn; and it is a fact that in modern times Pugin in some cases dispensed with either plans or elevations drawn out to scale, and made sketches with figured measurements. And if we take the plans still existing by Wren, or some of those of the Italian architects of the Renaissance which are in existence in various libraries, we find nothing that any modern contractor would estimate on or any modern quantity surveyor take quantities off. No more was done, in fact, than was just necessary to set the building out. The argument of those who wish to confine architectural planning again to this kind of mere "setting-out"—and it is an idea which is entertained by men eminent in the art, and of which more is likely to be heard—is not that there is anything essentially baneful in the act of drawing out elaborate plans in the modern manner, if time were unlimited, but that it occupies time which is wasted as regards the real end of architecture, that of producing beauty; that the study of architecture as an art is in itself all-absorbing, or should be; and that the architect should be busied rather in the designing and modelling of detail and in more direct relation with the craftsman who executes it. He should be less at the drawing-board and more in the atelier.

All this has been said before, and been regarded by a number of respectable people as Utopian talk; but the idea is persistently recurring to those who are in earnest about architecture; it is very strong, we believe, in the minds of the band of enthusiasts who have got up the "Arts and Crafts" exhibitions, and it is likely to be taken up and urged by men occupying a very important position in the architectural work of the day, and is an idea that has to be reckoned with, and a conclusion come to in regard to it, by those who are entering on the career of an architect.

Accepting as we do entirely the view that the real value of architecture to a nation is as an art, there seems to be among the ranks of what may be called the "anti-drawing-board" school a certain forgetfulness of the changed conditions of modern life in comparison with the periods when the great examples of "anti-drawing-board" architecture were produced. These changed conditions may be classified as resulting first from

greater complication of requirements for modern buildings, secondly from greater hurry. As far as plan and practical requirements were concerned, the Medieval cathedral was a simple problem compared with a modern municipal building for a large city, for instance. So also with the great Renaissance buildings. The plans of Bramante and Inigo Jones were made, as far as they were made, for purely architectural reasons, structural and artistic combined. Those of Bramante, as published in the Baron de Geymüller's interesting work, as far as plan is concerned show merely what we should call the setting-out of walls and piers, portions of a building in which some special difficulty might have occurred in carrying out the work. But the architects of Medieval cathedrals and Renaissance palaces were equally freed, by comparison, from the two modern influences we have referred to, complication and hurry. They had no considerations of electric lighting, of sanitary drainage, or even of ventilation, to trouble them. In some respects, no doubt, in Mr. Besant's phrase, "The world went very well then," but the world had not discovered that matters of drainage and ventilation had any important bearing on human life, and the architect was not troubled much about these matters. The less crowded condition of life, indeed, made sanitation much easier; and when the conventional architect had built his "garde-robe" over a running stream he had possibly done all that was necessary under the circumstances. And as to hurry, one knows how the Medieval cathedral dragged on from generation to generation in a manner which would horrify a modern contractor; and the owners for whom the Riccardi and Pitti palaces were erected were probably in no great hurry, any more than their peers for whom some of the great English mansions were erected; they built a house as an heirloom at a time when the present rapid and unexpected changes in the conditions of property were unknown; the progress of the work was a continual interest to the princely owner, and if he did not live to inhabit it for long, his descendants would have it, at all events. But nowadays a building, even a private mansion, is to be built to a given day, and provided with complicated arrangements for warming, ventilation, electric lighting, and other conveniences with which modern life will less and less dispense; and as to street buildings in London, "business premises" as they are called, they are to be hurried up by relays of workmen working night and day, because they are always commercial investments around which investors are gaping for the first touch of the money. We have before remarked on the absolute impossibility of any consideration for architecture under these conditions. There is not time to think of it, or time to execute the detail; it is a mere scramble to get a building up and opened for occupation by a given date. There is nothing wrong, of course, in this; only if people want architecture they cannot have it in that way.

But it must be evident, we think, to any man, however enthusiastic for the artistic side of architecture, who looks fairly at the problem of modern building, that the comforts modern civilisation requires and has a right to expect (at all events will not be content without) in a building for public or private occupation, cannot be provided properly except on the basis of a detailed and drawn-out plan beforehand. We agree that it is practical folly to spend time in highly elaborating such a plan, however it may be that some minds find in the production of a perfectly neatly-executed and finished plan a joy with which a stranger intermeddeth not. But the plan must be elaborated beforehand in sufficient detail to arrange where and how everything is to be placed, or there will be loss of time, money, and temper afterwards. It will be bad for architecture in another sense if our few artistic architects take to neglecting plans as matters of inferior interest, for in that case

they will unquestionably have less employment than they have now. But we may ask them to consider whether the act of drawing plans, even with the vicious T-square on the demoralising drawing-board, is of necessity deadening to the artistic sense. It is urged, we believe, by some who think so, that preliminary drawings of buildings are only a modern invention; and that argument (rather shaky in a logical sense) seems to be that as fine buildings have hitherto been produced without plan-drawing, this latter operation is not only unnecessary but inimical to art. The reply that always occurs to us when this argument is used is—how was the Parthenon built? In order to carry out the work as we find it carried out, there was as much refinement of setting-out necessary as in the Forth Bridge, though for a very different kind of reason; and it is difficult to imagine how the front, with its delicate adjustments of horizontal curvatures, and setting inward of the columns, and entasis, &c., could have been carried out without a careful delineation of some kind before the details were proceeded with: it would almost seem as if it must have been set-out full size, as in a ship-builder's moulding-loft, or how were the stones to be worked with the minute accuracy required?

As to the question of the deadening effect of practical detail on the mind and work of the architect himself, on the necessity of his giving his whole attention to pure artistic design, it is rather a pertinent question, Do you consider Wren an architect in the artistic sense or not? Oddly enough, the modern worship of Wren, which has been carried a little too far, was set up mainly by the very school of men who are crying out for exclusive attention to the artistic side of architecture. Now Wren certainly was not an art-architect in the modern sense. He was essentially a scientific—a very scientific—constructor, with a great attention to practical detail. But was he not an architectural artist? It is true that his decorative detail was, in our opinion, nearly always bad; but in the main designs of his buildings he exhibited a gracefulness, variety, and originality, which few individual architects have exhibited since; perhaps we might say not one, though there might have been more (Barry for instance) who could have done so if they had had the same exceptional opportunities.

The view of the art-architect party, as we understand it, is that the hope of architecture depends on architects become far more of sculptors and modellers than they are at present, more in fact of artists and less of professional men. So far we are with them, and we believe the more an architect attains to the power of modelling his own decoration, the more we shall have of artistic interest and life in our architecture. But it must be decorative art founded on good plan and good construction to begin with. Architecture means artistic arrangement of plan, and expressive treatment of construction, and artistic detail only after that. It is perfectly true that all this work is essentially an art, not a business or a profession in the ordinary sense of the word profession. But those who are desirous to emphasise the artistic view of an architect's work must remember that it is an art which reposes on adequately considered plan and construction, and is the expression of those. To make it a matter of sculptor's or modeller's detail only is simply to take the backbone out of it.

The Movement for the Registration of Plumbers.—The District Council for Devon and Cornwall have decided to hold public meetings in Truro and other towns in the district. The District Council for Sheffield and district have resolved to include Barnsley, Doncaster, Penistone, and Chesterfield in the area of their operations. The Plumbers' Company have offered a series of prizes to the students in the plumbing classes at the Townshend Institute.

BREAKWATER CONSTRUCTION.*

BY F. H. CHRESEWRIGHT, ASSOC.-M. INST. C. E.

ALL practical and theoretical experts are agreed that what is wanted is a vertical wall, or a wall as vertical as it is possible to obtain. For many years a great difference of opinion existed among engineers and scientific men as to the relative advantages and disadvantages of the long slope and vertical wall systems of construction; many authorities insisting upon the theory that in the case of a vertical wall, rising from the bottom in deep water, the wave is a simple undulation, and that it would rise up against a vertical face, and act by its statical pressure only; whereas in the case of the adoption of the long slope, the character of the wave would be so completely and entirely changed that it would have a considerable amount of progressive motion imparted to it, and consequently great percussive force, the result being that the whole weight of the mass of water, multiplied by the velocity with which it was moving, would be the measure of the force exerted on the slope, or rather upon the vertical wall reared at or near the termination of the slope.

Professor Airey says that "waves do not break against an upright surface, and exert no percussive force upon the wall,—they will exert the same sort of pressure that there is against a lock-gate; that is, a hydrostatic pressure."

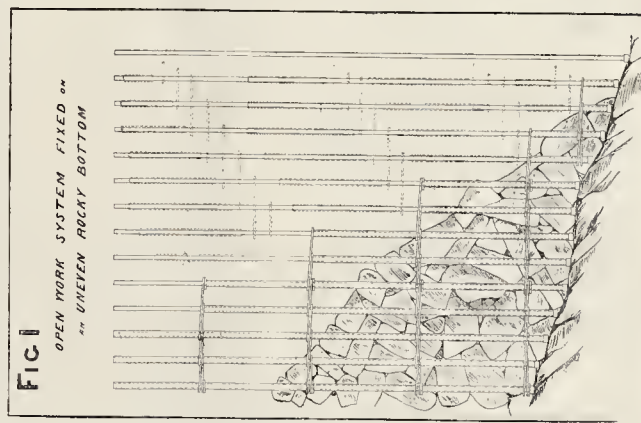
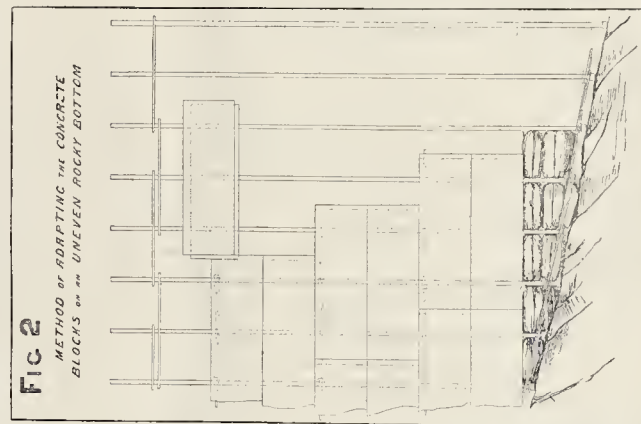
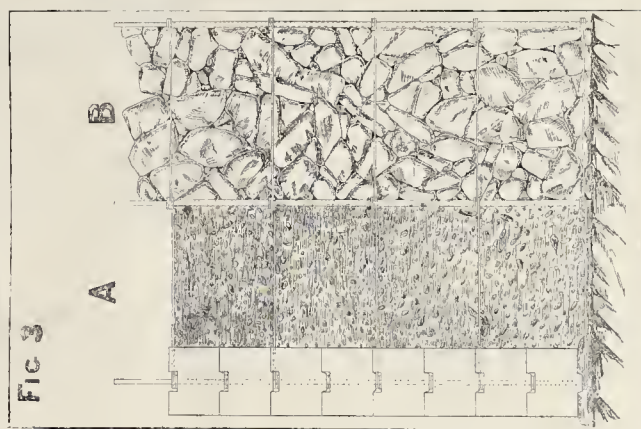
Sir Wm. Cubitt also says that "if in constructing a wall in the sea 72 ft. high in deep water we could be sure of all our premisses, the thing could be done, and would be the most perfect."

Capt. Vetch says that "he would prefer a wall of solid masonry rising holdly and perpendicularly out of deep water, but for the expense and difficulty of preparing foundations and carrying on such structures, as the time and expense would be so great 'on the usual mode of procedure' as to render it impracticable."

It may, therefore, be taken that there is a general consensus of opinion; 1st, That an upright wall is best adapted to repel heavy waves; 2nd, That it should rise direct from the bottom of the sea; and, lastly, that the great drawback to the construction of works of this description has been the cost and difficulty of preparing foundations for them in deep water.

A very fair contrast may be drawn between the breakwaters at Plymouth and Dover. Plymouth breakwater is a sloping one, while that at Dover is nearly an upright wall. They are somewhat similarly situated with respect to exposure to south-westerly gales, the height of the waves at Plymouth being 13 ft. and at Dover 12 ft.; during these gales the sloping breakwater suffers considerable damage in its "toe" and "head," while the upright wall receives no damage whatever. Moreover, taking into consideration the supposed more exposed position of Plymouth breakwater, all the more important advantage of such structures, as shelter for shipping, remains with the upright wall; and, in regard to the expense of maintenance, we have seen that the Plymouth slope may be put down at 5,000*l.* per annum, while the upright wall is comparatively *nil*.

The vast expense necessary for the erection of breakwaters on the old system has proved too frequently an insurmountable obstacle to their erection in places where they were much required. Frequently half-measures have been resorted to, and with the result common to half-measures at all times and places,—a dead loss of the money expended and no benefit obtained. It is no exaggeration to say that the colossal sums of money which have been fruitlessly cast into the sea in the construction of futile breakwaters amount in the aggregate to a national disaster. The history of those ports which have been erected by private and local enterprise presents

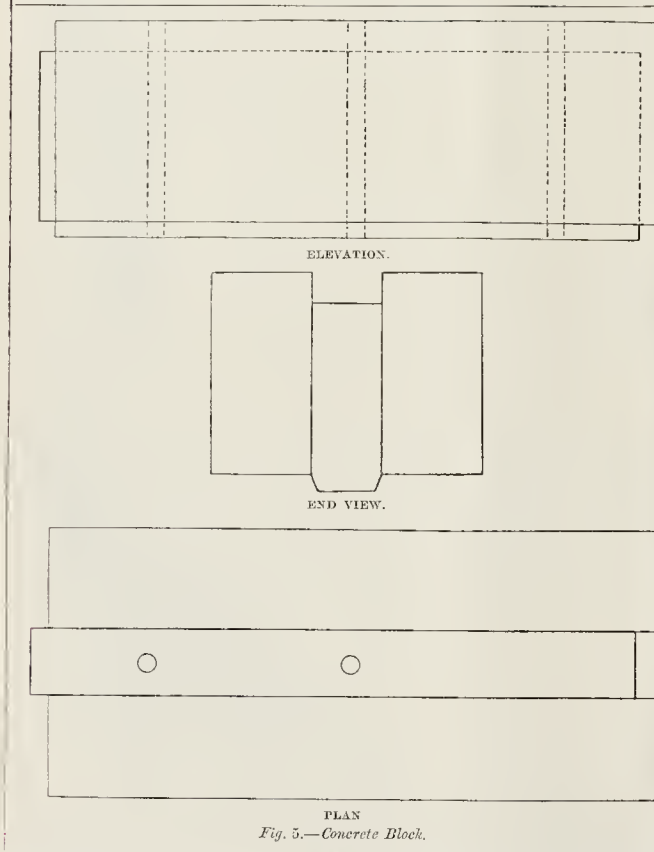
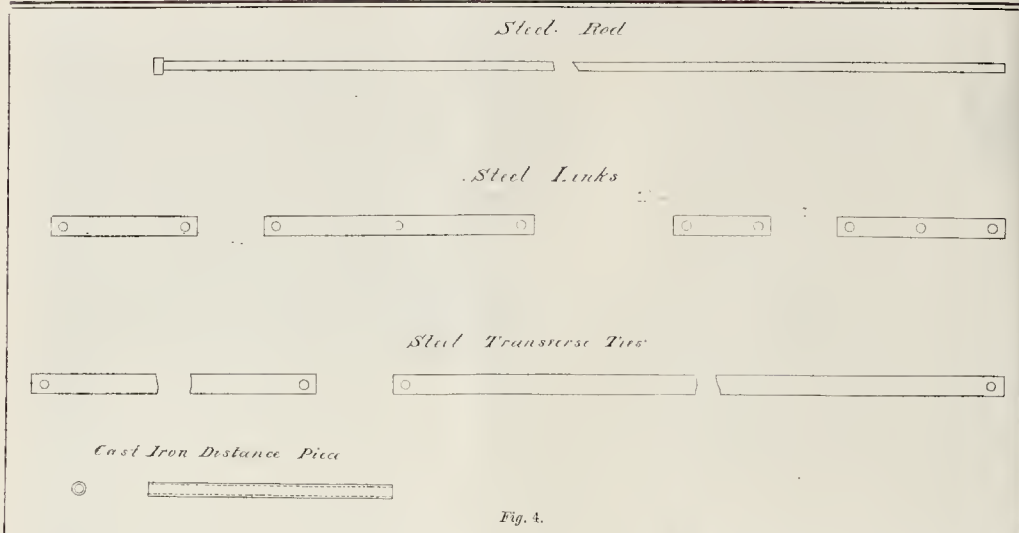


but a record of building makeshift piers at a time when funds were low, and of taking them down again when trade had expanded and more room was required. The want of funds has prevented too frequently the original work from being carried into deep water, and in consequence the most expensive part of the projected breakwater is often put down at the very place which has afterwards to be converted at great expense into deep water-way or herthage.

The author has now to call the attention of the meeting to the invention of Mr. John Lewthwaite for erecting upright walls in any

position, however exposed, and on any foundation, whether it be rock, sand, reef, or mud. Fig. 1 shows Lewthwaite's patent in elevation as adapted on an uneven rocky bottom where rock in any quantity can be obtained for filling; whereas fig. 2 shows the system employed on a sandy or soft bottom where only silt, sand, chalk, or other material of a loose nature is obtainable. In this latter case it will be seen that the loose filling is kept in place by concrete blocks threaded over steel rods, which are made to any desired dimension, the size being regulated by the amount of sea to be resisted. Fig. 3 shows a cross

* From a paper read before the Society of Engineers, on the 5th inst. See p. 390, ante.



section with details of all parts that are necessary to construct a breakwater or seawall of any size in any depth of water, let the nature or contour of the bottom be what it may.

One of the most important merits claimed for this invention is its simplicity of construction, there not being one piece in its formation requiring the hand of the skilled artisan. But though an important one, it is by no means the only one. Works on this system can be carried on with very great rapidity in almost

any weather short of a terrific hurricane. Staging, that most expensive of items, is only needed when the breakwater is not connected with the shore. Another, and that the distinctive characteristic of this new system, is that the work is one connected whole, and therefore, unlike most breakwaters or seawalls yet erected, perfect continuity is obtained. Again, there need be no fear about the works receiving damage during the course of construction, for, by this system, and this system only, the upright or vertical wall from

the sea-bottom to any desired height above water is rapidly and easily attained.

The method of erecting works on this principle is to form two horizontal stages parallel to each other, spaced the distance apart required for the two outer walls. In order to form an absolutely stable structure, the width should be about equal to the depth of water; i.e., if there be 40 ft. of water the breakwater should be 40 ft. wide. These horizontal stages have slotted pieces of iron (grippers) their entire length, being placed at stated intervals, and they are so disposed as to hold the upper ends of the vertical rods in position when dropped by the overhead traveller used in the construction of the work. These operations are carried out simultaneously on either side. When a rod on each side has been dropped, a transverse tie is threaded on, the "grippers" are drawn back, the tie allowed to pass, the "grippers" replaced on the rods, and the tie then lowered. This defines the transverse distance of the vertical rods. Other rods are then lowered in the same manner, and links are threaded on to them in the direction of the work to be done, each link being threaded over three rods. When a rod has three links on it, the "grippers" are drawn back and the links allowed to drop. The "grippers" are then replaced and the rods again secured to them in their proper position.

Should the construction be similar to that shown in fig. 1, pieces of tube called "distance pieces" are threaded over the rods to regulate the distance between the links vertically.

As will be seen by reference to this figure, "distance pieces" are of varying lengths when the bottom is uneven, until a horizontal line has been attained; when this has been accomplished the "distance pieces" used will be of equal lengths and the work continued in a regular and consecutive manner, until a further dip in the foundation is encountered, when the "distance pieces" will again be of various lengths until another horizontal section has been attained, and so on to the end of the work. The above sketch shows these "distance pieces" in the regular part of the work to be 6 ft. long, so that the cable links will be kept at that distance apart throughout the structure. The distances that these transverse ties are to be placed may be left to the discretion of the engineer. When this part of the work has been accomplished rock filling is thrown in, shoots being, of course, employed in order to prevent any damage to the transverse ties.

The same process is carried out when forming a breakwater, as shown on fig. 2, only that no "distance pieces" are required, the concrete blocks themselves acting in this

case as distance pieces. The concrete blocks are threaded over the vertical rods and allowed to glide into position. In addition to the "ties" used, further strength and continuity is gained by having the concrete blocks so made as to dovetail one with another.

The iron or steel used in this work (fig. 4) is of such forms that there is no need for any finished or skilled labour. The concrete blocks are shown in fig. 5. Some engineers entertain doubts as to the duration of iron under water. The following extract from a paper appended to the report of the Harbour Commission should suffice to set their minds at ease:—

"We are told that the *Mary Ross* was capsized when under sail at Spithhead in 1545, and recovered in 1837, after having been under water 292 years. It was then found that the guns, which were of the ancient type of wrought-iron bars bound together with iron hoops, having detached chambers keyed into solid wood, are corroded to the depth of a quarter of an inch."

Now, as the iron rods used in the construction of a breakwater on the Lewthwaite plan would be about 2½ in. in diameter, it would at this rate take over 1,000 years to wear them away; a very fair period for a breakwater to stand. But long before that distant epoch was reached the constant movement of the ceaseless ocean would have thoroughly solidified the rock fillings into a gigantic monolith, which would stand for yet another thousand years.

In conclusion, the author begs to say that the object for which this paper has been written will be fulfilled if it prove the means of introducing to his professional brethren a method of successfully making breakwaters, piers, and sea-walls with an upright wall, with such absolute continuity of structure, in any position, however exposed, on any bottom, and to overcome difficulties that have defied the most eminent in the profession during all ages.

NOTES.

AFTER a discussion which has extended over a considerable time, and after repeated divisions, the London County Council, at its meeting on Tuesday last (reported in another column), came to a decision on the question of maintaining eleven small gardens and open spaces which were planted and opened to the public through the agency of the Metropolitan Public Gardens Association, but which were recently closed in consequence of the inability of that Association to bear the annual cost of their maintenance as well as the first cost of planting and throwing them open. As will be seen, the London County Council have decided, by a very small majority, to maintain the spaces in question until October 31, 1892. There has been a great deal of rancour imported into the discussion, not between the "Moderates" and the "Progressists" so much as between the partisans of what may be called the dutiful Vestries and the negligent Vestries. Large numbers of each party in the Council took opposite views on the question, and the "cross-voting" thus caused is accountable for the narrowness of the majorities on the various motions and amendments discussed. Certain of the metropolitan Vestries, that of St. Pancras, for instance, have shown a great deal of public spirit in supporting many small open spaces in their respective localities out of local funds, and many of the representatives of these public-spirited Vestries opposed the proposition of the Parks Committee of the Council, on the ground that the Vestries and District Boards in whose Districts the eleven spaces in question are situate have neglected their duty in not supporting their own local spaces. On the other hand, the last-named authorities say that they are too poor to do so. To this it is replied that in most cases their rates are much lower than in those districts of the metropolis which have done their duty as to open spaces, and that they receive large subsidies in aid of local burdens. The Vestries and other authorities who have maintained

their own open spaces complain of the injustice of being doubly taxed for the benefit of those districts which have not and will not do their duty. The whole dispute, like that as to a similar question which arose last year about the provision of baths and washhouses in the many metropolitan parishes which are without those necessities of health and cleanliness, points to the necessity of the constitution of the District Councils which have been promised as an integral part of the reform of London government. The continual conflicts which take place as to the provision of open spaces and other necessities of health are not creditable to any one concerned. We are glad to think that there is a prospect of the spaces in question being reopened.

DR. STUDNICKZA'S brilliant monograph "Kyrene" should meet with special attention in England, owing to the light it throws on some of the most important vases fragments recently discovered at Naukratis. Where the vases known as "Cyrenaic" were actually made has been of late matter of much discussion. Puchstein attributed them to Cyrene itself, Klein to Sparta, Milchhoeffer believed their origin to be Creten, Dr. Studnickza now steps in and, we think, settles the question in favour of Cyrene itself. Not only that, but he creates a new goddess for us, the eponym of the town. "Cyrene" is no longer to be regarded as a mere late impersonation of a place, but she is the counterpart of Artemis the *lady snipa*, and her early image is to be seen on one of the most curious and interesting of the Naukratis vases now in the British Museum; there she stands holding the silphium in her hand, and a bough of the golden Hesperid tree is close beside her; the ground of the vase is thickly covered with small winged figures, male and female impersonations of the favouring winds of the city. In the ninth Pythian of Pindar Kyrene appears not as a great goddess, but as a lovely maiden whom Apollo saw wrestling with a lion and loved for her strength and beauty. In relief in the British Museum she is depicted struggling with a lion, and, as Dr. Studnickza notes, for the first time, this type explains some fragments of the archaic pedimental group which decorated the Kyrene treasure house at Olympia. The first type of Kyrene, in a word, and in part her legend, arose from the familiar figure of Artemis taming these wild creatures of the wood and field,—a figure so familiar to literature as art. Kyrene is one of the many instances of the degradation of goddess to heroine.

THE twenty-second annual report of the Council of the Surveyors' Institution, presented at the annual general meeting of members on Monday last, shows, we are pleased to see, that the Institution continues to make most satisfactory progress. The total number of members of all classes is now 1,617, made up of 15 Honorary Members, 1,080 Fellows, 310 Professional Associates, 89 Associates, and 123 Students. During the past year there has been a net increase of 184 in the number of Fellows, there having been 152 elections and 47 transfers from the class of Professional Associates. The balance-sheet shows the financial position of the Institution to be excellent. During the year there was a total increase of 304L 10s. in the revenue derived from members' subscriptions. The total receipts for the year, including a small balance brought forward, amounted to 5,406L 12s. 1d. In addition to meeting all current expenses, which amounted to 3,931L, the Council have been able to add the sum of 1,500L to the invested funds of the Institution. The report points out that the examination system becomes more and more vital to the future of the Institution "as the time approaches when it will be the only avenue to membership," and it is satisfactory to see that the system is "each year strengthening its hold on the rising generation of surveyors."

* Kyrene eine altgriechische Göttin von Franz Studnickza. Mit 38 Abbildungen. Leipzig: Brockhaus, 1900.

During the ten years (1881-90) during which the examination system has been in operation, 435 candidates have presented themselves for the Preliminary Examinations; of this number, 309, or 71.03 per cent., have passed. For the Professional Examinations, 461 candidates have presented themselves; and 333, or 72.33 per cent., passed. The number of candidates, and the average percentage of marks obtained by them, show encouraging signs of increase. With regard to the proposed new Special Certificate Examinations, the report says:—

"The passing of a technical examination has hitherto, with the exception of the direct Fellowship Examination (now suspended), been a mere condition precedent to membership; but surveyors, like members of every other profession, having developed a greater tendency within recent years to become specialists as regards particular branches of practice, it has been thought desirable by the Council to introduce, in a tentative way, a system of Special Certificate Examinations open to those actually members of the Institution, in the three subjects, Forestry, Sanitary Science, and Land Surveying and Levelling.

These three subjects obviously lend themselves to a much more exhaustive test than is possible or necessary in connexion with the General Examinations of which they already form a part, and a Special Certificate, as the result of a searching Examination in any one of them, could hardly fail to be of value to any rising practitioner possessed of sufficient ambition and capacity to pass the ordeal. Examinations in Forestry and Sanitary Science, for which a fair number of candidates have sent in their names, will be held during the present month."

The report informs us that the marked success which has attended the tentative course taken by the Council in the establishment, two years ago, of six Provincial Committees, has encouraged them to extend the system by the formation of several more Provincial Committees. One result of the working of these committees has been to bring the Council into much closer and more effective relations with the members in distant parts of the country. The report concludes by recapitulating the proceedings of the Council with reference to Bills now before Parliament. In one paragraph we read that

"The Council have been saved the necessity of opposing the Architects' Registration Bill, which it seemed might possibly prejudice surveyors in some of their relations with their clients, by the introduction of a clause specially exempting professional members of the Institution from its restrictive provisions, in the not very probable contingency of its receiving the sanction of the Legislature."

WITH regard to the very material changes proposed in the Law of Bankruptcy by Sir Albert Rollit's Bill, now before the House of Commons, the lending wholesale grocers and merchants in the tea, coffee, provision, spice, and colour trades have petitioned Parliament against the Bill. As the Bill, of course, affects all other traders equally with the grocers, &c., we give the terms of the petition, wherein are indicated the main proposals of the Bill:—

"That your petitioners have carefully considered Sir Albert Rollit's Bill to amend the Law of Bankruptcy, and are strongly of opinion that, if passed as it stands, the Bill would almost completely prevent creditors having the control over the assets of estates to which they are justly entitled, and it would hand over to officials of the Court the realisation thereof.

Experience has conclusively shown that such a course is neither economical nor calculated to benefit either the public, debtors, or creditors, and your petitioners feel very strongly that the property of an insolvent debtor should belong to his creditors, who are the proper and only persons who should decide how that property is to be dealt with.

The Bill, if passed, would practically repeal the Deeds of Arrangement Act of 1857, which provides for the registration of deeds of arrangement, and has been received with considerable favour.

Under these circumstances your petitioners ask your Honourable House to consider whether such a retrograde step should be for a moment tolerated, and they respectfully venture to suggest that if the Bill be not withdrawn, at least the important clauses should be amended to counteract the evident tendency to officialism."

A CASE of some interest not only to Hastings, from which place it came, but to other localities governed by Improve-

ment Acts similarly worded, is published in the current number of the "Law Reports." The case is that of *Meadows v. Marshall*. By Section III. of the Hastings Improvement Act, 1885, "the making of any addition to an existing building by raising any part thereof . . . shall for all the purposes of this Act . . . and of any By-law made thereunder, be deemed to be the erection of a new building," &c. By one of the By-laws made under the Public Health Act, 1875, notice of the erection of a new building was to be sent to the Surveyor of the Sanitary Authority. Mr. Taylor, the respondent in the case, built a house with a conservatory on the first floor, in accordance with plans duly passed by the Sanitary Authority. About a year afterwards he pulled down the conservatory and built a bedroom in its place nearly of the same size as the conservatory, the walls, which supported the glass of the latter, being raised for the purpose. No notice of this alteration was given to the Surveyor, it being contended—as the justices thought rightly—by Mr. Taylor that the case did not fall within the Act of Parliament, since this was not an addition to an existing building. On appeal, the Judges of the Queen's Bench Division thought differently, and reversed the decision of the magistrates. It does not require a legal training to construe the section in question, and apply it to the facts of the particular case. There was, in fact, an addition to the house by the adding on of a new bedroom formed out of a new structure. The fact that it was of the same dimensions as the conservatory did not make it less an "addition to an existing building." In fact, it is scarcely possible to understand how the magistrates came to the decision, though it was probably because they considered that no harm had been done by a technical breach of the law. But if the High Court had agreed with them it would have clearly defeated the intention of the Act.

WITHIN the past six months considerable attention has been bestowed in Germany on the results of certain experiments carried out last year with a view of testing the comparative advantages of using a volcanic sand in making mortar. This sand is found in the Eifel, being the residue of ejections from the recently-extinct volcanoes of the district. In chemical composition it is silica and alumina, with rather large proportions of lime and magnesia, and for years has been known to make good hydraulic mortar when mixed with lime. Details of the experiments will be found in a paper by Dr. Böhme in the "Mittheilungen aus den Königlichen technischen Versuchsanstalten zu Berlin," Supp. I., 1889; but we may state that they indicate that mortar made with the ordinary Prussian standard sand is inferior, both in tensile and crushing strength, to that in which the volcanic sand was employed. For example, a mortar made with 3 parts of the standard sand and 1 of Portland cement, after having been immersed in water for one year, indicated a tensile strength of 34.15 kilograms per square centimetre, whilst precisely the same kind of mortar, but made with volcanic sand, under similar conditions, gave a strength of 50.15 kilograms per square centimetre. Their respective crushing weights were 320.8 and 499.1 kilograms per square centimetre. When mixed with rich limes, the volcanic sand also showed its superiority to the standard sand; whilst experiments made as to the powers of adhesion to stone and resistance to frost (as far as this latter can be artificially ascertained), also prove the great advantages of mortar made of the former kind of sand. The first question which naturally arises on considering these results, is whether such a product exists in this country. We have not seen a sample of the volcanic sand experimented with, but from its description it appears to be an ordinary kind of material, which is in reality merely lava in an extremely comminuted condition, which latter was brought about by its having been blown out of the crater into the air during

eruptions, and which fell as dust and sand on the volcanic pile. Such a sand might possibly also result from the decomposition of certain classes of lavas. It would be useful to know how far the chemical composition of the volcanic sand influences its quality as an ingredient of mortar, because if this element is permitted to be elastic a similar product might possibly be found in some of the volcanic areas of Britain. The compositions of the Eifel sand alluded to, and the Vesuvian lavas of 1631 and 1867-8, are very similar. Could the same superior class of mortar be manufactured from sand obtained by crushing such lavas?

SEVERAL Roman inscriptions and sculptures have been found in the North Wall of Chester, and it is thought that further exploration will result in new discoveries. A circular, appealing for subscriptions towards the cost of such exploration, has recently been issued in Oxford, and bears the signatures of Professor Pellham, F.S.A., Dr. Collingwood Bruce, and others. Professor Mommsen, of Berlin, has also written in aid of the movement, saying:—"I approve with all my heart the project of taking up on a larger scale the excavations at Chester. For the story of the Roman Empire, so far as it has to be based on the monuments, there is nothing so instructive as the great headquarters of the Imperial army . . . We Latin scholars will pray very earnestly for good luck to the English pickaxes occupied at Deva; and the last discoveries give good hope." The Bishop of Oxford (Dr. Stubbs) is strongly of opinion that the researches begun three years ago should be resumed, and has no doubt that further discoveries will be made. "Of all the historic sites in England," says the circular, "none are so likely to aid our knowledge of Roman history as the Roman military centres, and it is well-known that Deva was garrisoned by the Twentieth Legion from the earliest times until the end of the Roman occupation of our island. The area of search would be the Dean's Field and the North wall adjoining the portions examined previously. . . All Roman inscriptions and sculptures found will be deposited in the Grosvenor Museum with those found in the previous exploration of the North-wall. The scheme has the hearty approval of the Council of the Chester Archaeological and Historic Society." The Dean has given consent for excavations to be carried on in his field, and the Corporation of Chester has just granted permission for the walls to be explored. What is now required is money; this may be sent to Professor Pellham, Bradmore-road, Oxford. Doubtless there are many antiquaries who will be willing to give something towards this object, and we certainly wish the movement success, although we do not think that the excavations will result in the discovery of anything of much purely architectural interest.

IT had originally been the intention of the Municipality of Berlin to erect a monument to the deceased Emperor Frederic in the capital. We now hear that the young Emperor will not permit such an erection on the part of the municipality, but that he himself intends dedicating a monument in memory of his father, and that he has already given the necessary instructions to the Minister of Public Works. According to good authority, this Minister will be in favour of placing the proposed monument on an extension of the Frederic Bridge, situated between the Museum and the Exchange.

THE good people of Ulm, amid the ringing of bells and general rejoicing, laid the last stone of their cathedral spire on Saturday last. In 1492 the tower had reached the height of 316 ft., but the work was then stopped on account of the yielding of the two eastern piers; after four centuries the spire has been added, and it is now (so say the people of Ulm) "the highest in the world, having an altitude of 530 ft." The official celebration of the event will take place on June 28 and three following days.

FEATHERS - COURT, No. 261, High Holborn, is in course of being rebuilt, for the purpose of making a widened thoroughfare, to be named Holborn-avenue, into Whetstone-park, at the back of Lincoln's-in-fields. The sign of the "Feathers" (shown as the Prince of Wales's cognisance) distinguished a tavern formerly in Hand-court, nearly opposite, in High Holborn which was a favourite haunt of Lamb and Coleridge, perhaps during the former's residence in Little Queen-street, at a house whose site is now occupied by Holy Trinity Church, being the house wherein, on September 22, 1796, Lamb's mother met with her death. Hand-court is so styled from the tavern by sign of the "Hand in Hand," which also was not an uncommon sign with former matrimonial agencies in the town.

THE delay in the appearance of "Bradshaw" this month was probably due to the fact that nearly the whole of the tables have been re-arranged. The guide is considerably improved in several respects, the compilers having at last discarded the bewildering practice of utilising every inch of space between the figures by cramming in notes and references. The latter are now clearly set forth at the end of the respective tables; or, in the case of a main line, in an ample margin at the side. There are also a greater number of fares and distances inserted, and the headings are printed in bolder type. The great economy of space which was effected by the old system of abbreviating and "cramming" (in which art "Bradshaw" has long stood unequalled) is strikingly evidenced by the fact that, under the new arrangement, no fewer than 100 additional pages are required for the time-tables. These now occupy 523 pages, the complete guide consisting of 726 pages, exclusive of the index. Few, however, will object to the increase in bulk, while the improvements effected in the familiar "monthly" will doubtless be greatly appreciated by those who have to study its pages.

IN reviewing a work on the railways of America a little while ago, we remarked on the impression given in the book as to the carelessness with which railways are constructed in the States, and the want of feeling of responsibility among American railway officials, as evidenced by some of the statements made in the book. The terrible disaster at Oakland, California, reported in the daily papers, when an engine and train went through the opening in a swing bridge, comes as a unhappy example of this. It seems the bridge was at the end of a curve where the driver could not see it, and he neglected the danger signal because "he expected that the bridge would be closed by the time he reached it." This sort of thing seems only too characteristic of the American railway system.

THE President and Council of the Royal Academy have commissioned Mr. W. Reynolds Stephens to paint a "Wall Decoration" in the refreshment-room of the Royal Academy. The sketch for it obtained the "Prize for a Decoration" of the Academy-Schools in 1887, and was exhibited at the Academy in 1888. The subject is "Summer." The work will be commenced directly the present Exhibition closes. We published an illustration of the design in the *Builder* of December 31, 1887.

Strikes in the Building Trade.—The Dublin carpenters, to the number of nearly 400, struck work on Monday, on account of the refusal of their demand for shorter hours. Some of the men returned to work on Tuesday, on their demands being conceded.—The Exeter carpenters and joiners also struck on Monday, to the number of about 150. Their ground of action is that the masters refused to agree to a uniform code of rules and the payment of a minimum wage of 6½d. an hour. On the other hand, it is reported that the operative bricklayers of South Shields, who have been on strike several weeks for an advance of wages to 9½d. per hour, have accepted the award of the arbitrators of 9d., and have returned to work.

ARCHITECTURE AT THE ROYAL ACADEMY.—V.

1,816. "Pevery, Shropshire": Mr. Aston Webb. The two general perspectives in this frame we published among our lithographs in last week's issue, and they require therefore no description here. They present an exceedingly good example of a large house designed on the "home-like" principle; a house which would be called a "mansion" if it were a rectangular and symmetrical block of building, but which is too picturesque to merit that rather doubtful title. Plans of ground and first floor are appended. A long corridor from end to end of the house forms the backbone of the plan; we presume that some break in the way of either curtains or swing-doors would be made use of to shut out the vista of the kitchen region from the best end of the house. The main staircase seems rather small for a house on this scale; no effect appears to be made with it. One of the most agreeable features is the block of plain masonry which rises in a partially tower-like form on the north front, over the entrance, with a little cupola at one angle of it. A larger drawing of this portion is appended in the same frame, showing also a coat-of-arms with a finely-treated mantling over the door. The whole makes a very pleasing collection of drawings.

1,817. "The Bishop's Door, Lincoln Cathedral": Mr. John Begg. A slightly-executed but very artistic sketch, lightly tinted in Indian-ink for the shadows. The author, who gained the Pugin Studentship this year, has established himself as one of the best of the younger architectural sketchers of the day.

1,818. "House at Weybridge": Mr. Ernest Newton. A very nice pen-drawing, but rather too much of an affectation of rural simplicity in the house; especially in the porch with its little sticks of columns. This is the kind of thing that amuses one by its naïveté in houses of the last century, but the deliberate adoption of it is merely an appeal to sentiment.

1,819. "East Gallery, Avery Hill": Mr. T. W. Cutler. This is part of the same house of which the sculpture gallery is shown in No. 1,731; though here the drawing is a sketchy one in ink line in a recognisable hand: the architecture is of much the same type as in the latter drawing, consisting of the ordinary *réchauffé* of paneled pilasters &c. Avery Hill is evidently a house on which much money has been or is being expended; we wish we could say that its architectural interest appeared at all proportionate to its probable cost.

1,820, 1,821. "Cottages at Higbam, Colchester": Mr. W. H. A. Berry. Two pretty little pen drawings; perhaps the picturesque effect is a little more due to the touching of the drawings than to the actual details of the architecture shown.

1,822. "Junior Constitutional Club, Piccadilly; New Buildings": Mr. R. W. Edis, F.S.A. We do not know whether it is "of malice aforethought" that this is hung just over No. 1,819, but the result at all events is amusing. Here are two drawings of different buildings in different localities and bearing the names of different architects, yet it does not require the draughtsman's signature in the corner to show that they are both by the same hand. Ought it not to be a requirement in the Architectural Room that architects should exhibit some of their own individuality in the drawing of their designs, instead of merely sending them to a recognised draughtsman to make a show drawing in his own style? Whatever the actual merit of the drawings, it is making the whole thing too much of a mere architectural draughtsman's illustrated catalogue to have this vicarious drawing all about the place. If it were required that the drawing should be done by the person whose name is appended to it in the catalogue, the latter would be a fairer representation of the real state of things in the Architectural Room; it might be put this way in the catalogue:—

"19.—HOUSE, MUDDLEBOROUGH (Peckniff & Co., architects),..... Thomas Pinch."

As it is Thomas Pinch's draughtsmanship that gets the drawing hung, this would be putting matters on a proper footing. Or if it were made a rule that the architect of every building exhibited should make his own drawing, we should then have the additional interest of finding out who could draw and who could not, in which respect perhaps some curious revelations would be made. With regard to the

actual design in this case, we may say that the Junior Constitutional Club is a true lineal descendant of its senior, and shows, probably with intention, just the same features and treatment; satisfactory of their kind and suitable for club architecture, but hardly suggesting any further comment that that.

1,823. "Design for Public School": Mr. F. W. Bedford. This was one of the designs submitted for a recent Soane medallion competition; and in spite of its eccentricity of colour and design, there is an originality and a certain picturesque quality about it which justifies its being hung here, though we are not quite prepared to say whether anything could justify its being built.

1,824. "Priory of Our Lady, Haywards Heath": Messrs. Goldie, Child, & Goldie. This is a rich and finely-finished water-colour drawing of the interior of a chapel in late Gothic style, with a rich *recofes* of gilded tabernacle work, and roofed with a single hammerbeam roof, with longitudinal as well as transverse curved braces. It is very correct and satisfactory, but we do not know that there is anything more to be said about it.

1,827. "Stables, Asham Hall": Messrs. Chorley & Cannon. A creditable attempt to give a picturesque effect to stable buildings, chiefly by piling up a large irregularly shaped heap of half-timber work over the centre entrance: it looks a little too much, however, like an affectation of the picturesque.

1,829. "Alms-houses, Welbeck": Mr. John Brooke. This is a very unpretending, but pleasing and home-like building of a simple Elizabethan type, with long low mullioned windows; the coupled arches, with a much-enriched column, at the entrances between each block, have a good effect. No plan is given, but the architectural expression of an almshouse, as a haven of rest, is very well attained.

1,830. "Sauchieburn, Stirlingshire, N.B.": Messrs. Sidney Mitchell & Wilson. It is difficult to make out whether this is an addition to an old castle, or an entirely new building in the Scotch castellated style. Upon this question the architectural merit of the thing would rather depend. As a new building, it is very deficient in interest and has no higher merit than that of consistency with a type; if a portion of it is an old building, and the rest additions in keeping therewith, one might regard it differently; but there is no plan or other indication to show. As a pen drawing, it is exceedingly delicately executed.

1,832. "Church of St. Wulfran, Abbeville, West Front": Mr. H. Wilson. Another exceedingly artistic though slight water-colour sketch by the same hand as No. 1,735 already referred to, but a good deal superior to the latter. A slight touch or two to relieve the extreme bareness of some of the subsidiary buildings, such as might have been given in half a minute, would have balanced it better as a whole and removed the raw look of the foreground; but the author understands the art of seizing effect and colour in a rapid sketch.

1,833. "Interior of the Lady Chapel, St. Alban's Abbey, Herts": Mr. Roland W. Paul. These two drawings, on one sheet of paper, were made as illustrations for this journal, and were published among our lithographs in the *Builder* of April 5 of this year. They were made with the view of preserving a record of the appearance of the interior of the Lady Chapel before its apparently impending disfiguration under the hand of Lord Grimthorpe. It now remains to be seen, however, whether the change in the bishopric of St. Alban's will leave Lord Grimthorpe with as free a hand as before. Report says not.

1,834. "Poles, Herts": Messrs. Ernest George & Peto. This is a charmingly picturesque drawing of a long straggling house of a semi-cottage Elizabethan type, in which the effect is got entirely by the arrangement of the windows and the effect of some projecting semi-octagon bays happily placed. There is absolutely no ornament, only mouldings and what some architectural writers affect to call "fenestration." In the drawing the effect is most pleasing, but we cannot help asking how much of this depends on the drawing,—on the method of getting it up, whereby the look of an ancient and weather-stained building is imparted to it; and whether the actual house, as a new building, has or can have the peculiar charm which is imparted to it by the manner of drawing. We have not seen the house, but we should very much doubt, in regard both to this and other drawings we have seen at different

times by the same hand, whether the actual building produces the effect of picturesqueness which the drawing does.

1,835. "Barusdale Hill, Rutlandshire": Mr. E. J. May. A reproduction of this drawing appears in our pages this week. Mr. May is one of the few exhibitors who thoroughly recognise the importance of plan, and in this case, as in the others, occupies as much of his paper with the plans as with the view of the house; and a study of the ground plan will show that for comfort, and privacy of various portions, it is a very good house plan. The house, like most of its author's, is picturesque and expresses its plan and purpose well; but we cannot say that we think the system of sketching off a drawing in a rather hurried and scribbly manner over different parts to give it a little effect, is precisely the best kind of example to set in getting up drawings for the Academy, though the drawing has the merit in this case of individuality, which is something.

1,837. "77, Welbeck-st.," Mr. Beresford Pite. This is another drawing also with a strong—very strong, flavour of individuality. It is a water-colour showing a brick building with stone dressings, Renaissance frameworks to the windows, with stone halls over the cornices, &c., in the middle of an expanse of brick wall. The projected bays are carried on cupid figures at the angles in a pretty manner, and the cupola in the centre of the roof-line is also original and picturesque; but the striking element in the drawing is the colour, in which the author has shown his usual originality of perception. As shown here it looks like an old building and not like a new, and looks moreover very dilapidated; but as a bit of colour it is one of the cleverest things in the room.

LETTER FROM PARIS.

It has been already mentioned, in the review of the two Salons at Paris, that the secession in the camp did not seem to have materially affected the prosperity of the old Salon, and a further practical proof of this may be mentioned here in the fact that while the entries on "vanishing day" in 1889 were 1,964, this year they have been 2,384, realising a sum of 23,840 francs, which has been applied towards the creation of a "maison de retraite" for aged artists. At the Champ de Mars the "vanishing day" was free, so that no financial comparison can be made in this case; but we learn from good authority that the managers of the new Salon are abundantly satisfied with the commercial results of the enterprise.

The old Salon, however, has no need to be jealous of the new one as far as regards its official position, for the State has been prodigal towards it, and has voted a sum of 225,000 francs for the purchase of works of art from its collection. Nevertheless, since the new minister, M. Bourgeois, has shown himself determined to encourage all new efforts, a sum of 75,000 francs is to be appropriated to the purchase of works from the new Salon. The prizes and bursaries given on the recommendation of the Conseil Supérieur des Beaux-Arts are all appropriated to the old Salon to which they were first attached, though it is said that M. Antonin Proust intends to propose, when the matter comes up for discussion, that next year these revenues should be equally divided between the two establishments.

There is a small exhibition on the Champ de Mars, not far from the Salon Meissonier, and a little crushed by the latter, which deserves a word; this is the ground-floor gallery on which M. Henri Dupray, a painter of the School of De Neuville and Détaillé, has revived the history of the French army for the last hundred years, with its variety of costumes and arms, in a long series of pictures showing much talent and scrupulous exactitude.

The Chamber of Deputies has pronounced in favour of the preservation of the Exhibition Palace of 1889, and its annexation to the City, on certain conditions which we have already recorded. This matter may probably now be regarded as settled; at any rate M. Alphand thinks so, for he is at present making out the arrangements for a grand fête to be given on the Champ de Mars.

The political events of this month, and especially the artisans' manifestations of May 1, have had for one consequence to bring to

* This seems rather like confederation, as regards the vested rights of the old Société.—Ed.

Hôtel de Ville the Préfecture of the Seine and all the administrative services which have since 1879 been installed in the Pavillon de Flore. The Museum of the Louvre will therefore at last be able to take possession of all the buildings along the quay, to install here a number of collections which have hitherto been consigned to the attics, and to isolate the works of art completely from the neighbourhood which left them in constant risk from fire.

Since the Exhibition, and the sale of the Crown diamonds, the Salle des États of the Louvre has been unoccupied. There is a talk of transforming it into a museum to receive various pictures taken from Versailles since the Exhibition, and which since then have been hidden away in Paris. Among these are "Le Sacre" of David and the "18th Brumaire" of Bouchot. In the new Salle would also find place a series of portraits at present put away in lumber-rooms. If the necessary funds are not forthcoming, the galleries will be temporarily arranged and the decoration of the Salle des États postponed, the necessary repairs only being undertaken at a probable cost of 25,000 francs. On the other hand, a gallery is being prepared for the exhibition of antiquities from Tunis and Algeria. This gallery, which will be reached from the Daru staircase, and which will be ready in about two years, is situated under the gallery of Early Italian art.

The Louvre is about to receive Millet's picture of "Les Glaneuses," left by Mme. Pommeroy of Rheims, and which will be shortly exhibited. The gallery of Renaissance sculpture is also enriched by a statue of the Virgin by Germain Pilon, which decorated the Ecole Militaire at St. Cyr. In exchange for this statue, the State has offered to the Ecole one of the most important pictures of Protais, "La Reserve," bought at the posthumous sale of the artist's works.

The question of a house for the Opéra Comique is to come before Parliament again shortly. The Budget Committee appears to have shown itself utterly hostile to the reconstruction of this unfortunate theatre on the Place Boildieu, and it is feared that things will be left as they are, and the Opéra Comique be maintained on the Place du Châtelet, without undertaking any new building. The French architects who have asked for a competition for the new theatre will therefore probably be disappointed in their hopes. Another disappointing prospect awaits those who were looking for a competition for the rebuilding of the Ecole Polytechnique at St. Cloud. This scheme, which would have entailed a great deal of inconvenience in regard to carrying on the educational work of the school, is probably abandoned. The Minister of War is personally opposed to it, and as M. Freycinet is an old Polytechnic man, his opinion will have considerable weight with the Government. Probably the present establishment will be opened out by the acquirement of some adjacent property, and the neighbouring area put into a better sanitary state. The architects will however have, as a consolation, the competition for the reconstruction of the Caserne des Célestins, decided on in principle since 1886.

The cost of the new Caserne to be built adjoining Boulevard Henri IV. is estimated at 1,700,000 francs. The author of the project classed as No. 1 will receive a premium of 6,000 francs if he is commissioned to carry out the work, and 10,000 francs otherwise. Other competitors are to receive premiums of 4,000, 3,000, 2,000, and 1,000 francs. The competition will be closed on July 22. Among the works in progress in Paris, those of the rope railway, at Belleville, are being actively carried on. They were commenced in March last under the direction of M. Bievenue, Ingenieur des Ponts et Chaussées. This work, which will be completed in autumn, will be of great convenience to the neighbourhood, and the Administration thinks of establishing two other similar railways up the hills of Montmartre and Montsouris.

At the Bourse de Commerce, the gate which closes the principal entry has just been fixed. It is a piece of open wrought-iron work, with decorative designs (palms, griffins' heads, escutcheons, &c.) in massive bronze. The gates, which are folding, have been executed after the designs of M. Blondel, the architect.

M. Injalbert and M. Rodin have just completed the models for their decorative sculpture for the Panthéon, the former, as before noted, taking the monument to Mirabeau, and the latter that of Victor Hugo, and the Commission des Beaux-Arts has decided that a temporary

imitative model of each should be set up in the Panthéon in order to judge of the effect; an excellent expedient which might well be adopted more often in such cases, to avoid ultimate disappointment. If the same had been done with the paintings in the Panthéon, we should not now be regretting the grotesque contrasts of style and subjects which have spoiled this decorative scheme.

It is to obviate further disappointments of this kind that the committee for the decoration of the Hôtel de Ville has resolved to require from all the painters who have been selected to cooperate, that they should put up full-size sketches in position before proceeding to the finished work. The result so far has been most useful, for it has enabled the artists to judge of, and modify where necessary, the scale of the figures, the height of the sight line, the values of colour, and the general harmony between the architecture and the painting. The question of the ceilings has yet to come, and the committee will have some difficulty in bringing about a harmonious combination between the odd and incomprehensible project of M. Besnard for the Salon des Sciences (exhibited at the Champ de Mars Salon) and the ceilings by MM. Bonnat and Jules Lefebvre which are to be in near neighbourhood to it.

The competition for a monument to Condoreet has been decided at the Hôtel de Ville. Among the three artists in the second competition the commission for execution has been given to M. Perrin. M. Louis Noël has carried off the first premium, and M. Steiner the second. We must confess that none of the three models have captivated us much, and we doubt whether the result will be improved in the bronze.

Among artistic news may be noticed the exhibition of paintings, designs, pastels, and sculptures by M. Raffaelli. This rather intractable artist refused to exhibit at either Salon, and has made his own exhibition at the Goupil Gallery in the Boulevard Montmartre.

Among works recently executed is the bust of the late M. Perrin, former administrator of the Comédie Française, executed by M. Guillaume for the State; and the statue of the Princess of Wales which has been completed by M. Chapu, and which will shortly be exhibited at the National Gallery of Copenhagen.

We announced recently that M. Alfred Normand had been elected a member of the Académie des Beaux-Arts in place of the late M. Diet; and we have now to announce also the election of M. Pascal, the learned architect of the Bibliothèque Nationale, in place of the regretted André. M. Jean Louis Pascal was born in Paris, and obtained the Grand Prix de Rome in 1866, as well as a medal at the Salon of the same year; and in 1880 he gained the Cross of the Legion of Honour. M. Pascal had as competitors for the honour MM. Ancelet, Guadet, Guillaume, Hardy, Dutert, Scailles, and Corroyer.

At its last sitting, the Academy of Science awarded the Fremont prize to M. Lavalley, painter, and M. Danguy, architect, and the Deschamps prize to M. Gigot, architect.

At the Ecole des Beaux-Arts the Conseil Supérieur, on an official return by M. Guillaume, has formulated an opinion the realisation of which would make a kind of revolution in the artistic world here. It has demanded that women should be given the same facilities as men in regard to artistic education, and be put in all respects on the same footing. In support of this proposition it is urged, and with truth, that for twenty years back the number of female artists, painters and sculptors, has been continually increasing. Admitted to the Salon exhibitions, and with liberty to participate in all the honorary awards along with men, they find themselves often occupying a secondary position which would not exist if they could profit equally with the other sex in the higher education of the Ecole. In all the "Facultés," it is added, the "étudiantes" enjoy the same privileges as the men. Female artists, on the contrary, are obliged to content themselves with instruction given in private ateliers, and which is often unsatisfactory even as far as it goes. The administration of the Beaux-Arts will have now to consider the means of satisfying the views of the Conseil Supérieur, and if they arrive at an affirmative conclusion, the Ministry of Fine Arts will have to ask the Chambers for a vote for the necessary funds.

The competition in decorative composition has just been adjudged at the Ecole. A première médaille has been awarded to M. Binet, pupil of MM. André and Laloux, and troisième

médailles to MM. Armbruster and Lerolle. M. Armbruster was the author of the premiated design for a sun-dial, published in the *Builder* for April 5 of this year. In the competition for the second-class students, the subject of which was, "Trois hôtels construits sur un terrain irrégulier," the jury have awarded "premières mentions" to MM. Binet and Labouret. In the competition in "Éléments Analytiques" of which the programme was "Un petit arc de triomphe décoré d'un ordre Corinthien Grec," sixty-four projects have been sent in, of which not less than fifty-nine have received honourable mention.

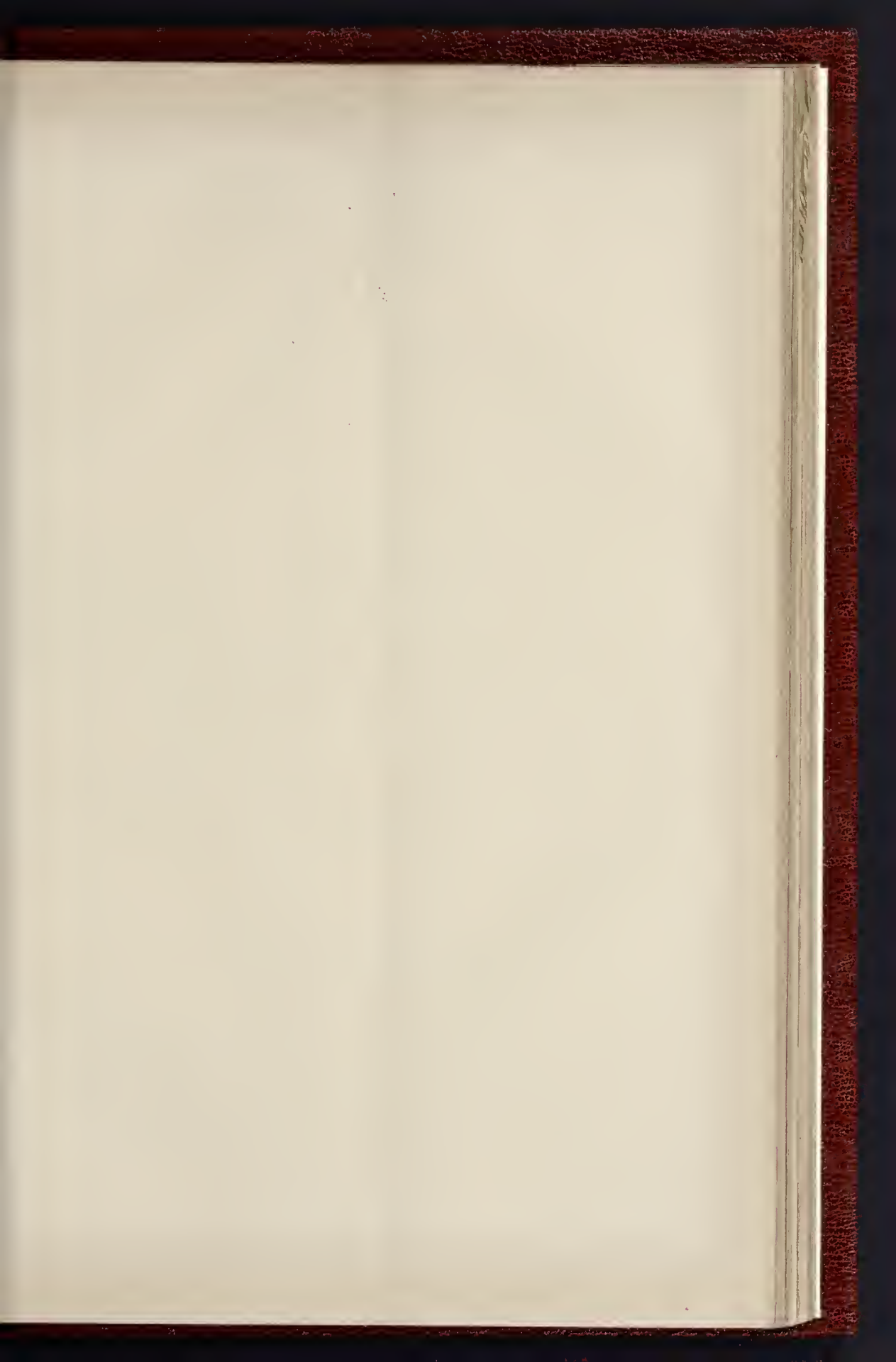
We learn that M. Gustave Moreau, painter, and Member of the Institute, has been appointed by the Government a member of the Conseil Supérieur des Beaux-Arts in place of M. Robert-Flcury. To be appointed to succeed such a master is an honour of which M. Moreau may well be proud.

As to the venerable Robert-Flcury, whom we followed on the 8th of May to his last resting-place, he was for some time past overborne with the weight of years, and belonged, so to speak, to the past rather than to the present; yet up to the last, at the age of 93, he still preserved all the faculties of his mind intact.

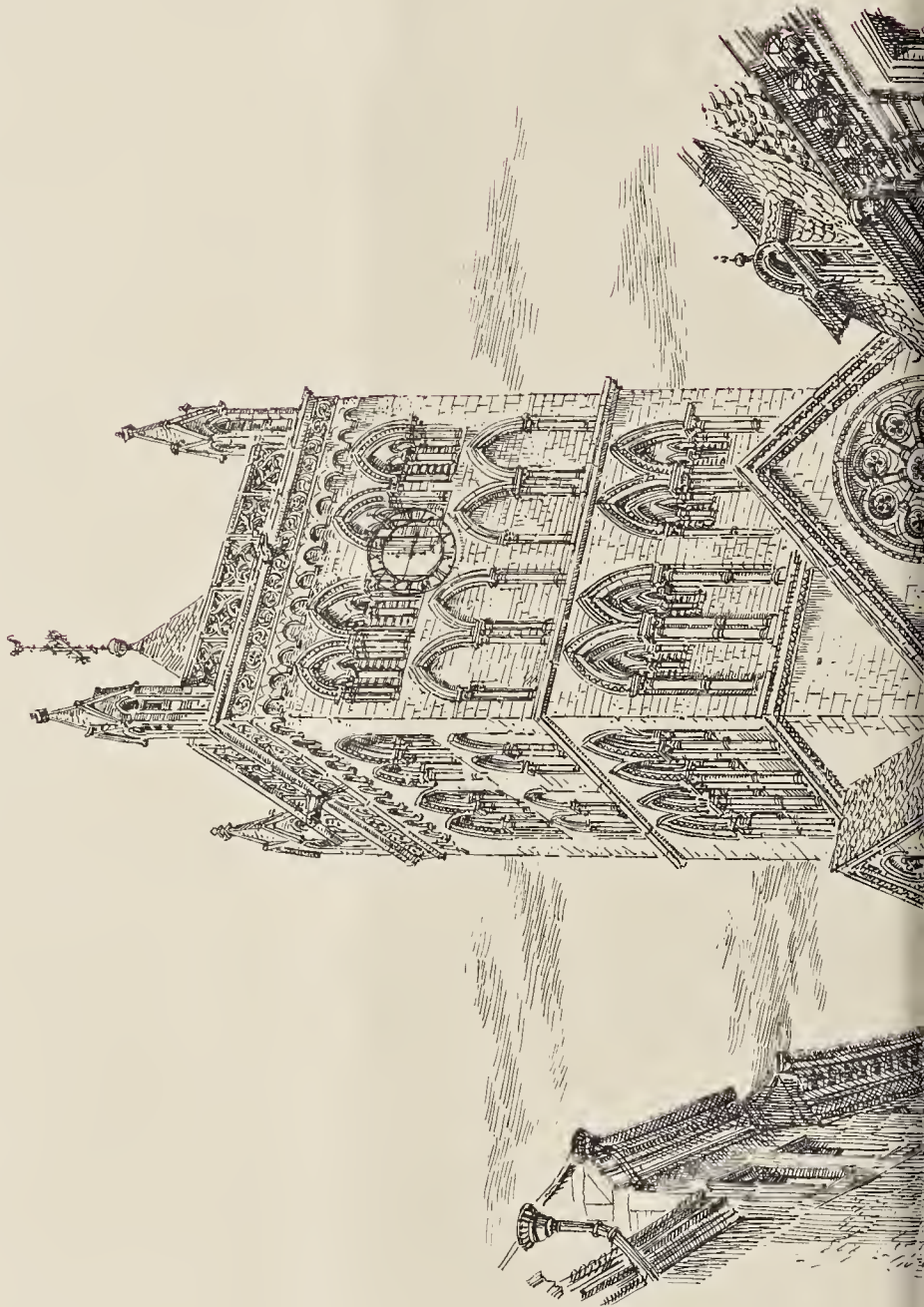
Robert-Flcury was born at Cologne in 1797. He carried on his artistic studies in Paris in the ateliers of Girodet, Gros and Horace Vernet. He first exhibited at the Salon in 1820, where his picture attracted much attention; and from that date his reputation increased year by year. Among his principal works we may mention "The Triumphal Entry of Clovis into Tours," which is at Versailles; "Galleo before his Judges," and "Christopher Columbus," both of which are in the Luxembourg Museum; "Tasso in the Monastery," "The Last Moments of Montaigne," "Charles V. at the Monastery of St. Just;" works well known and widely popularised by engravings. In the course of his long and laborious career he had honours showered upon him. He received medals in the Salons of 1824 and 1834, was "décoré" in 1836, made officer of the Legion in 1849 and Commander in 1867, and had been elected a member of the Institut in 1850. In 1855 he replaced Blondel as Professor at the Ecole des Beaux-Arts, of which he became Director in 1863. In 1865 he went to Rome to direct the Villa Medici establishment. He was a member of nearly all foreign Academies, and had received decorations from most of the Sovereigns of Europe. For the last twenty years he had taken no part in exhibitions, but he did not cease to interest himself in the art in which he was so distinguished. His name will remain prominent among the annals of that interesting artistic period of the first half of the century, the epoch in which the romantic school began to give to French painting that new impulse which freed it from the cold classicism into which it had been congealed during the Imperial epoch.

The death is also announced of the sculptor Camille Demesmay, who had his time of celebrity. He died at Bezançon at the age of seventy-four; he was the author of various decorative statues, notably that of Mlle. de Montpensier which adorns the terrace of Luxembourg Jardin, and procured its author a deuxième médaille in the Salon of 1848. He executed also the "Mater Christi" of the Church of Ste. Genevieve, the "Saint Philippe" of the Ermité, the "Justice" at the new Louvre, &c. We may also cite among his works various busts which are in the Museum of Versailles, and a Virgin and Child which is in the Museum at Bezançon.

Competition: Hymers College, Hull.—Mr. E. C. Robins, the assessor appointed in this competition, has sent in his report on the designs, which were thirty-seven in number. After a general analysis, seventeen of these were rejected as unsuitable, and after a full examination of the remainder, the assessor reported in favour of that marked "Supervisor" (Messrs. Botterill, Son, & Bilson, Hull) as first, that marked "Balbus" (Mr. Wigram, London) as second, and that marked "Wilberforce" (Messrs. Chorley & Connon, Leeds) as third. Mr. Robins speaks highly as to the generally high order of merit of the designs sent in, and observes that "The Governors have every cause to be grateful to the architectural profession, for the ready and able response it has made to their appeal for its technical assistance in this important matter."



THE BUILDER. JUNE 7, 1890.



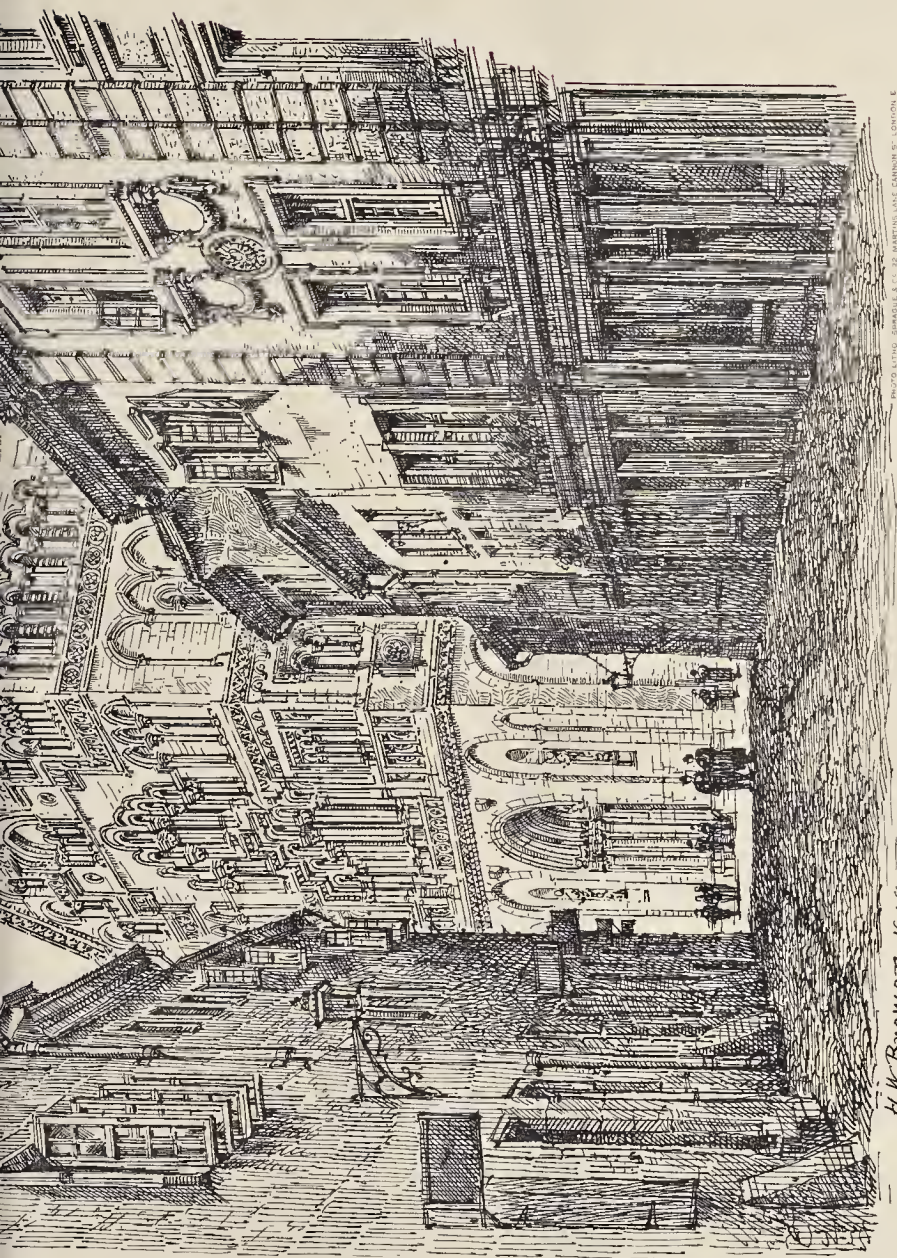
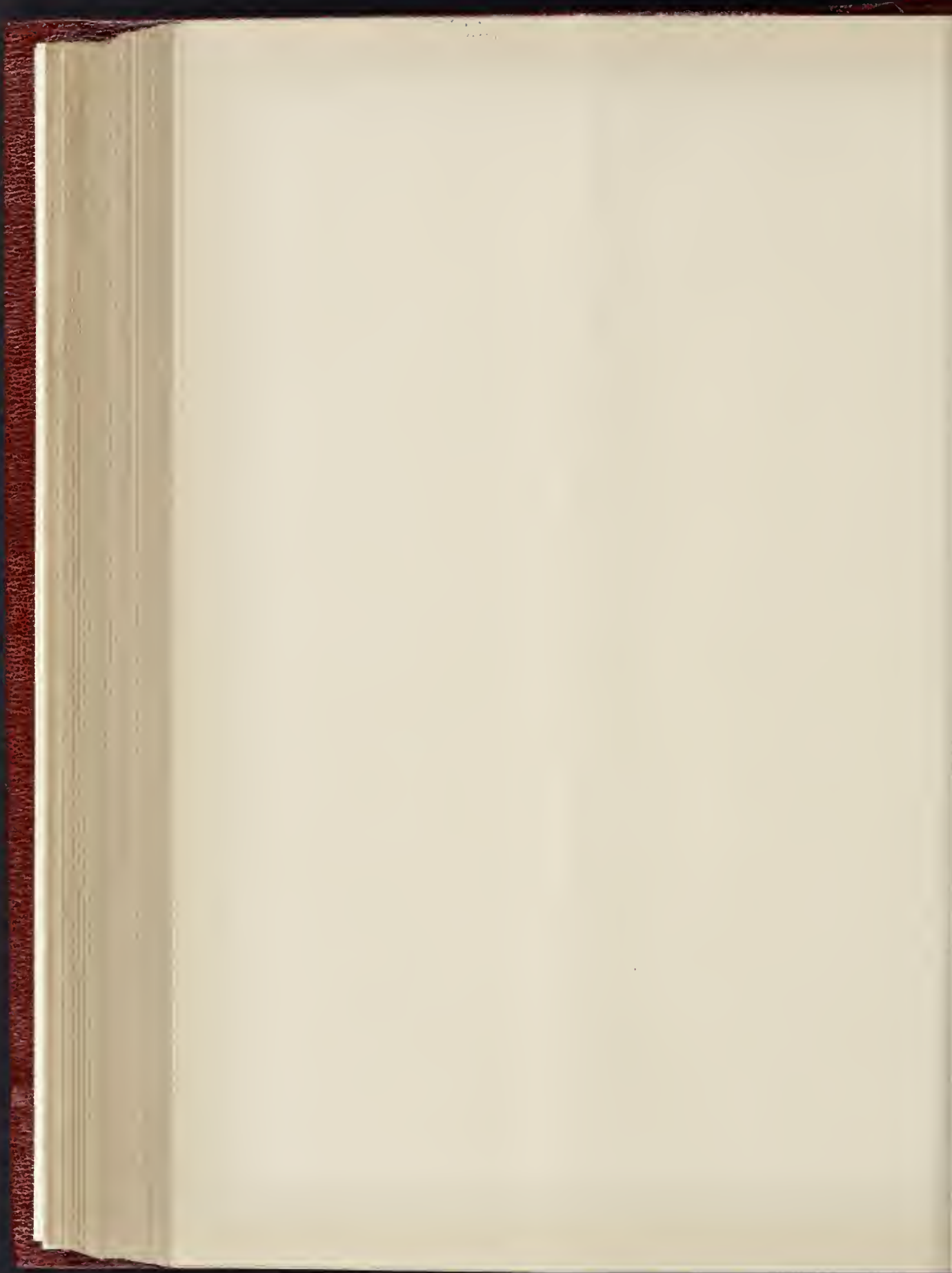


PHOTO-LITHO. SCHEIDT & CO. 27 MARKT-PLATZ, DARMSTADT.

THE CHURCH OF ST. QUIRINUS, NEUSS.

H. W. Brewer. 1889.



THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The twelfth ordinary general meeting of the present session took place on Monday evening last, Mr. Alfred Waterhouse, R.A. (President), in the chair.

Election of Officers and Council.

The President read the report of the scrutineers as to the election of the Council. The voting was as follows:—

President.—Mr. Alfred Waterhouse, R.A.†
Vice-Presidents.—Prof. Geo. Aitchison, A.R.A.†; Mr. John Macvicar Anderson,† Mr. Arthur Cates,† and Mr. Henry Currey.†

Honorary Secretary.—Mr. Aston Webb.†

Members of Council.—For eighteen seats to be filled by Fellows there were thirty candidates. The voting was as follows:—Collcutt, T. E.,† 442 votes; Slater, John,† 399; Graham, Alex.,† 391; George, Ernest, 388; Emerson, Wm.,† 383; Belcher, John,† 379; Spiers, R. Phené,† 377; Blashill, T.,† 376; Brooks, James,† 364; Papworth, Wyatt,† 360; Douglas, Campbell (Glasgow), 300; Brydon, J. McK., 298; Sedding, J. D., 297; Hansard, O.,† 288; Robins, E. C.,† 281; Holden, John† (Manchester), 280; Gruning, E. A.,† 268; Fraser, J. B.† (Leeds), 254. The foregoing eighteen were declared elected. *Not Elected.*—Ridge, L. W., 247; Hall, E. T., 235; Johnson, R. J. (New-cast), 234; May, E. J., 207; Seddon, J. P., 206; Goddard, Joseph (Leicester), 197; Plunbe, R., 173; Conroy, J. W. (Leeds), 142; Drink-water, H. G. W. (Oxford), 142; Ingelow, B., 120; Seward, E. (Cardiff), 113; Gough, Hugh Roumieu, 102.

Associate-Members of Council.—To fill the two seats on the Council allotted to Associates, there were five candidates. The voting was as follows:—Blomfield, R. T., 292; Rickman,† T. M., 241. The foregoing were elected. *Not elected.*—Street, A. E., 236; Julian, G. R.,† 159; Middleton, G. A. T., 50.

Presidents of Allied Societies, elected to seats on the Council:—Crisp, H.† (Bristol Society of Architects); Drew, Thos. R.H.A. (Royal Institute of the Architects of Ireland); Freeman, R. E. (Manchester Society of Architects); Reade, T. M. (Liverpool Architectural Society); Walker, Herbert (Nottingham Architectural Society).

Representative of the Architectural Association (London).—Mr. Leonard Stokes, President.

Auditors.—Wm. Kidner, Fellow; Wm. Woodward, Associate.

Election of Standing Committees.

Art Standing Committee.—Fellows: J. M. Brydon, R. H. Carpenter, T. J. Flockton (Sheffield), C. F. Hayward, W. Kidner, E. M. Macartney, E. J. May, R. Nevill, E. Newton, and E. S. Prior. **Associates:** A. Aitchison, E. J. Ball, G. H. Birch, G. C. Horsley, James Neale, and A. B. Pite.

Literature Standing Committee.—Fellows: F. T. Baggallay, E. P. Loftus Brock, T. H. Eagles, C. L. Eastlake, J. A. Gotch (Kettering), B. Ingelow, E. M. Macartney, Wyatt Papworth, H. W. Pratt, and Hugh Stannus. **Associates:** R. T. Blomfield, H. O. Cresswell, T. Garratt, G. R. Julian, A. E. Street, and P. Waterhouse.

Practice Standing Committee.—Fellows: Cole A. Adams, H. C. Boyes, S. F. Clarkson, G. R. Crickmay, Prof. B. Fletcher, G. E. Grayson (Liverpool), E. T. Hall, J. S. Hansom, L. W. Ridge, and S. Salter. **Associates:** A. R. Barker, T. Batterbury, F. H. A. Harcastle, T. M. Rickman, R. S. Wilkinson, and E. Woodthorpe.

Science Standing Committee.—Fellows: Lewis Angell, H. D. Appleton, T. W. Cutler, H. Dawson, A. J. Gale, J. D. Mathews, Prof. T. Roger Smith, B. Tabberer, Ernest Turner, and T. H. Watson. **Associates:** H. A. K. Gribble, C. Henman, F. Hooper, H. Lovegrove, W. C. Street, and H. Tanner.

On the motion of Mr. Hall, a vote of thanks was passed to the scrutineers for the trouble they had taken in connection with the election.

The Arab House in Cairo.

Mr. R. Phené Spiers, F.S.A., then read a paper by Count D'Hulst, entitled "The Arab

* For the offices of President, Vice-Presidents, and Honorary Secretary, as well as for the seats on the Council filled by the Presidents of the Allied Societies and the representative of the Architectural Association, there was, of course, no balloting.

† Marked thus were members of the outgoing Council.

House in Cairo," of which the following is an abstract:—

In introducing the subject, the author stated that it was the custom in the East for a monarch to build a fresh capital on ascending the throne. Among the examples of this habit, Cairo was conspicuous; and, again, Egypt had been the most conquered and exposed to internecine quarrels. These causes, time, and an unreasonable imitation of European architecture, had furthered the destruction of Arab houses. Some beautiful old ones were, however, still left in Cairo, and proved that the richness and elegance displayed in Arab public buildings were also attributes of the private houses. According to Arab writers, private houses in Damascus were built after the fashion of the late Roman houses; in Persia, especially in Bagdad, the ancient Persian houses served as examples; while in Northern Africa and Spain the Moors evidently had copied those of the ancient Roman. The principles of the plan of the Arab house were: (1) Grouping of the rooms around courts and gardens; (2) absolute separation of the rooms for each sex; (3) prevention of passers-by seeing into the courts; (4) windows arranged so that a man on camel-back could not see in, and so that they neither overlooked, nor were overlooked by, others; (5) railing the windows of upper floors so that the women could see into the streets and courts without being observed; (6) arrangement of the entrance to the harim (female apartments) in a special court, or in a place remote from that to the salamlik (male apartments); and (7) the arrangement of rooms, kitchen, bath, stables, &c., with due regard to the ruling breezes, and the construction of ventilators to air the rooms.

The Cairo house had generally several floors, and not infrequently, towards the streets, a row of small shops on the ground floor; while in the upper part of the house, by-like constructions protruded about 1 ft. 6 in., mostly composed of turned wooden lattice-work; the roof was flat, and surrounded by a pendant fretwork ornament. The foundation walls to the height of the first floor were of quarried stone or cased externally with the soft calcareous stone of the Mokattam, while the superstructure was of plastered brick. The house was entered by a more or less narrow dark vestibule leading to the court, and forming one or two angles to prevent those in the street seeing into it. A detailed description of the court and the various halls and rooms was then given, allusion being made to the fact that the horse-shoe arc, commonly considered a characteristic of the Mohammedan arch, was not very frequent in Cairo, the author stating that in all the remains of Arab houses he had examined he had only discovered two instances in which the arcades of the *mahad* (a reception-room on the first floor) were horse-shoe shaped. In the Cairo Arab house all decoration, exterior and interior, was the work of the architect, and not of the decorator or the upholsterer. The exterior was very plain: all ornamentation, if any, being displayed upon the entrance. It was much to be regretted, Count d'Hulst considered, that this style of house building, so suitable to the conditions and requirements of the country, was rejected for the building à la Française, the suitability of which was very doubtful. The house of the French Consulate General, better known as Count St. Maurice's house, showed how well Cairene architecture could be adapted to modern requirements, and what handsome and artistic effects it could produce.

Local taste and exigencies were important factors in Egypt; and in the towns of the Lower Delta and along the sea-shore there existed an altogether different style—namely, brick architecture. What was most noticeable were the doors and doorways, which were ornamented with delightful geometrical designs in a kind of mosaic, composed of thin pieces of red and black bricks, whose furrows were filled in with white plaster and inlaid in the brickwork. Another mode of decoration was the utilisation of the brick itself to constitute the intended design. It was notable that, notwithstanding such a developed technique, no trace of moulded bricks had yet been discovered. All the towns of the Lower Delta had a number of portals of mosques with pendentives constructed entirely of bricks. At Rosetta the ground-floors were exclusively devoted to warehouses and offices; a separate door leads to the dwelling with a staircase to the first floor; a peculiarity is that this staircase very often protrudes with half of

its breadth. In Damietta, as well as in other places, another arrangement existed: the house formed three sides of a square; the entrance on the open side led into a place partly court, partly hall, having roof only in that part which is built over, and this place served for reception. Another style of brick architecture which was interesting was to be met with at Assiout. These brick constructions, being mostly in a ruinous state, were disappearing fast, their material being used for new buildings; yet Count d'Hulst thought the places mentioned in his paper would well repay a thorough exploration.

Mr. Phené Spiers himself added some notes to the paper, of which notes the following is a brief abstract:—Broadly speaking, Saracenic domestic architecture derived its architectural inspiration from religious buildings. The entrance doorways were simpler versions of the magnificent portals which were the characteristic features of Mohammedan architecture, the doorway being placed at the back of a square niche, which rose the whole height of the building, and was arched over with a stalactite vault. It was generally about 5 ft. wide, and from 8 ft. to 10 ft. high, and its decoration was confined to the elaboration of its voussoirs, and to its enclosure within a flat decorative moulding. The corbels which carried the projecting upper floors were generally of stone, and inclined slightly upwards. The principal feature in the chief court was the *mahad* or open gallery, placed on the south side, and facing the north; its architectural design was derived from the arcades surrounding the courts of a mosque. The ceilings, cornices, &c., of the reception-rooms, Mr. Spiers considered, were based on those found in the mosques, which were the finest and earliest. It was possibly due to the absence of published plans of these houses that great diversity of opinion existed in the distinction between the *mandarah* and the *hakh*, and attention was drawn to the points of difference of Mr. Stanley Lane Poole, Mr. Dillon, and Count d'Hulst. In all cases the ceilings were richly painted and partially gilt. The openings between the *durkakh* and the *teenân*, and between the latter and its recesses, were spanned by beams supported on curved brackets and carried on stalactite corbels, the whole being elaborately carved, painted, and gilt. Mr. Spiers joined with Count d'Hulst in deploring the daily destruction of these beautiful works of art. Many of those in Mr. Dillon's drawings had already been pulled down and their decorative features broken up or stolen.

Mr. J. D. Crace, in opening the discussion, remarked that all those who had visited Cairo would thank Count d'Hulst for his extremely interesting paper, and Mr. Spiers for having taken the trouble of reading it. There were one or two points in the paper which struck him as being worth attention. The *mandarah* was always the ground-floor room, but the first-floor room above was often quite as handsome, or even more so. Europeans rarely had the opportunity of seeing the *hakh*, as it was so intimately connected with the ladies' department. Many of the phrases used in the paper appeared to have been taken from Mr. Lane's book. It was well that architects should notice that some of the provincial towns of Egypt presented interesting examples of coloured brickwork, and with regard to the whole subject, the architecture of Egypt presented all the excellences which rendered it suitable for such climates as India and East Africa. People went on building, in tropical countries, houses suitable for London or Paris, instead of adopting some of the architectural arrangements of the Mediaeval East, which would really be of practical utility to Europeans who were resident in hot countries. Mr. Crace concluded by proposing a vote of thanks to Count d'Hulst and to Mr. Phené Spiers.

Mr. W. A. Boulnois asked if the exportation of wood carvings from Cairo still went on as it did some ten or twelve years ago? He spoke from experience, because on one occasion he had instructions from a client to build a room in the Eastern style, with the fittings he had brought home. There was very little to adapt in the interior, but the exterior was made to look like Egyptian work, with zinc and other appliances, and the process was very humbling.

Mr. R. H. Carpenter said that at one end of Cairo there was a museum, containing all kinds of woodwork of this description. It was, however, badly arranged, and there was no cata-

logue. In 1876 he was offered the whole of a house-front, from top to bottom, and though it was wonderfully cheap the difficulty of getting people to pull it down and remove it was too great.

Mr. W. Brindley scolded the vote of thanks. He considered that more might have been made of the subject, by showing what dissimilarity there was between a Cairo house and such houses as were to be found in the South of Spain, in Algiers, and even in Tunis. The marble mosaic pavement of the house of the Muffi, illustrated by Mr. Spiers, had probably been taken from one of the churches built by Justinian. There appeared to be scarcely any remains of these churches left in Egypt, though Procopius stated that Justinian erected several churches in Egypt. Where then were these churches, and where were the mosaics they contained? He did not believe they had all gone to Venice, as most of the mosaics to be found in that city had undoubtedly come from Constantinople. The mosaic referred to by Mr. Spiers was probably part of Justinian's work; and he was persuaded that many of such mosaics were Christian mosaics, adapted frequently with Moorish interlacings of soft marble. He did not believe the Arab ever tackled the working of red and green porphyry. The nearest approach to mosaic with Arab feeling in it was seen in the mosaics to be found at Salerno, Palermo, and Amalfi. There the real Arab feeling was to be seen running through the mosaic, while the Arab mosaic work in Cairo was not in many instances so original. In Granada the old houses remained in some instances as perfect as when left by the Moors. Nearly all the well-to-do modern houses of Seville were on the Arab model, consisting of a central court with marble colonnades, round which were placed the rooms. They were very beautiful, and certainly suited the climate.

The President said that architects might learn much, as artists, from the wonderful works of the Moors, from the manner in which they used geometry, and the beautiful forms from it.

The vote of thanks was then put, and carried by acclamation.

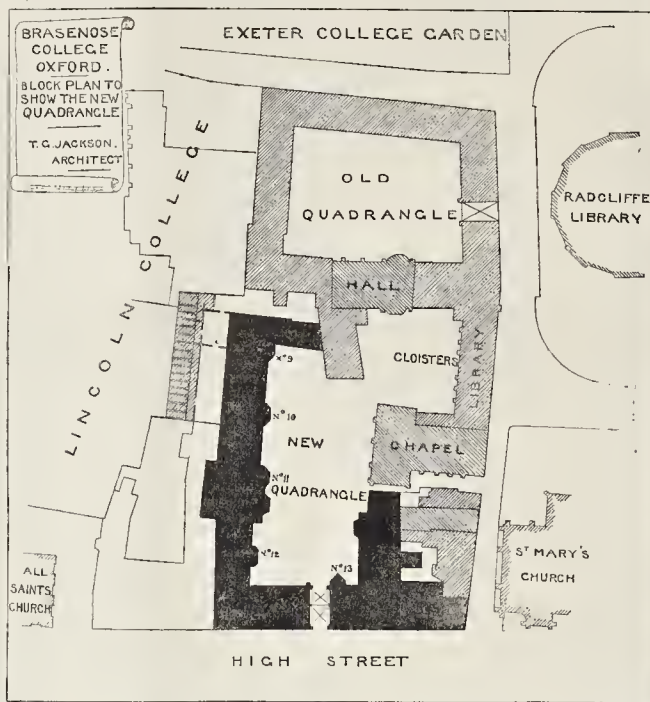
Mr. Phené Spiers, in replying, said that the importation of Calene woodwork still went on to a certain extent. Some little time ago he was able to get an interesting shop-front, but it was becoming more and more difficult to get good Egyptian woodwork out of the country. The adaptation of materials had gone on to a very large extent; old capitals of the Roman period, and occasional specimens of marble and even of porphyry having been used. Still there remained the admirable patterns of the Arabs, or rather of the Copts, who had always been the art-workers of the Mahomedans. The Copts were extremely clever with geometrical patterns, and he had no doubt that the one he had referred to was of the thirteenth or fourteenth century. The number of these patterns was practically endless.

The President announced that the next meeting would take place on Monday, the 16th inst., when the Royal Gold Medal would be presented to Mr. John Gibson (Past Vice-President), and a business meeting would also be held.

The proceedings then terminated.

The English Iron Trade.—The English iron market is in an even worse condition than it was last week, its tendency being still downwards. There is very little business doing in any branch of the trade. Pig-iron has been very quiet. Scotch warrants have gone down steadily, and Scotch makers' iron has declined, in sympathy, from 6d. to 2s. 6d. a ton, according to brand. Cleveland iron has lost another shilling in value, and even at that rate is little inquired after. In other districts similar conditions prevail, lower prices and a dull demand. Bessemer pig has settled down to 5s. in the north-west, the trade being without life. There is little animation either in finished iron or steel. Further reductions in price are noted, ranging from 2s. 6d. to 7s. 6d. a ton. The prospects of the shipbuilding trade are not improving. Those of engineers are slightly better.—*Iron.*

Ventilation.—Messrs. Baird, Thompson, & Co., have introduced their system of ventilating into the large new Abbey Parochial Hospital, erected at Paisley, their improved patent self-acting exhaust ventilators being used for the extraction of the vitiated air.



Illustrations.

SOME CHURCHES UPON THE LOWER RHINE.—V.

ST. QUIRINUS AT NEUSS.

THE little town of Neuss, on the Lower Rhine, a little south of Dusseldorf, is not a very agreeable place. It stands in the midst of a dreary-looking plain, and is unattractive to the general traveller who is in search of pleasure or recreation. The architect or antiquary will, however, pardon its dingy appearance and odours on account of its archaeological treasures. It is undoubtedly a place of Roman origin, and monuments of a very early date, coins, and other relics are constantly being found. There are considerable remains of Mediaeval walls, and two very fine gates, built of brick, with extinguisher-capped towers, which may date as far back as the fifteenth century. The principal street is not unpicturesque, and possesses some fairly good gabled houses. There are four churches in the town, but only one of them is specially worthy of notice; it is the minster, or Church of St. Quirinus. The building is a remarkably interesting example of Transition from Romanesque to First Pointed, consisting of a nave and four aisles, western tower with transepts, and a "crossing" from which two short apsidal transepts and an eastern apse radiate. This crossing is crowned by an octagonal lantern terminating in a dome, each side of the lantern being gabled. Whether the dome is part of the original design or not it is difficult to say. Externally the west front is by far the finest portion of the church. It is a singularly rich and beautiful composition, more like the Late Romanesque work of Lombardy than that of Germany. The date inscribed near the western doorway is 1209, but probably this only refers to the upper portion of the work.

The tower appears to be slightly later than the gables below it, and has rather an English look about it. The parapet and pinnacles are, of course, later,—fifteenth- or, possibly, sixteenth-century work. In all probability, as originally erected, the sides of the tower were gabled, and the composition terminated in a square spire with its angles set upon the apices of the gables.

The interior of the Church of St. Quirinus is very striking. It is remarkably lofty in proportion for an early church. The nave is vaulted

in square quadripartite bays, each containing two pier arches and two triforium openings. The latter are subdivided into two lights, and the triforium itself is vaulted with moulded ribs.

The outer aisles are subdivided into chapels containing modern Romanesque altars. The lantern is internally vaulted with octopartite groining, which has been decorated by Overbeck. The work, however, is unworthy of that master, and singularly feeble and poor. Standing under the lantern is a huge modern Romanesque baldacchino and high altar of the most wretched design. The three apses which form the eastern portion of the church are beautifully treated, and, if the wretched modern high altar were cut down, would have a charming effect when seen from the nave. There is a very original treatment of the choir here which offers a most valuable and useful suggestion for our modern churches. The choir-stalls, which are excellent examples of fourteenth-century woodwork, instead of running in a straight line from east to west so as to cut off the transeptal apses, follow the curves of the apses themselves. This is not only a utilisation of space, which is generally lost, but has two other advantages, for, while it places the choir in its correct position, it prevents the singers being so very conspicuous as they generally are in a stalled choir; and, secondly, there can be no doubt that each set of stalls being backed by a semicircular apse is better for sound than a flat wall or open screen.

Beneath the three eastern apses and the "crossing" is a very early crypt, which is visible from the nave, and is entered by a flight of steps in the centre going down into it; this crypt is divided into three aisles by two rows of small columns, and has a grand, mysterious effect.

Except the stalls previously mentioned, the Church of St. Quirinus, at Neuss, contains no furniture worthy of notice. H. W. B.

BRASENOSE COLLEGE, OXFORD.

THE illustration shows one bay of Mr. Jackson's new front of Brasenose College, in the High-street of Oxford, and is reproduced from the drawing exhibited in the Royal Academy this year.

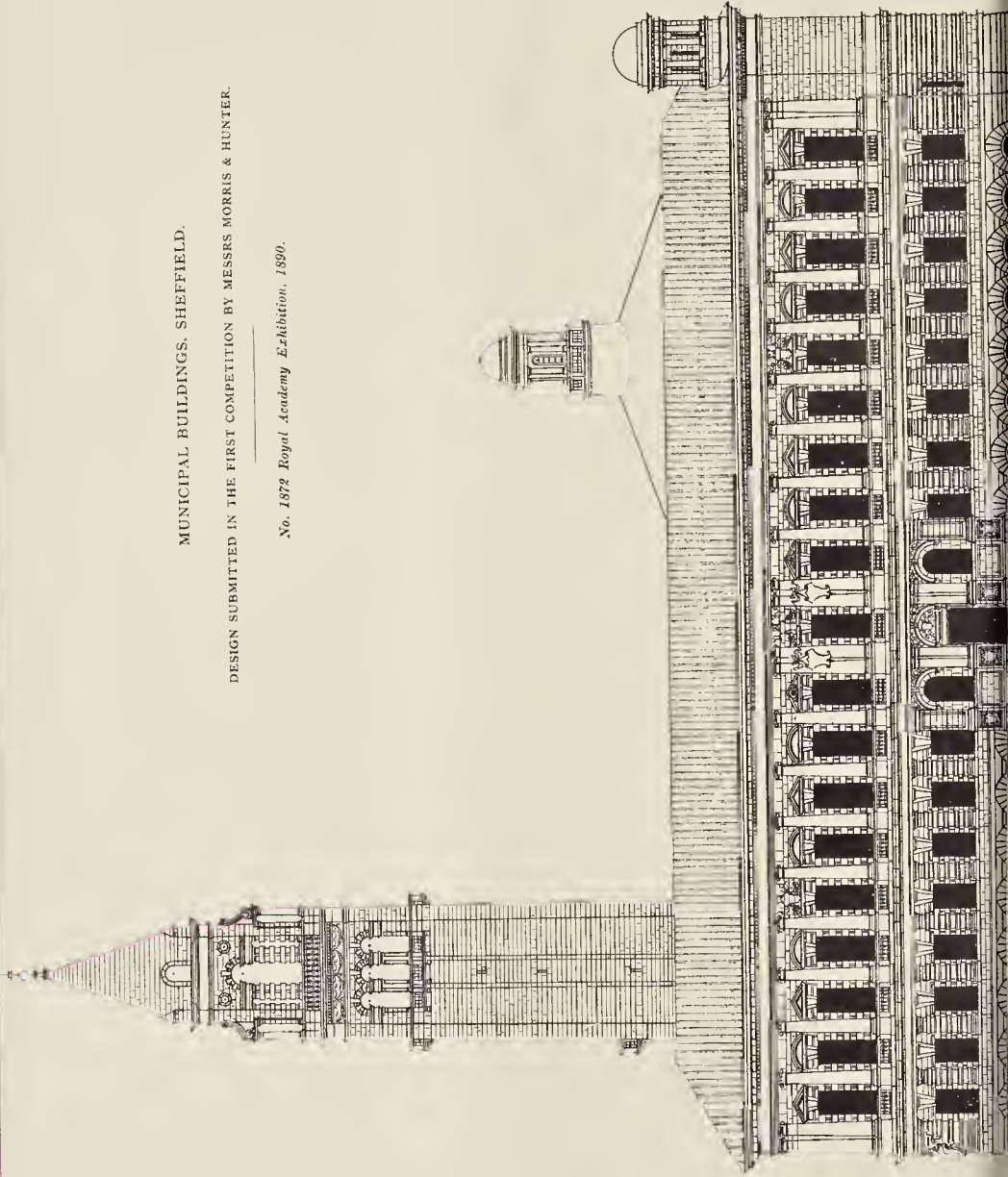
The completion of the new front will be the last portion of an extensive scheme for the enlargement of the College by a new quadrangle

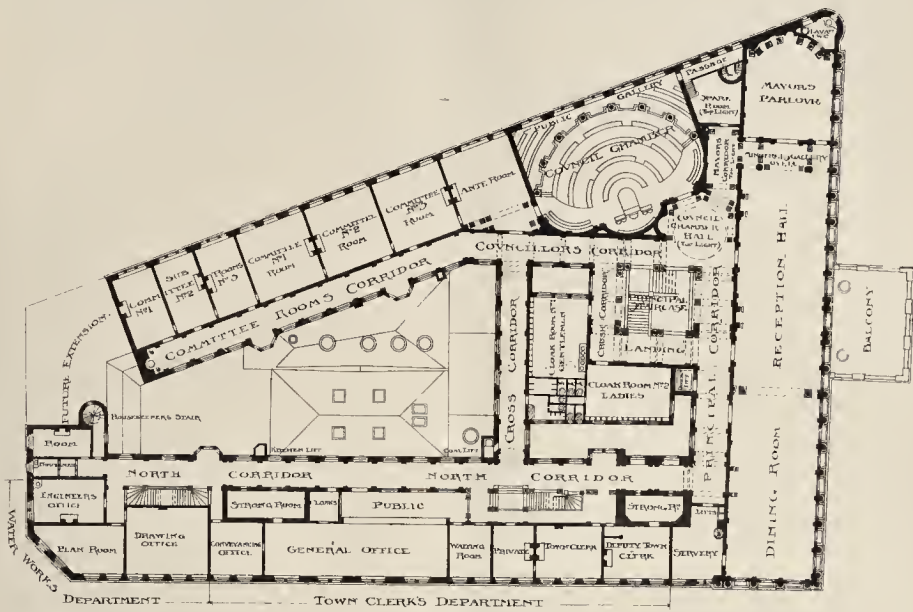


MUNICIPAL BUILDINGS, SHEFFIELD.

DESIGN SUBMITTED IN THE FIRST COMPETITION BY MESSRS MORRIS & HUNTER.

No. 1879 Royal Academy Exhibition, 1890.





PLAN OF FIRST FLOOR



PLAN OF PRINCIPAL GROUND FLOOR

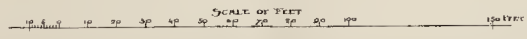
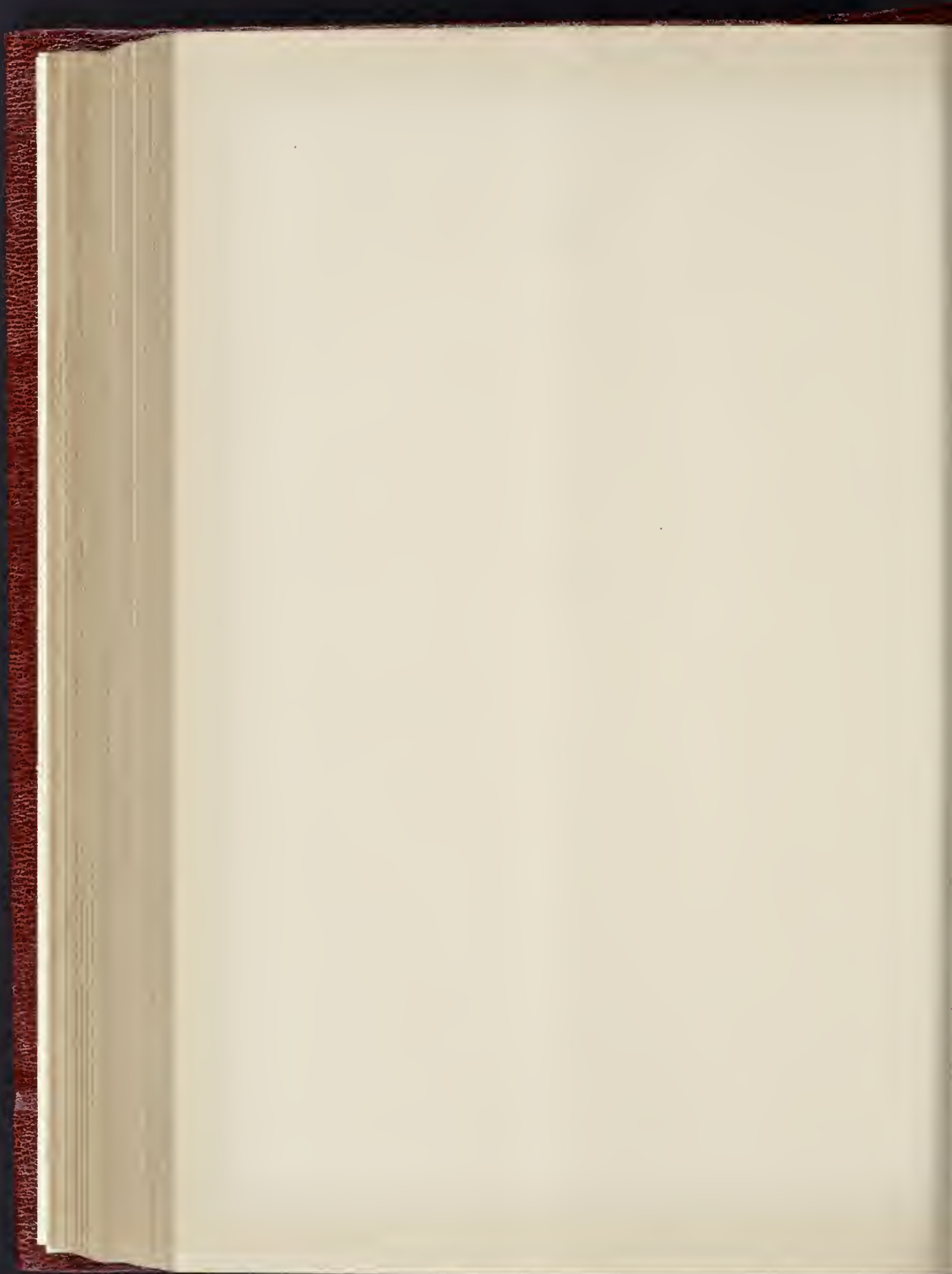
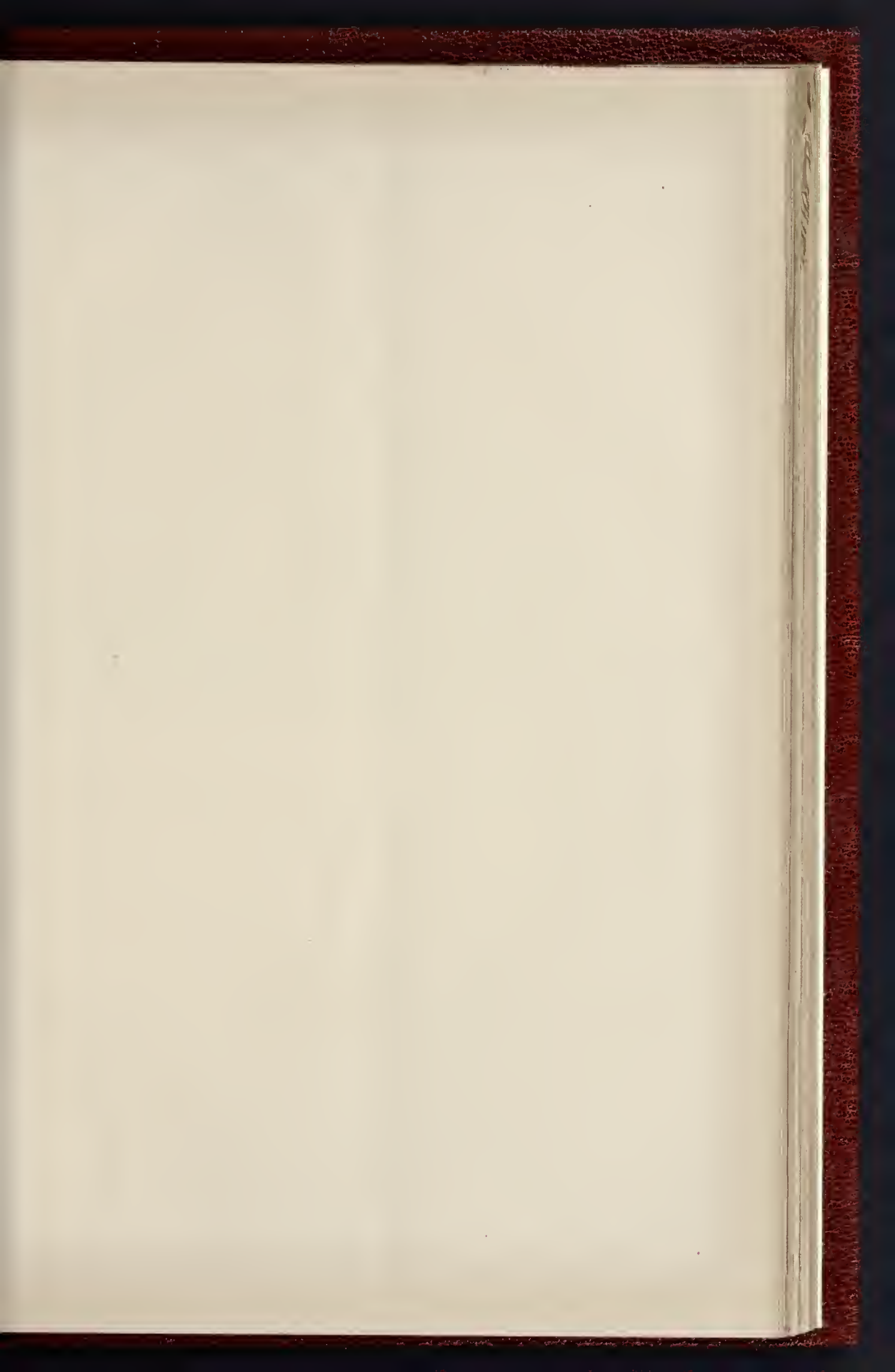


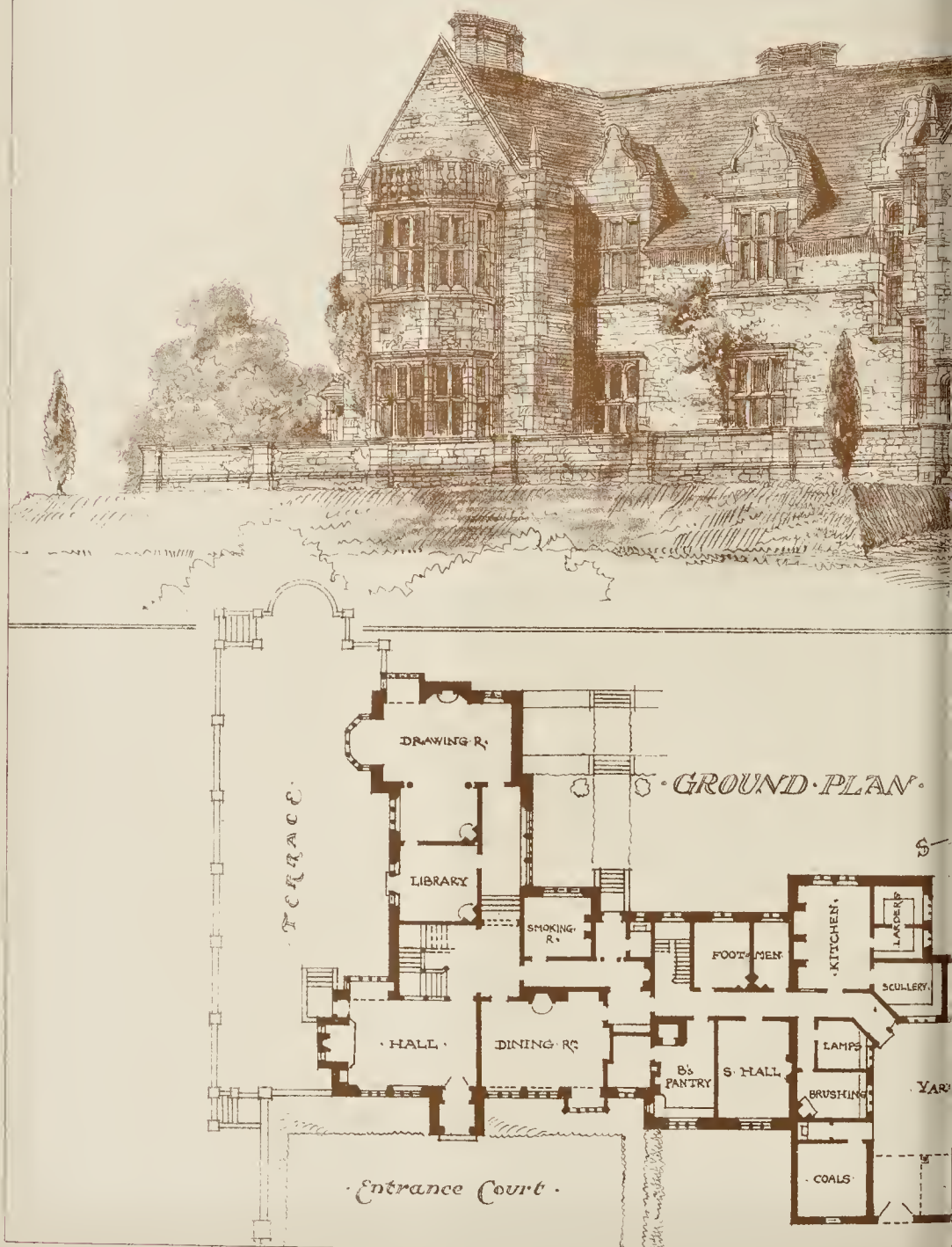
PHOTO LITHO. CHARLES & CO. 22, MARK LANE, LONDON, E.C. 3.





BARNSDALE HILL RUTLAND

CAPTAIN THE HONBLE CHAS FITZWILLIAM





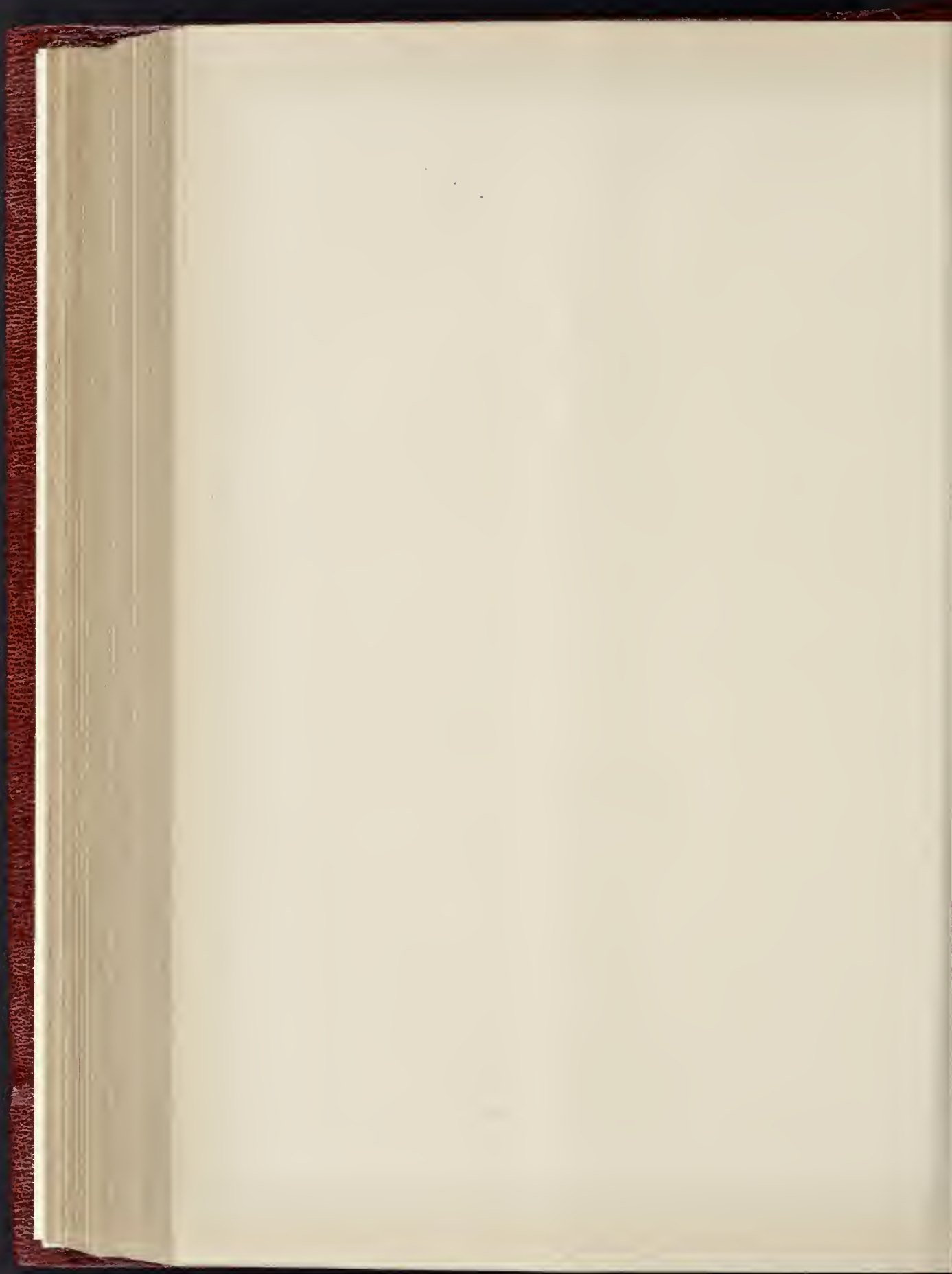
may 1890



FIRST FLOOR PLAN



E. J. MAY, Architect.



which was begun in the year 1882, and has been carried out in successive instalments down to the present time. There still remains one block to be added in order to complete the new quadrangle, which has to await the expiration of some leases. The accompanying block plan shows the extent of Mr. Jackson's additions to the College.

The bay we illustrate to-day is at the south-east corner of the new front, next to St. Mary's Church, and forms part of the new house for the Principal.

The general contractor for the last part of the work was Mr. Dobson, of Colchester. The Clerk of Works was Mr. Mocketford.

BARNSDALE HILL, RUTLAND.

THIS house is being built on a fine site, about three miles from Oakham. The walls are built and faced with stone from Exton Park, in the neighbourhood. The general stone dressings are of Weldon stone, and the copings, cornices, and weatherings of Doulting stone. The red moulded bricks for the chimneys are from Cossey, near Norwich, and the facing bricks from the same neighbourhood. The roof is tiled. Mr. Grundy is to warm part of the house with hot air. The hall is eventually to be panelled with some of the fine oak from Wentworth Park, Yorkshire. The contractors are Messrs. Foster & Dicksee, of Rugby, and the architect Mr. E. J. May, F.R.I.B.A. The clerk of the works is Mr. Woolcott. The illustration is from a drawing in this year's Royal Academy Exhibition.

COMPETITION DESIGN FOR SHEFFIELD MUNICIPAL BUILDINGS.

WE give this week the elevation and two plans of the design submitted in the first competition by Messrs. Morris & Hunter, the elevation of which is exhibited at the Royal Academy. In regard to the intention and scheme of the design, the architects give the following notes embodying a portion of their report:—

"The conditions governing the plan are briefly these:—That it should be convenient in its general arrangement for the effective working of each of the several departments, whether taken separately or in their necessary inter-communication; that the corridors should be direct; that the general entrance doors and those to the public offices and principal rooms should be centrally placed and easily discerned; the staircases convenient to the departments to which they lead; and that finally, the various departments may admit of future extension and rearrangement, and that this last proposition is best provided for by continuous and circumambulant corridors. Beside the small spaces shown on the ground and first floors for future extension, an additional area of 6,400 sq. ft. is provided on the second floor for the same purpose."

The Council-chamber has been placed in the angle formed by the diverging line of Cheney-row, partly because by having direct communication on either side with the Mayor's parlour and committee-room suite it is better adapted for the general transaction of Council business, and partly because, by being so situated, it avoids the objections to a Council-chamber placed in a central area and surrounded on all sides by corridors, while the requisite quiet and absence of bustle is secured by its being placed, together with the committee-rooms, towards the side overlooking the churchyard. The Council-chamber is semicircular in form and is lighted principally by a range of clerestory windows. Directly beneath, on the ground floor and partaking generally of its form, is the Borough Accountant's public office. The ceiling of this room, above the public portion, is 15 ft. high, but by the upward slope of the Council-chamber floor above and the public gallery, a height of 21 ft. is reached at the outer wall, in which are placed windows of that height, throwing a flood of light into the room. In the Waterworks Department the administrative and clerical portions are placed on either side of the departmental corridor.

The grand staircase rises directly from the entrance-hall, and being the state staircase leading to the reception-rooms suite, it has been treated with greater elaboration. The entrance-hall is comparatively low, and its ceiling is broken up into panels by heavy beams supported by solid stone columns. This hall has been purposely kept low in tone and heavy in character to give full value to the arched staircase, with its bright dome light, which rises directly beyond. On the first floor the staircase is surrounded by corridors, giving access to the reception-rooms suite, the Council-chamber, committee-rooms, and cloak-rooms. As the promoters desire that the latter shall be placed on the first floor and be common to the reception rooms and Council-chamber suites, an effort has been made to secure the avoidance of the unfortunate crush some-

times observable during receptions when ladies and gentlemen's cloak-rooms are respectively on either side of a staircase, and opening from a reception corridor. In a continuous line are the reception-room, dining-room, and Mayor's parlour, and these occupy the entire length of the Pinstone-street front.

The heating throughout would be by hot water. Fresh-air inlets are provided to each room, and these, together with the hot-water pipes and foul-air extracts, would be under the control of the occupants of each room, the foul air being conducted by a series of exhaust tubes to the large upmost exhaust shafts fitted at either end of the building. The entire drainage system is concentrated at two points, from whence it would be discharged into the main sewer, and at the head of each system are automatic flushing tanks.

Externally the design is influenced by its site, its surroundings, and the material of which it is supposed to be built. To be effective one ventures to think that it should be treated simply and in mass, with strong broad mouldings and detail, and this is perhaps rendered the more imperative by the smoky condition of the city atmosphere. These considerations seemed to point to the Italian Renaissance as a style combining the simplicity and breadth considered essential, together with the dignity associated with the abode of a civic body. The range of reception rooms having naturally settled themselves towards the main front, and requiring a much greater height of ceiling than that necessary for offices, the Surrey-street front has been detached from it by the tower, and treated separately as two floors. The greater height of the reception-rooms suite seeming to preclude the idea of rooms being placed above for any practical use, and increased vertical height not being thereby obtainable, the necessity for a strong horizontal treatment more distinctly asserted itself; while again, if the grand length internally of the reception-rooms suite were broken by the contracted walls of a heavy central tower, it seemed clear the effect of these rooms would be considerably reduced. The desirability of an unbroken range of building having thus arisen from the requirements of the plan, it was endeavoured to give expression to the same in the elevation.

As a tower rising from the Pinstone-street front could not be well seen from any very important point near, it has in consequence been kept behind the line of the front walls, and placed so that rising from the Surrey-street wing, its upper and richer stages could be seen above the roof of the front block, and from its great height and mass form the crowning feature of that summit of the city."

THE ARCHITECTURAL ASSOCIATION: A NEW DEPARTURE RESOLVED UPON.

THE adjourned special business meeting, to further consider the report of the special Education Committee* was held on Friday, May 30, at 9, Conduit-street, the President, Mr. Leonard Stokes, in the chair.

Mr. Owen Fleming announced that the first vacation visit would be made on Saturday, June 7, to Ship-lake Court, by permission of the architects, Messrs. Ernest George & Peto.

The President said they would now proceed with the discussion on the report of the special Education Inquiry Committee, but, before doing so, he would just like to point out that although the report as printed in *A. A. Notes* was the report of the special Committee, the report had been submitted and approved by the general Committee of the Association, and the general Committee having adopted it, it was therefore now not merely the report of the special Committee, but was the report of the general Committee. He had also to announce that in the interval which had elapsed since the last meeting, the Committee had considered the suggestion made by Mr. Stannus of dividing the report into sections, or of submitting resolutions covering certain definite portions of the report. As the result of that consideration, the Committee had drafted a series of resolutions which would be submitted to the meeting. With regard to the latter portion of Mr. Stannus's amendment, directing that the opinion of the members should be taken by paper on a certain part or parts of the scheme, Mr. Stannus was not there, but he understood that he only proposed that the opinion of members should be taken after the discussion of the report, and therefore he would gain nothing by pressing that part of his amendment then.

Mr. C. H. Brodie, as the mover of the adjournment of the discussion on the last occasion, then rose to continue the discussion. He said that he thought it was gratifying to find that the Committee should have adopted Mr. Stannus's suggestion as to dealing with the

report by sections. But that having been done, he hardly knew now upon what he was going to speak.

The Chairman said that Mr. Stannus's amendment having been virtually accepted by the Committee, they proposed to take the report in sections, each of which would be covered by one of the resolutions which had been drafted by the Committee. Passing over the first portion of the Report, from page 123 to a little way down p. 125 in *A. A. Notes*, which was purely historical, they came to the actual recommendations of the report in which the Committee recommended the necessity of the adoption of a methodical system of teaching. In order to give effect to that portion of the Report, he would move from the chair the following resolution:—

"That some more methodical system of study is essential in the Architectural Association, and that the need of such a system is emphasised by the recent publication of the Institute programme of progressive examinations."

Mr. Brodie said he should be very happy to second that.

Mr. Leverton supported the motion.

Mr. Needham Wilson said he failed to see what were the arguments to show that the present system had failed. He thought it would be a great mistake for the Association to convert itself into a mere cramming machine for the Institute Examination. He went further than saying, with Mr. Cole Adams, that the Association should not become a mere College of Architecture, and he said that they must not make it into a mere cramming machine.

The Chairman then put the resolution to the meeting, which was carried unanimously.

The Chairman said that the next resolution that he would move was as follows:—

"That the mutual system, which was adopted by the Association at a time when the number of members was small, now presents great disadvantages and difficulties."

Mr. Leverton opposed this motion. He said that each Class under the present system had either a chairman or a number of Visitors who were generally far removed from the members of the class, both in years and in knowledge. He thought that Mr. Slater failed to prove his case that the mutual system had failed. When the Association was first established it was quite true that it had not anything like the same number of junior members that it now had; but then it had few or no senior members to draw upon for Visitors. Now, they had in their "Brown Book" the names of some of the very first men in the profession. Mr. Slater had mentioned the fact that they had now eighteen classes, and he urged that as a reason why they could not go on with the voluntary system. Mr. Slater said that the voluntary system had been strained to the breaking point. On the contrary, he (Mr. Leverton) did not think that it had reached the limit of elasticity. The great disadvantage of having paid Visitors was that it would restrict them to the choice of young and comparatively unknown men as teachers, for they could not expect the leading men of the profession to come down and teach them for the remuneration they would be able to offer. But on the other hand, if the teachers were honorary officers, there was no reason why they should not ask the leading men in the profession to come and act as Visitors. He was quite aware that, on the other hand, a great disadvantage of having honorary Visitors, instead of paid teachers, was that a great many would be required to work the Classes; and there was the further disadvantage that with a succession of Visitors there would be some loss of continuity in the work. There were a great many things in architecture which were matters of individual opinion, upon which one could not lay down the law and say "This is right" or "That is right." Naturally the pupils would favour the views of the men whom they best knew or admired. He suggested, therefore, that for the first half of the proposed course—

Mr. F. R. Farrow, hon. sec., here rose to order, on the ground that Mr. Leverton was referring to the details of the curriculum, which would be dealt with in subsequent resolutions.

Mr. Leverton, resuming, proceeded to quote from a letter written by Mr. Farrow to *A. A. Notes* in November, 1887, concerning that the mutual system had worked well, and that it would be undesirable for the Association to put itself into competition with the classes at University College or elsewhere. And yet Mr. Farrow had signed the report of the special Committee

* See pp. 316, 349, 371, and 376, ante.

Mr. Farrow said it was quite true that he had changed his views on the question, but the present position of architectural education and of the profession in general was totally different to that which it held when he wrote the letter quoted from. Since that time the Institute had established a scheme of progressive examinations. Had not that scheme of examinations been established, the need for the proposed new departure on the part of the Association would not have been so imperative as it was. The Royal Institute of British Architects had changed its tactics, and had said that every man entering the profession must pass through a systematic course of study. But where was that course of study to be pursued? It could be obtained easily on the Continent, and in America even, but was not to be obtained in this country; and he thought that the Association, as the largest architectural society in the country, would be very much to blame if it did not take some steps to provide the deficiency. Mr. Leverton had said that they had a large number of Visitors to draw upon for their classes. It was no doubt true that a great many of their members were competent to act as Visitors, but it was exceedingly difficult to get them so to act, even for one night per session. That was his experience, and he thought it would be the experience of all who had been engaged in the working of the Classes during the past ten years. As a matter of fact there had, for some few years past, been some departure from the mutual system, as was seen in the fact that they had already one or two classes in which they had paid lecturers or teachers.

Mr. Cole A. Adams said that if he thought for one moment that the intention of the resolution before the meeting was to eliminate altogether the mutual system from the work of the Association, he should support Mr. Leverton in opposing it. But he did not read it so. He thought that the resolution was simply an expression of opinion that now that the Institute had established the Examination, the voluntary system of work in the Association needed supplementing. He therefore hoped that they would vote upon the motion without further delay.

Mr. Max Clarke thought that the resolution was somewhat too vague. The question was, if the resolution were carried, how far would the Committee be bound to employ paid teachers? He was sorry to see that there was, comparatively speaking, such a small attendance of members present.

The Chairman then formally put the motion, which was carried with only one or two dissentients.

The Chairman then moved the next resolution:—

"That it is advisable to adopt the Institute programme as the basis (but not the limit) of any systematic course of instruction established by the Association."

Mr. Harry Sirtt thought that the resolution rather committed the Association to do too much,—that was, if he understood it aright. If it were carried, would it bind the Association to establish a class with a paid teacher for every subject in the Institute programme?

The President, in reply, said certainly not. Classes would only be established as they were needed, and in response to a demand for them on the part of the members.

Mr. W. Barrall said that he did not like the wording of the resolution at all. Why should they make the Institute programme the basis for their work in the Association? He did not say that that programme was a bad one, and he should have no objection to the formation of classes for the study of the subjects mentioned in it, and others besides.

The President said that that practically amounted to the same thing.

After some further discussion, the resolution was carried with only five or six dissentients.

The President said the next resolution he had to move was as follows:—

"That a combination of lectures and classes is preferable to teaching in classes or by lectures taken singly; and also that, as a general rule, instruction in any one subject is likely to be better imparted by a single teacher, but that for advanced students the system of Visitors is in most cases preferable."

Mr. Max Clarke moved, as an amendment, the omission of the words "in most cases" in the last line of the resolution.

After some discussion, this amendment was negatived by a large majority, only about a dozen hands being held up in its favour, and the resolution was then adopted.

The President next moved the following resolution:—

"That in formulating any curriculum of study, the work should, as far as possible, be so arranged as not to necessitate, generally speaking, more than twelve hours of evening work in each week."

After some little discussion this was carried unanimously.

The President next moved:—

"That it is particularly desirable that an architectural studio be established by the Association."

Mr. Leverton moved, as an amendment, "That the consideration of the establishment of a studio be postponed for a year." This, however, finding no seconder, dropped to the ground, and after some remarks by Messrs. E. S. Beale, C. H. Brodie, and Percy D. Smith (A.A. Travelling Student for this year), all in favour of the recommendation of the Committee, the resolution as put from the chair was unanimously adopted.

The President next moved:—

"That it is desirable that a course of day instruction be established on the same basis as the evening instruction."

Mr. Needham Wilson said he was not in favour of that proposal, and must protest against the establishment of any such thing as a day-class, except for pupils preparing to enter architects' offices. After an article pupil had been a short time in an architect's office his principal expected to get some small return in the shape of work for the pains bestowed upon the pupil. He did not think it fair to ask the principal to allow his pupils to go to a day-studio or to day-classes.

Mr. Cole A. Adams said he heartily supported the resolution before the meeting. The establishment of day-classes was inevitable. It would be in the knowledge of all who were members of the Institute that quite recently that body had issued what might be called a model form of articles of pupilage, and one express stipulation in those articles was to the effect that the principal should give all reasonable facilities for enabling the pupil to improve his knowledge, and to go up for the Institute Examination. Now that form of articles had been issued to practically all the senior members of the profession who were principals, and who had a tolerably fair knowledge of the pulse of the profession. He was therefore decidedly of opinion that the establishment of day-classes would be a very great success, and that the principals themselves would welcome them. Those who did not would probably find it difficult to get pupils after a time.

Mr. Beale said that the Association was taking a very great step in the passing of the report. They had heard various arguments in favour of day-classes, and the report of the Committee, indeed, was in favour of them. Why not, then, start these day classes directly they started with their new scheme? He thought it would be most advisable to do so, and he therefore begged to move as an amendment "that it be an instruction to the Committee that arrangements for the formation of a day-class should be made concurrently with any departure that may be decided upon in connexion with the new scheme."

The President pointed out that that amendment would not be necessary, for if the meeting adopted the resolutions, the Committee would certainly take steps to establish a day class as soon as opportunity offered.

After some further discussion, in the course of which the amendment did not find a seconder, the resolution was carried with only one dissentient.

The President then moved:—

"That it shall be made possible for members to obtain books from the library during the day-time."

Mr. Brodie said he heartily supported the motion, but he strongly deprecated any countenance being given to the suggestion made in the Report that possibly the library of the Association might be amalgamated with that of the Institute, or placed under the control of an officer of the Institute. He should strongly object to anything of that kind. Let there be as much good feeling as possible between them and the Institute, but let them keep their affairs quite separate.

The motion was unanimously carried.

The Chairman said the next resolution he had to move was

"That, inasmuch as it would not be possible to carry out the proposed curriculum relying only on voluntary helpers, it is desirable that additional paid teachers be appointed."

After some discussion, in the course of which the Chairman said it was by no means desired to abolish voluntary helpers altogether, the resolution was carried by a large majority.

The Chairman next moved:—

"That this meeting approves the scale of fees mentioned in the report, subject to such modification as may be found necessary."

This proposition led to a desultory discussion in the course of which three or four members expressed the opinion that the fees suggested were too high. The general opinion, however, appeared to be that the fees were as moderate in amount as could be expected, and the President pointed out that if these resolutions were passed, the whole scheme would be remitted to a Committee to carry out; and they might be quite sure of it, that if the fees could be placed at a lower figure than those named, it would be done. Mr. Barrall thought that the whole scheme, if carried, would press somewhat hardly upon some of their members who were unable to afford the fees; because while they would be arranging by this scheme for a series of classes with paid teachers and lecturers, they would not be carrying on concurrently the free classes which were now available for those of their members who would not be able to afford fees. Mr. Brodie, referring to this point, said that no doubt there would be some cases of hardship, but was any reform ever effected without pressing hardly upon some people? Mr. Leverton strongly opposed the scale of fees. He expressed his belief that if it were adopted it would wreck the whole scheme. He moved as an amendment "That members of classes with paid teachers pay 10s. 6d. per term for each class." He was proceeding to quote figures with a view to showing that some arrangement of this sort would be sufficient, when Mr. Cole Adams suggested that Mr. Leverton should put the details of his scheme on paper and place it before the Committee for their consideration. Mr. Leverton was understood to consent to do so; as any rate his amendment was not seconded, and the resolution as proposed from the chair was carried almost unanimously.

The President next moved:—

"That it has become absolutely necessary that a paid Assistant Secretary be employed."

Mr. Earle having said a few words in support of this motion, it was carried unanimously.

The President then moved:—

"That this meeting considers that the annual subscription for town members should be raised to one guinea, and that for country members should remain as at present."

He explained the reasons for this recommendation, as set forth in the Report, and said that after giving very close and careful attention to this matter the Committee saw no alternative but to submit this proposal for their acceptance. It was absolutely necessary to adopt that course.

Mr. Cole Adams having made some remarks on the subject,

Mr. Max Clarke said he was now convinced that the time had come to take the step indicated in the resolution, which he therefore cordially supported.

Mr. Brodie said he feared that the motion if carried would cause a great many old members to fall out of the ranks of the Association, and he therefore desired to move, as an amendment, "That it be an instruction to the Committee to provide for the creation of a class of honorary members, whose annual subscription shall remain at 10s. 6d., provided that they have been subscribing members for not less than ten years."

Mr. Needham Wilson spoke against the proposal of the Committee.

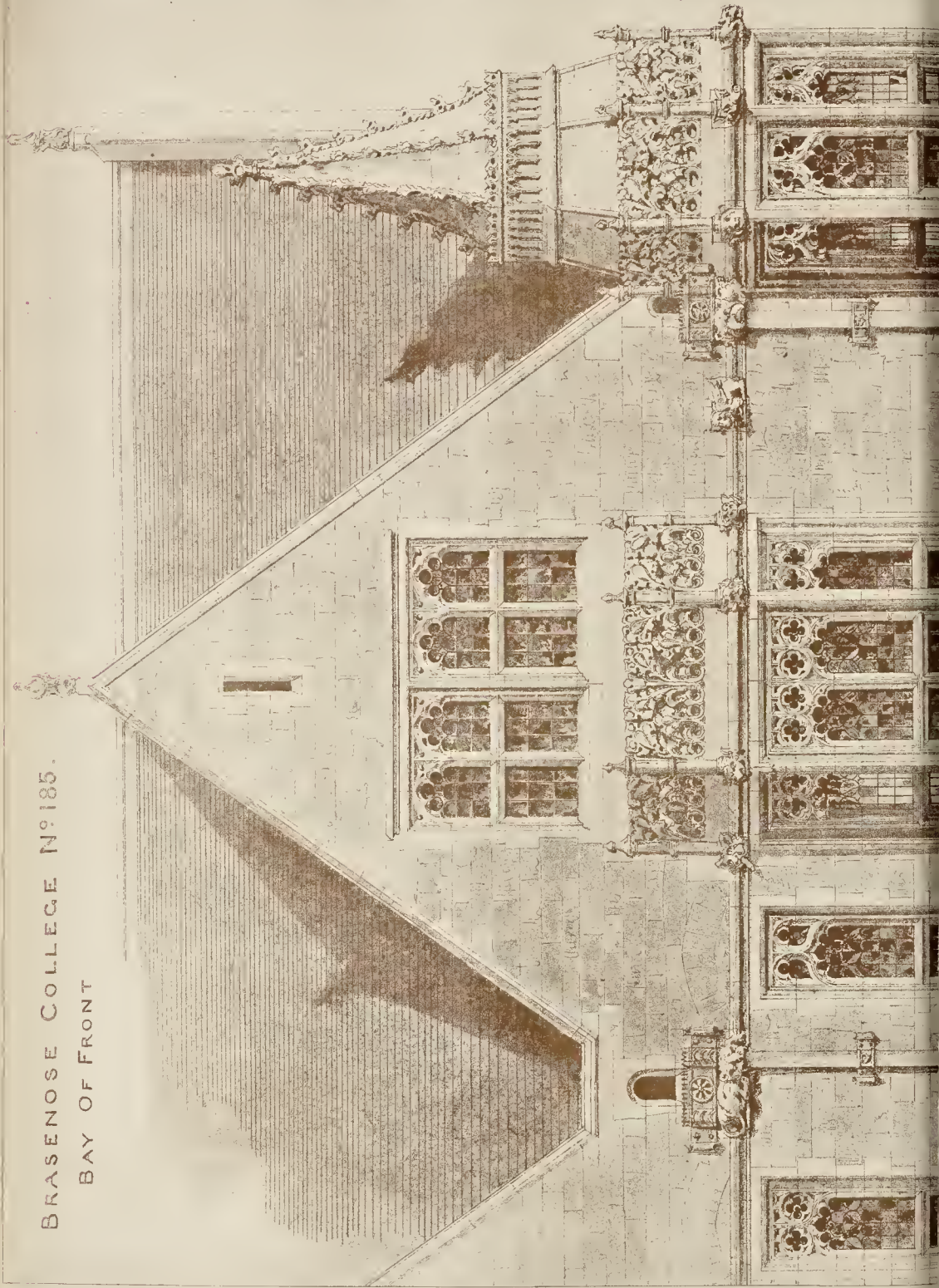
Mr. Owen Fleming asked whether Mr. Brodie suggested the creation of a "finite" class of members who had paid their subscriptions for ten years, or whether he meant that the ranks of that class should be added to from year to year by the inclusion of all members who had subscribed for ten years?

Mr. Brodie said that his intention was that suggested in the last part of Mr. Fleming's question.

Mr. H. W. Pratt said that, as Treasurer, he thought there was something worth consideration in Mr. Brodie's proposal.

Mr. Brodie's amendment having been seconded, a good deal of discussion ensued, Mr. Mountford and other members expressing it as their decided opinion that with scarcely an exception the old members of the Association would prefer to pay the increased subscription.

BRASENOSE COLLEGE N°185.
BAY OF FRONT





Dorian

2.3

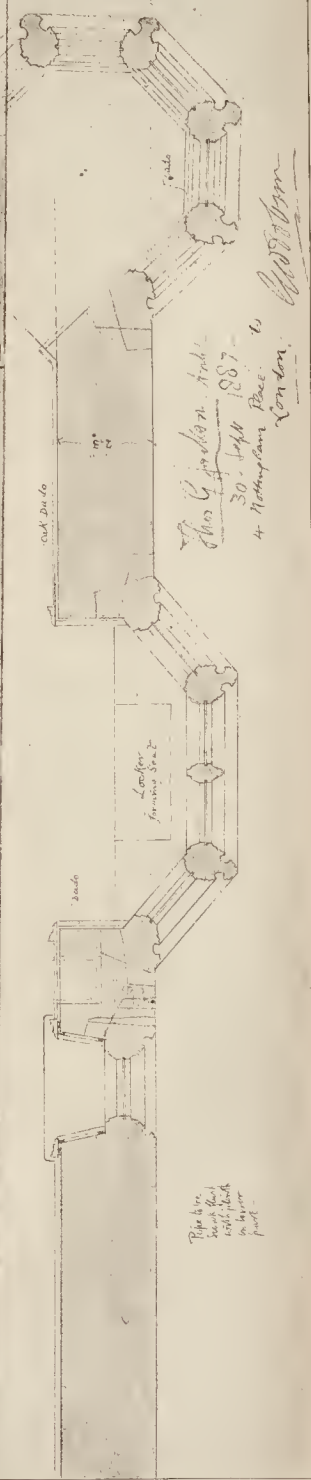
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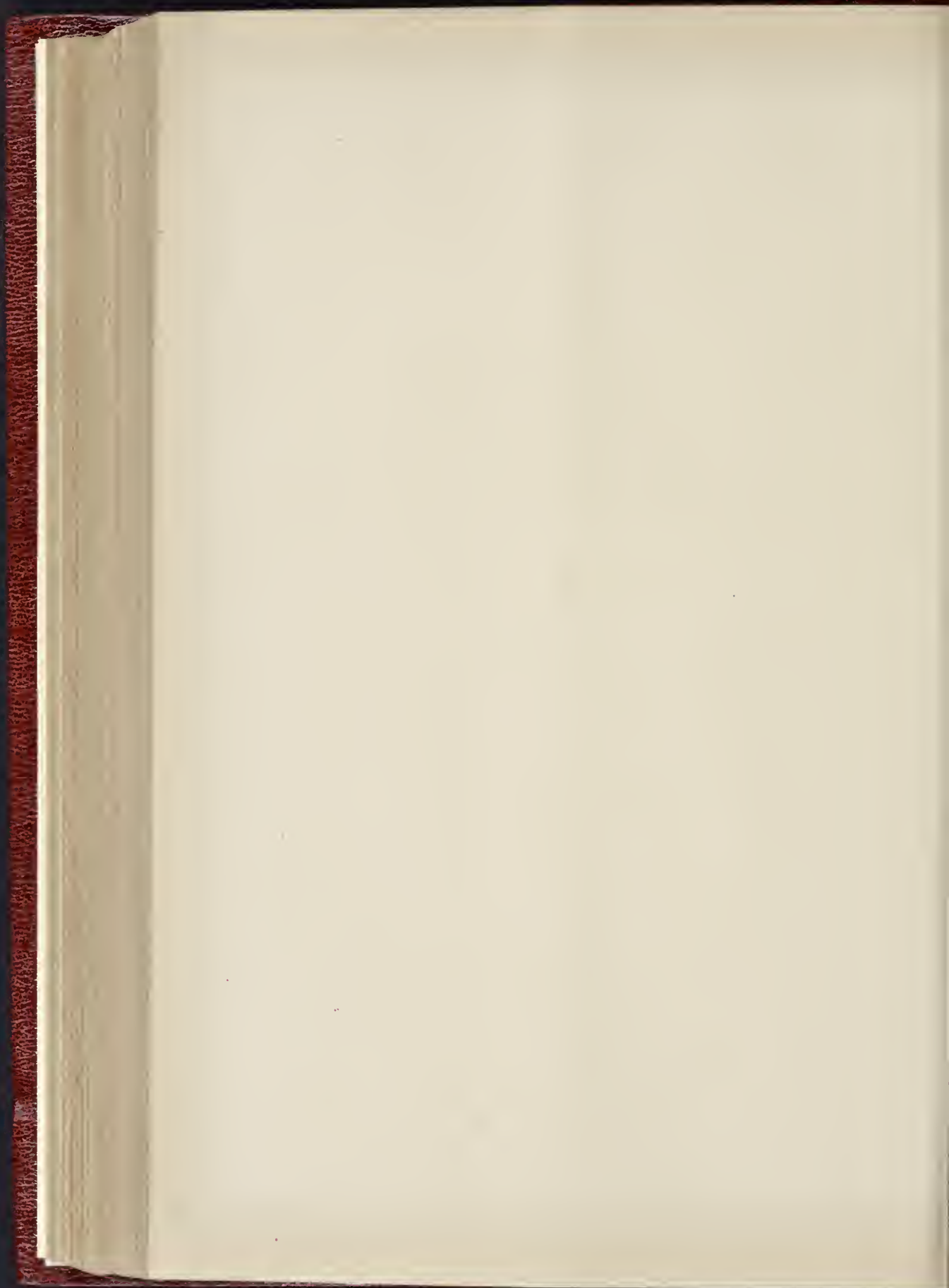
3.1

Produce to
1.5



Wm G. Jackson, Archt.
30. York 1887
4. Nottingham Place
London.

Plaster
work
cut
with
in
front



They would have sufficient *esprit de corps* not only not to desert the Association at a time of difficulty, but to do all they could to help on the new departure. One member made the suggestion that the "half-guinea" members should be distinguished in the "Brown Book" from those who paid a guinea a year. The Chairman said that was a detail: if the amendment were carried no doubt some means would easily be found of distinguishing the "honorary" members. The amendment was then put, and as only 17 hands were held up in its favour it was declared lost. The discussion was continued by Mr. Needham Wilson, who protested against the proposed increase of town members' subscriptions, and by Mr. Leverton, who moved a further amendment to the effect that the meeting be adjourned with a view of eliciting the opinions of the members at large. This having been seconded, was put to the meeting, when twenty-one members voted for it, and a very much larger number against it. The motion proposed from the chair was then put and carried by a large majority, and the following motions were one by one unanimously agreed to,—

"That this meeting approves the suggestion of the Committee that a Guarantee Fund and an Endowment Fund be established."

"That the best thanks of the Association be expressed to those gentlemen who so kindly, considerately, and ably assisted the Special Committee in the preparation of their report."

"That the resolutions which have been passed be referred to the General Committee, with instructions to take the necessary steps to carry the same into effect."

This concluded the business of the evening. It was announced that a special general meeting of members would be held on Friday, June 13, to consider the alterations of rules which will be necessary to give effect to the foregoing resolutions.

ARCHITECTURAL SOCIETIES.

Nottingham Architectural Society.—The annual general meeting was held on the 23rd ult. It was resolved that the Society subscribe the sum of 10*l.* 10*s.* to the guarantee fund for holding the Congress of the National Art Association in the town in 1891, and 5*l.* 5*s.* to be awarded as a prize to architectural students studying at the School of Art or University College, the special fund for the prize will take effect as decided by the Council of the Society after consulting the authorities of the institutions named. Mr. G. T. Hine, F.R.I.B.A., retired from the presidency, after two and a half years of office, and Mr. Herbert Walker, F.R.I.B.A., was elected in his place, with Mr. William Jolley, F.R.I.B.A., vice-president.—Messrs. Fred. Jackson, F.S.I., R. Booker, F. Watson, J. Howitt, and A. E. Heazell were chosen members of the Council, and Mr. J. W. J. Barnes, F.S.I., honorary secretary and treasurer.

Edinburgh Architectural Association.—The annual general meeting of this Association was held on the 30th ult. in the Architectural Hall, George-street.—Professor G. Baldwin Brown, President, in the chair. The Secretary (Mr. T. Fairbairn) read the report of Council, which stated that during the session twenty-seven new members had been admitted, the number on the roll being now 273. Mr. A. Dods Fairbairn, C.A., submitted the balance-sheet, which showed an excess of revenue over expenditure of 28*l.* 16*s.* 6*d.*, the balance in hand being now 192*l.* 6*s.* 2*d.* Mr. R. M. Cameron read his report on the library; and Mr. Hippolyte J. Blanc submitted his reports of the Work Class and Sketch-book Committees. All the reports were adopted. Mr. John Kinross was appointed President. The retiring President (Professor G. Baldwin Brown) then delivered his valedictory address. After reviewing the work of the Association, he referred briefly to the present position of the architectural profession in Scotland. Questions of the organisation of architects and of the architectural education of students were under discussion, he said, and it was to be hoped that the outcome would be a closer union among members of the profession for the furtherance of common aims, as well as improvements in the methods of art education.—The annual excursion of the Association took place on Saturday last, when about thirty members of the Association left the Waverley Station for Dunfermline early in the day, under the leadership of Mr. Russell Walker.

THE LONDON COUNTY COUNCIL.

The London County Council re-assembled on Tuesday last in Spring-gardens, after the Whitson recess, Lord Rosebery in the chair.

Petitions.—Among the petitions was one from the St. Luke's Vestry, presented by Councillor Benn, praying that the Council would take over and maintain as open spaces St. Luke's Churchyard and the Seward-street burial-ground, both of which have been hitherto maintained by the Vestry of St. Luke's. The petition was referred to the Parks and Open Spaces Committee for consideration and report.

Gardens and Open Spaces and the Local Authorities.—The Council then resumed, for the fourth day, the discussion of the report of the Parks and Open Spaces Committee, recommending—

"That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, the Council do undertake, at an estimated cost of 1,020*l.* a year, the future maintenance of the following places:—

	Area.	Estimated cost for wages.
1. Red Lion-square-garden, Holborn.....	1a. 2r.	£28
2. Whitdore-street-play ground, Whitechapel..	0a. 2r.	30
3. St. Dunstan's Churchyard, Stepney, garden.....	7a. 0r.	142
4. Lindhouse Churchyard, garden.....	3a. 0r.	111
5. Holy Trinity Churchyard, Finsbury-square, Bow, garden.....	1a. 1r.	50
6. Carlton-square-garden, Mile-end.....	0a. 3r.	50
7. St. Paul's Churchyard, Rotherhithe, garden....	0a. 3r.	50
8. Spa-fields-playground, Exmouth-street, Clerkenwell.....	2a. 0r.	50
9. Drury-lane-playground, Russell-court.....	0a. 1r.	50
10. St. Paul's Churchyard, High-street, Shadwell, garden.....	1a. 0r.	50
11. St. Bartholomew's Churchyard, Bethnal-green, garden.....	1a. 0r.	50

Materials..... 19 0 acres. 571
 £1,020"

The reasons which induced the Committee to make this recommendation were stated in their report, which we printed *in extenso* in the *Builder* for May 17 last, p. 361. In the course of the discussion on previous days the recommendation of the Committee had been modified, and the following amendment carried, viz.—

"That the Council is unable to agree to the principle involved in the recommendation that the Council shall take over small spaces which are purely local in their benefits, and which ought therefore to be maintained by the local authority; but, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, the Council do undertake, at a cost of 1,020*l.* per annum, to re-open and maintain the places recommended by the Committee, for eighteen months, at the expiration of which time it is hoped that the District Councils will be in office, and may be induced to take them over and maintain them; and that an application be made to the Charity Commissioners for a grant out of the City Parochial Charities Fund towards the maintenance of these grounds."

This having become a substantive motion, the following amendment, moved by Councillor Phillips at a previous meeting of the Council, but not then disposed of, also stood upon the paper, viz.—

"That on the understanding that no precedent for future action is hereby established, the Council do undertake the maintenance until October 31, 1892, at a cost not exceeding 500*l.* per annum, of the undermentioned disused burying-grounds which the Metropolitan Public Gardens Association have laid out, but the maintenance of which they have intimated inability to continue."

On the amendment being put to the vote, 23 hands were held up for it, to 22 against. A division being demanded, the votes were: For the amendment 42, against 36. The amendment was therefore declared to be carried. On the Chairman proceeding to put this as a substantive motion,

Councillor Beresford-Hope moved the following amendment:—

"To leave out all the words after 'That,' and to insert the words—'subject to the Vestries or District Boards of the parishes or districts within which the undermentioned gardens or playgrounds are situated, entering into proper agreements to undertake the management and control thereof, the Council do contribute towards the annual expenses thus incurred an amount not exceeding in each case that stated in the report of the Parks Committee; and that this arrangement do continue until a Bill for establishing District Councils shall have been passed into law.'"

* That is to say, those mentioned in the foregoing list.—Ed.

Councillor Acworth seconded this, partly on the ground, he said, that it would not be decent to decide the question while petitions such as the one from St. Luke's were under the consideration of the Council. Councillors Howell, Williams, Westcott, Probyn, Elliott, and Hughes supported this amendment.—Col. Hughes on the ground that if the recommendation of the Parks Committee were adopted, the Council would have many of the local authorities coming to it and asking it to take over their duties and liabilities with regard to the maintenance of small open spaces, gardens, and playgrounds, such as were mentioned in the Committee's recommendation. He wished to know whether the respective local authorities in whose districts the various gardens and spaces referred to were situate had been applied to to bear the cost of maintaining and keeping open their own local spaces? Alderman Lord Meath replied that they had been repeatedly applied to, but without result. Councillors Edis and Eneas Smith protested against the injustice involved in the proposal of the Committee. Many of the Vestries and District Boards in the metropolis (the St. Pancras Vestry, for instance) had cheerfully done their duty in maintaining their own open spaces. Were they now to be doubly taxed by having to contribute to the maintenance of gardens and playgrounds in districts where the local authorities had shamefully neglected their duty in that respect? Alderman Sir Thomas Farrer and Councillor Antrobus pointed out that the local authorities in whose districts the eleven open spaces mentioned in the Committee's recommendation were mostly those who received large subventions (ranging from about 8,000*l.* in the case of Bethnal-green down to 1,000*l.* in another district) from the general Metropolitan rate, and yet they refused to maintain their own local gardens and playgrounds. The amendment, on being put to the vote by show of hands, was declared lost.

Councillor Lord Compton then moved the following amendment, viz.—

"To omit all words after 'That' and to substitute the following words—'the Council, whilst strongly of opinion that it is the duty of the local authorities to maintain public gardens and playgrounds which are for the benefit of their respective districts, is unwilling that the gardens and playgrounds referred to in the Parks Committee's report should be closed for want of funds, and will, therefore, subject to the Metropolitan Public Gardens Association agreeing to continue for a time the maintenance of the small open spaces in question, contribute towards the cost of such maintenance a sum not exceeding 1,000*l.* a year until such time as District Councils are established in London.'"

Councillor James seconded this amendment, which after a short discussion was lost.

Alderman Stuart then moved as a further amendment:—

"That, in the opinion of this Council, it is inexpedient that the Council should undertake the maintenance of the eleven open spaces referred to in the report of the Parks and Open Spaces Committee."

Councillor Westcott seconded this, which was supported by Councillors Osborne, Benn, and Howell Williams,—the last-named urging that the Council ought to obtain a perpetual easement over each of the areas mentioned before they took any action in the direction recommended by the Parks Committee. Councillor John Barns also supported the amendment, on the ground that if the Committee's recommendation were adopted, the Council would be asked to take over some sixty more small open spaces which ought to be maintained by the local authorities. On being put to the vote, forty-two hands were held up in favour of the amendment, and forty-eight against. A division was demanded, with the result that forty-seven voted for the amendment, and fifty-three against. The amendment was therefore lost.

Alderman Barker next moved another amendment, viz.—

"That this debate be adjourned for one month, the Council being of opinion that it is undesirable to adopt the recommendation of the Parks and Open Spaces Committee until the opinion of the London Vestries generally had been obtained on the subject."

In support of this amendment, Alderman Barker pointed out that the annual vestry elections had only just taken place, and that they had hardly had time to meet yet. Those bodies had received a large infusion of new blood, and it would be better to wait and see whether they would not, after all, decide to do their duty in the matter in question. Councillor Farvell seconded the amendment. After being discussed for some time, it was put to the vote, and was lost on a show of hands by 43 for to

45 against, and on a division by 49 for to 53 against.

Councillor Hutton moved a further amendment to the effect that the Council should obtain a perpetual easement over all the open spaces in question before pledging itself to maintain them. This amendment having been seconded, Alderman Lord Meath said he believed that a clergyman had no power to give a perpetual easement over a disused churchyard or burial ground. After some further discussion, the amendment was lost, on a show of hands, by 45 for to 47 against.

Councillor Hughes then moved, and Councillor Corbett seconded:—

"That the Council do proceed to the next business."

This was at once put to the vote, 49 hands being held up for it, and 50 against. On a division being taken, the numbers were 48 for and 53 against the motion, which was consequently lost.

The closure was then moved, and Councillor Phillips's amendment, verbally altered so as to read as follows:—

"That, subject to an estimate being submitted to the Council by the Finance Committee, and on the understanding that no precedent for future action is hereby established, the Council do undertake the maintenance until October 31, 1892, at a cost not exceeding 900*l.* per annum, of the undermentioned* grounds, which the Metropolitan Public Gardens Association have laid out, but the maintenance of which they have intimated inability to continue,"

was put to the vote and carried on a show of hands by 45 votes for to 42 against. A division was not demanded.

Alleged Sub-letting of Brickwork by a Contractor.—The first paragraph of the adjourned Report of the Special Committee on Contracts was as follows:—

"On April 30 last year the Main Drainage Committee reported to the Council that the contractor for the construction of the precipitation works at Crossness had practically sub-let the brickwork, contrary to the terms of his contract, and they recommended that he should be fined 200*l.* The Council, however, referred the matter back to the Committee, with instructions to invite the contractor before them. On October 22 the Committee reported that, having taken further evidence, they did not consider that what had been done amounted to sub-letting, and they recommended that no further action should be taken. This recommendation was not adopted by the Council, but the minutes of the evidence were referred to your Committee for report. Wishing to put the matter as far as possible beyond dispute your Committee consulted a Solicitor, who concluded his report with the following words:—

"Unless, therefore, some stronger evidence can be obtained of a sub-contract having been made by the contractor, I could not advise the Council to sue for the penalties. Not content with this, your Committee submitted the whole of the evidence for the opinion of Mr. Meadows White, Q.C., and the conclusion at which he arrived was stated as follows:—'On the whole I am of opinion that there is not enough evidence in the statements, the whole of which I have read and considered, to justify the expectation that penalties could be recovered for breach of contract under clause 11'; and he further states:—'I do not think that the Council is in a position to enforce the penalties under clause 11', and my strong impression is that Messrs. Jones were acting under an arrangement, in substance such as that described by Mr. Webster and Mr. Hunter Jones, and, if so, they were not sub-contractors under Mr. Webster.' Having regard to the opinions above stated, your Committee consider that no good result would be obtained from their making any further inquiry into the matter; and they, therefore, recommend:—That no further action be taken, and that the reference be discharged."

This was unanimously agreed to.

The Supervision of Painting Work.—The same Committee also reported that they had received a deputation from the Executive Council of the Amalgamated Society of House Decorators and Painters, who urged the necessity of the employment of practical painters as inspectors of painting work done for the Council. The deputation stated that under the present system work of this kind was sometimes badly done, and that, as the clerks of the works employed were often unacquainted with painting, they were unable to detect imperfect work. The Committee said that they had fully considered the suggestion and that the statements made by the deputation in support of it, and were of opinion that it should be adopted by the Council. They therefore recommended:—

"That when a contract which includes extensive work of painting or decoration is entered into by the Council, a practical painter shall be employed to superintend that portion of the work."

This was agreed to after some discussion, in the course of which it was suggested that the Council should do its own painting.

After transacting other business, the Council adjourned.

* Those mentioned in the foregoing list.

BUILDERS' BENEVOLENT INSTITUTION.

ELECTION OF A PENSIONER.

An election of one pensioner on the funds of this Institution was held at the offices, 4, Vernon-place, Bloomsbury-square, on Thursday, May 24. Mr. Geo. Plucknett, J.P. (hon. treasurer), presided, in the absence of the president, Mr. J. W. Hobbs, J.P., through domestic bereavement. There were six candidates for the one vacancy—viz., one man and five women.

Shortly after the close of the poll, the scrutineers (Messrs. F. Stirling and E. Hilder) announced the results of the polling to be as follows, viz.:—Charles Sabeys, 97, St. Peter's-street, Islington, aged 70, builder (second application), 1,198 votes; Margaret Alice Richardson, Preston, North Shields, aged 65, widow of T. B. Richardson, builder (third application), 1,179 votes; Mary Ann Shapland, 132, Stamford-street, Lambeth, aged 70, widow of William Shapland, builder (second application), 690 votes; Emma Bird, 48, Clapnam-road, Paddington, aged 60, widow of Joseph Bird, builder (second application), 3,055 votes; Elizabeth Darby, 2, Sangora-road, Clapham Junction, aged 80, widow of Edward Darby, builder (second application), 728 votes; and Bessy Webb, 314, Old-street, E.C., aged 60, widow of Robert Webb, builder (first application), 1,050. A successful candidate was therefore declared to be Emma Bird.

Among the friends of the Institution (other than those already named) who took part in the proceedings were Messrs. J. T. Bolding, W. Scrivener, C. Ansell, G. B. New, C. Bussell, and R. Richardson.

Votes of thanks to the chairman and scrutineers closed the proceedings.

THE PROPOSED INCREASE IN THE SUBSCRIPTION AT THE ARCHITECTURAL ASSOCIATION.

Sir,—Will you kindly allow me through the medium of your valuable paper to appeal to all members of the A. A. to make an effort to attend the next meeting and vote, ye or nay, on the proposed alteration in the rule relating to the subscription.

At the last meeting a surgestion which had been made both by Mr. Cole Adams and Mr. Stannus, that a paper should be sent to every member asking his opinion on the question, was formally moved as an amendment, and although supported by some influential officials, who know the risk that is run at the present crisis in losing a large number of members, was lost when put to the vote. The comparatively-speaking haudful present objected to those who were not there having an opportunity of expressing their opinions.

Those members who will not be able to attend might write to the honorary secretaries stating their views. It is most important that such radical changes as are now proposed in the rules should not be voted on until as many expressions of opinion as possible have been heard. AN OLD MEMBER.

** We willingly give "An Old Member" space to express his views; but we cannot help expressing our own strong opinion that members who make a rally to vote against the raising of the subscription will act in an exceedingly foolish and mischievous way.—Ed.

PRICE-BOOKS.

Sir,—I cordially agree, to an extent, with the opening remarks of your correspondent "Practical" in your issue of May 24, so far as they relate to competitive estimating. Assuming we are dealing with a job of some 20,000*l.* to 25,000*l.*, the first thing any estimator would do would be to run through his bill of quantities and mark all the important items, and write off as quickly as possible for special quotations, giving all necessary information as to quantities required, stations for delivery, &c., particulars which of themselves may influence quotations enormously; and in these days of what your correspondent calls "close shaving and fierce competition," any other course would be sheer madness.

I cannot, however, go any further with your correspondent as to a price-book being the joint production of a number of men, be they ever so practical, and I fully endorse your own view in the article on Price-books of May 3, which, while admitting that they require a combination of qualities rarely found in one person, yet goes on to state that one qualified person could do it better than an association of several. I have about as much faith in the result that might be expected from your correspondent's suggestion as I have in the almost obsolete system of letting a building contract into the hands of several tradesmen. Estimating is, perhaps, the most important function in a builder's office, and, above all other requirements, it is most essential that it should never be undertaken by any one but those of thorough experience. Many an impetuous young man, whose intense anxiety appears only to be "to get the job," has succeeded, but only to his employer's loss, or even actual ruin; and although it may seem rather divergent to make such a statement here, yet I do so with the fullest assurance of its truth, that no

man under forty to forty-five years of age ought ever to touch an estimate of any weight or importance, as upon the subject of estimating, as well as the compilation of a price-book, nothing can possibly take the place of, or stand one in the stead of, good sterling experience.

Nothing can be easier than to make the sweeping assertion that price-books, as a rule, give prices at which no one could expect to secure a large competitive contract, and the reason of this is so obvious that it is not worth the time of entering into any explanation for the benefit of those who cannot perceive it for themselves. But I hope that the day is very distant when the pages of "Laxton's Price-book" shall have become unanswerable for the loss and ruin entailed on builders by such foolish and reckless pricing as evidently must exist in many of the estimates we see published.

THE EDITOR OF "LAXTON'S PRICE-BOOK."

GERMAN TECHNICAL MUSEUMS.

Sir,—In replying, after reading my paper on Technical Museums, at the Royal Institute, on May 19 last, I am reported as having condemned generally the buildings I saw. My criticism was only intended to apply to one or two of the older buildings, especially the Museum of Industrial Art at Berlin and the Technical High School at Charlottenburg, are admirable in every way.

FRANK GRANGER.

DUTIES OF BOROUGH SURVEYORS.

Sir,—As Surveyor to a somewhat important borough in the South of England, I should like to ask some of your subscribers in the same predicament what the position of such an official is as regards private roads and improvements. Where the appointment excludes any private work, it seems such an anomaly that he should be compelled to do it, but without any extra recompense in the shape of a commission on the work, which is surely outside his regular duties. Such commission would not come out of the pockets of the ratepayers, but would form a perfectly fair adjunct to the sum payable by the owners. Why should they have the services of a Surveyor for nothing?

I am compelled to make all the necessary plans, sections, and estimates, reference of all owners and occupiers; no assistants or assistance allowed me, and have to carry out all daily and routine duties. The salary is a miserable one, and there is no chance of a rise.

SURVEYOR.

May 27, 1890.

WOODEN WATER-PIPES.

Sir,—Your last issue contained an interesting paragraph [p. 404, *contd.*] on the discovery of wooden water-pipes in Belfast. Such things are not infrequently found in London, one case particularly coming under my notice a few weeks ago. While passing through a street at the West-end the other day I happened to look down into an excavation then being made, apparently for the inspection of gas-pipes. In doing so I observed an old elm-tree water-pipe, which local influence enabled me to secure from re-burial.



The accompanying sketch gives a general idea of its size and appearance. It is in sound, hard condition, and displays very slight signs of decay. It has absorbed from the surrounding soil in which it was once a strong smell of gas, which exposure to the air does not remove. The spigot end is reduced to an outside diameter of 6 in. to enable it to be fitted into the socket end of another pipe. The socket end measures 18 in. outside diameter, and has an iron ring driven into it as a precaution against splitting.

Towards the centre of the pipe is a square hole, presumably for the insertion of a service-pipe to a house. The total length of the pipe is 6 ft., and, as an evidence of its weight, it took three labourers to lift it about.

Very little seems to be known on the subject of these tree-trunk pipes, and it might, perhaps, be interesting if you were to supply an account of the origin, use, and gradual displacement of this primitive method of water-supply in London.

A. O. COLLARD.

8, Craig's-court, Charing Cross, S.W.

May 30, 1890.

** We were aware that such wooden water-pipes as Mr. Collard has described and sketched have been frequently and are still occasionally found in London; our own pages have from time to time chronicled instances of their discovery. Such tree-trunk pipes were used by Sir Hugh Widdelton in his New River scheme. But the special interest of the Belfast discovery seems to consist in the fact that the pipe found there was square in external section. How these square-shaped pipes were joined the *Belfast Newsletter* did not say. Can Mr. McCann afford any information on this point?

SPRAY JETS FOR WASHING.

Sir,—Could you, or any of your readers, oblige with some particulars of the washing with "improvement jets, up as well as down," referred to in Sir Edwin Chadwick's paper, reported on p. 396 of your last number, or with the address of Mr. W. Bartholomew, the inventor or designer of the arrangement? I should be glad to learn something more of such an appliance, and, if possible, to see it in operation.

* * A somewhat similar system, especially intended for use in barracks or to schools, has been elaborated by Mr. David Grove, the well-known engineer to the German Imperial Court, and was described in the *Builder* for September 7, 1889, pp. 167-8. Of the system referred to by Mr. Chadwick we have at present no further information.

DANGER TO IRON BUILDINGS FROM LIGHTNING.

Sir,—I shall be glad if you, or any of your correspondents, will kindly, through your columns, give me any information as to the effect of lightning on iron roofs.

(a) Whether a corrugated iron-roof is liable to suffer from lightning, or whether it would act as a conductor.

(b) In case of danger, what form of lightning conductor would be advisable.

I shall be grateful for any information on the point.
J. ARTHUR WALLINGTON.
May 31, 1890.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—XXIII.

DISTRIBUTION (continued).—TRANSFORMER SUPPLY.

SECONDARY batteries were not referred to in the last article, as they are not essential to any of the systems of distribution which were described in it. The size of the generating plant, however, required at any station supplying by means of the continuous current, can always be reduced by the addition of secondary cells. In the day time, or at such times as the current going out from the station is small, the surplus power of the dynamo-machines is available for charging the cells; and during certain hours of the night when the call for power is greater than that which the machines are capable of delivering, the batteries discharge into the mains and relieve the machines of a considerable portion of the load. There is also the additional advantage that in the event of the break-down of a portion of the generating plant, or of an abnormal output being required for a short time, a store of power is ready to meet the emergency. Used in this way secondary batteries are the most valuable auxiliaries to a continuous current dynamo-machine, but their services may be, and often are, entirely dispensed with.

In the systems hitherto described, it can be seen from the diagrams (figs. 58 to 62) that the currents or current sent into the mains by the machines are ultimately conducted through the lamps, but in the systems about to be described the main current is used to supply power for the generation of local currents, which can be produced under such varying conditions as will suit the requirements of each consumer. The chief advantage of this class of distribution systems is this: If the supply companies carefully lay their mains underground in such a way that it is absolutely impossible for a consumer to get at them either intentionally or by accident, potentials may be used a hundred, in the future perhaps a thousand times, greater than can possibly be allowed in a public or private building. The main current and section of its conductor may thus be reduced almost without limit, provided always that the insulation can be made thoroughly efficient.

Any system in which the main current is made to produce another current for the use of the consumer, is called a transformer system. We shall consider three such systems: (i) The Battery-transformer System, (ii) The Motor-transformer System, (iii) The Transformer System. It is the third system in which the piece of apparatus, already described as the "transformer," is employed, and an alternating current used; systems *i* and *ii* requiring a continuous current.

In the early days of electric lighting battery-transformer systems were tried and failed; but in recent years modifications, in detail, have

been introduced that give every prospect of success. Groups of local cells (fig. 63) are charged

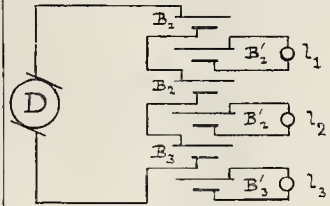


Fig. 63.

in series by the dynamo-machines, D, in the generating station. In each group a portion of the cells, B, is being charged, whilst another set, B', is connected to the consumers' circuit; so that a single current, of high E.M.F., charges the various groups, B, &c., while the consumers' circuits are supplied by local currents entirely distinct from one another, and from the charging current, by means of the groups B', B'. At certain intervals of time, B and B' are interchanged, and the supply thus kept up. Occasionally the cells are placed on the consumers' premises, and automatic devices are then relied on to keep them in order; but there is considerable risk in this, and it seems wiser to place the cells in local distributing centres in the hands of skilled attendants, who can at once remedy any sign of failure in a cell.

It has been shown (article xiv.) that when a current passes through the armature of a dynamo-machine certain reactions are set up. Fig. 35 gives the direction of the resultant field, and if we regard the armature as an electromagnet it is evident from the figure that since the north and south poles of the armature are not opposite the south and north poles of the field magnets, a couple acts on the armature pulling it in the opposite direction from that in which it is turned. The same thing is true also in figs. 40 and 44. Mechanical power forces the armature round against this couple, and is converted into an output of electrical power from the machine. If, in fig. 40 for example, a current is sent through the machine from some external source, this same couple is called into play, and the armature, if free to do so, will spin round in the reverse direction from that supposed in the figure; the motion through the field being reversed, an E.M.F. is set up in the armature which opposes the current. The current, and therefore the couple, is maintained so long as sufficient electrical power is supplied to the machine, and the armature turns round, giving out mechanical power. A dynamo-machine so used is called a "motor." It should be noted that if a current is sent between the brushes of the shunt-wound machine, fig. 44, the relative direction of the currents in the armature and coils of the field magnets will be the reverse of that which they have when the machine runs as a dynamo; hence in the shunt machine the armature turns in the same direction, whether it is used as a dynamo or a motor, though in the latter case also the E.M.F. produced opposes the current.

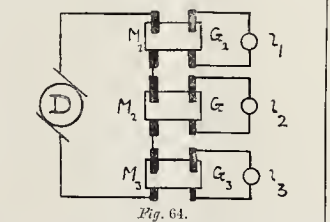


Fig. 64.

The motor-transformer or motor-generator assumes the form of a dynamo-machine or motor with a double armature. The main current from the dynamo-machines, D, fig. 64, in the supply station excites the field magnets, and passes through one section of the armature, M, in each of the motor-generators in succession. By this means the armature is kept in rotation, and the second section, G, generates the current for local use. The windings of the two parts of the armature and the two commutators are kept totally distinct; the generator portion

can, therefore, be wound to meet the requirements of the consumer.

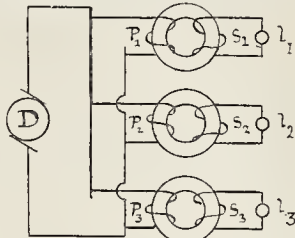


Fig. 65.

The transformer, as well as certain peculiarities of an alternating current circuit, have already been considered (articles xviii. and xix.). The alternating current is sent from the generating plant, D, into the mains, across which the primary coils of the transformers P are connected abreast, and the independent secondary circuits, S, are connected to the lamps L. This system, therefore, has all the simplicity of the simple parallel system, and the transformers transform the power given them by the mains into a current under suitable electromotive force for lighting purposes. The figure given in the concluding paragraph of article xix. must be regarded as propiætiæ rather than true at the present time, an extra 0 inadvertently inserted itself. In cases where the power from the machines may be transmitted under very high E.M.F. in order to traverse long distances, the transformers, fig. 65, would be placed in local distributing stations, and the current from these secondary coils would be sent into the street mains. Abreast, across the street mains, come the primary coils of a second set of transformers, out of whose secondary coils flow the currents for final use.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

3,758, Plane-irons. W. Dowland.

According to this invention the plane-iron is made with grooves at the back, either flat or curved at bottom. The face is left thin, and strengthened by ribs between the grooves.

7,001, Door-check. B. A. Mitchell, jun.

This device consists of a check or weight, detachable from the doors and fitting to them by means of springs. The shape is not unlike a horseshoe, with the springs upon the inner edge. At the bottom of the "yoke," as it is called by the inventor, is a wedge which, when the device is properly weighted, prevents the door from closing or opening.

9,567, Heating and Ventilating Apparatus. W. Jones.

This invention consists in combining the low and high pressure systems of heating by water, and using the low-pressure system for heating the lower stratum of air and the high-pressure system for heating the higher stratum. By this combined method the time required to raise the temperature of the air to the desired degree will be shortened, and a higher temperature can be maintained than by using the low-pressure system alone. Other details are enumerated for improvements in the general ventilation of buildings.

4,219, Graining, Decorating, &c. G. Engel.

This invention relates to improvements in the method and means for decorating walls, doors, &c., and graining and marbling. Paper is prepared with a suitable pattern on the front, which, when mounted on the back, allows the design to "set off" on the work.

4,678, Indicators for Doors. H. Hincley.

This invention relates to that class of indicators, for closets and other apartments, comprising a wood sign or visual sign adapted to be exposed to view on the outside of the door by the act of holding or locking the door from the inside, and to be withdrawn or concealed upon unlatching the same. A bent bar at the back of the sign is engaged by a projector on the bolt, and caused to be pushed or raised forward so as to allow the wood to be seen, and another stop withdraws the wood from view as the bolt is withdrawn.

4,783, Screw Nail. S. E. Groff.

According to this invention a number of parallel spiral grooves are cut in the length of the nail, and these being slightly turned from head to point, the

nail rotates as it is driven in the wood, forming a thread to prevent it being withdrawn.

NEW APPLICATIONS FOR PATENTS.

May 19.—7,775, H. O'Brien, Smoke Cowl.—7,782, F. Boulbee, Automatic Fuel and Grate for Saw-benches.—7,783, J. Green, Water-waste Preventers for Cisterns, &c.—7,797, W. Hood, Pile-driving Machines.—7,802, G. Hayes, Metallic Lathing.
May 20.—7,822, D. Cliff, Effecting Correct Designs in Decorative Tiles.—7,823, J. & D. Sagar, Machines for Carving Wood, Stone, &c.
May 22.—7,876, J. Woolton, Apparatus for preparing Circular-saws to be sharpened.—7,928, J. Harris, Set-square and Scale-ruler.—7,944, J. Pollock, Glazing Glass.—7,951, W. & B. Furnival, Chimney-pipe or Cowl.—7,970, P. Abobbot, Window-sashes to Open Inward.—8,008, J. Cowley, Nails.—8,033, G. Skelsey, Removal of the Free Lime and Heat in newly-ground Cement.
May 23.—8,058, J. Habbawate, Treads for Floors, Steps, &c.—8,083, W. Bull, Sash-fasteners.—8,108, F. Sarr, Concrete.
May 24.—8,122, W. Rushforth, Brickmaking-Machines.—8,138, W. Lester, Glazing Bars, &c.—8,176, E. Chandet, Hot-water Heating Apparatus for Buildings.

PROVISIONAL SPECIFICATIONS ACCEPTED.

5,912, J. Smith, Window Sashes and Frames.—6,720, G. Clarke, Setting Saws.—6,850, E. Parry and H. Foksett, White Pigment to be used in the Manufacture of Paints and Colours.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

10,285, H. Harris, Opening and Closing Doors.—10,333, A. Hoffman, Brick Kilo.—11,517, G. Hopkins, Wood-planting Machines.—11,953, J. Stenner and Others, Chimney-cowl or Ventilator.—4,741, W. Gibbs, Kils for Cement.—6,231, A. Fielding, Ovens or Kils for Pottery, &c.

RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

MAY 28.—By G. A. WILKINSON & SON.
Upper Norwood.—7 to 10, Selwyn-ter., ut. 70 yrs., g.r. £48, r. £175 480
Finlay Pl.—13, Upper Tollymore-ter., f., r. £44 p.a. 480
By T. B. WESTACOTT.
Haverstock-hill—50, Belmont-st., ut. 73 yrs., g.r. £6 10s. 380
By STORES & FINLAY.
Marylebone-rd.—No. 210, ut. 11 yrs., g.r. £35, r. £90 p.a. 225
By JAXTER, PAYNE, & LEPPER.
Keston—"The Holly Bush," and a plot of land, f. 1,700
By INMAN, SHARP, HARRINGTON, & ROBERTS.
Stoke Newington—63, Darville-rd., ut. 88 yrs., g.r. £3, r. £30 275
Whitechapel—100, High-st., f., r. £120 p.a. 2,010
Forest Gate—36 and 37, Chapel-rd., f., r. £57 p.a. 715
90, Ridley-rd., f., r. £29 p.a. 335
By W. A. BLAKEMORE.
Putney—13 and 14, Pentlow-st., ut. 85 yrs., g.r. £9, r. £52 290
By D. SMITH, SON, & OAKLEY.
Streatham—A f. mansion and 13a. 12 sp. 12,500
Westminster—F.g.r. of £104 p.a., with reversion in 12 yrs. 6,000
F.g.r. of £108 4s. p.a., with reversion in 12 yrs. 6,940
MAY 29.—By MR. ROBERTSON.
Bow—7 and 9, Alfred-st., ut. 24 yrs., g.r. £9, r. £63 p.a. 275
By FAREBROTHER, ELLIS, & CO.
Clapham, Larkhall-rise—The Residence known as "Thirlew," and 4a. 3r. 10p., and six Houses and Shops in Wandsworth-rd., f. 16,150
Fleet-st.—2, Crane-st., f., r. £210, area 1,087 ft. 3,450
By JONES, LANG, & CO.
Waltham Green—"The Town Hall Buildings," n.t. 11 yrs., g.r. £80, r. £400 3,200
City, Fore-st.—L.g.r. of £26 p.a., n.t. 76 yrs. 1,300
By BATTAM & CO.
Kensington—22, Holland-rd. Villas, f. 3,500
By A. CHANCELLOR.
Mortlake, Queen's-rd.—"Alma House," ut. 77 yrs., g.r. £6 200
By NEWBON & HARDING.
Maida Vale—4, Clifton Gardens, ut. 38 yrs., g.r. £20 555
Balls Pond-rd.—No. 129, f. 465
King's Cross—3 and 4, Argyle-st., ut. 21 yrs., g.r. £12, r. £88 811
MAY 30.—By L. FARMER.
West Hampstead—11, Priory-rd., ut. 60 yrs., g.r. £3 300
By T. G. WHARTON.
Upton Manor—25, Selwyn-rd., f. 235
Old Kent-rd.—2, Glegg-rd., ut. 36 yrs., g.r. nil, r. £35 p.a. 395
Dulwich, Half Moon-lane—"The Oaks," ut. 70 yrs., g.r. £8 15s., r. £72 710
Foots Cray—5 to 8, "May's Villas," f., r. £91 p.a. 1,025
Sevenoaks—3 and 4, "Gordon Villas," f. 685
Brighton, St. James's-st.—"The New Steine Hotel," and 40, Devonshire-pl., ut. 18 yrs., g.r. £28 10s. 3,060
Narfield, Ansell-rd.—L.g.r. of £60 p.a., ut. 83 yrs. 1,185
Camberwell, Kibberley-rd.—L.g.r. of £30 p.a., ut. 31 yrs. 730
Gravesend—1 g.r. of £69 10s., ut. 74 yrs., at a g.r. of £22 2s. 965

Peckham, Albert-rd.—F.g.r. of £25 4s., with reversion in 42 yrs. 4740
Old Kent-rd.—2, Glegg-rd.—F.g.r. of £40, with reversion in 73 yrs. 960
Norwood, Gipsy Hill—F.g.r. of £60 11s., with reversion in 76 yrs. 1,550
Colby-rd.—F.g.r. of £22 10s., with reversion in 76 yrs. 565
By E. HOLSWORTH.
Wandsworth-rd.—No. 189, ut. 17 yrs., g.r. £18 18s., r. £60 250
Stoke Newington—2, Wellington-rd., ut. 20 yrs., g.r. £28, r. £45 110
Dalston—38, Abblon-rd., ut. 52 yrs., g.r. nil 1,020
By A. G. THOMSON & CO.
Belgravia—31, Moreton-pl., ut. 33 yrs., g.r. £9, r. £63 540
By PRICKEIT & ELLIS.
Camden Town, Murray-st.—L.g.r. of £138 p.a., ut. 54 yrs. 2,750
Stratford-pl.—L.g.r. of £138 p.a., ut. 54 yrs. 2,540
By A. BAKER.
Hatfield, near—"Holwell Farm," and 86a. 0r. 9p., f., r. £200 5,450
Enclosures of f. land, 20a. 3r. 9p. 870
Enclosures of f. land, 66a. 3r. 36p. 2,110
F. arable and wood land, 217a. 1r. 19p. 2,169
F. arable and wood land, 66a. 0r. 22p. 1,590
F. wood land, 28a. 2r. 31p. 1,260

[Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; r. for rent; f. for freehold; e. for copyhold; l. for leasehold; e.r. for estimated rental; n.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

MEETINGS.

SATURDAY, JUNE 7.
Architectural Association.—Visit to Shipplake Court, near Henley.
THURSDAY, JUNE 12.
Royal Institution.—Professor Dewar, M.A., F.R.S., on "Flame and Explosives." V. 3 p.m.
Society of Arts (Indian Section).—Sir Theodore C. Hope on "The Rationale of Indian Railways." 5 p.m.
FRIDAY, JUNE 13.
Royal Institution.—Professor Sylvanus P. Thompson on "The Physical Foundation of Music." 9 p.m.

Miscellaneous.

Adams's Sewer-flushing Syphon-tanks.—The Narrey Gazette publishes this account of the inspection by the Sanitary Committee of the Town Council of Guildford of the new flushing-tank at Meadvale.—The Sanitary Committee were called together at Cronk's-hill on Tuesday morning, to look at the new automatic flushing-tank at work. Present: Mr. Alderman Summers (Chairman), Alderman Yerworth, and Councillors Dr. Walters, Walby, and Farrington. Mr. W. B. Waterlow was also present, and the Borough Surveyor (Mr. F. D. Clark), and the contractor (Mr. Faulkner). The tank is built of 9-in. brickwork, surrounded with concrete, and is fitted with one of Adams's patent automatic syphons; it has a capacity of 500 gallons, and can be regulated to discharge at will; at present it is so regulated to discharge 500 gallons of water down each sewer (Cronk's-hill and Somerset-road) once a week. The examination was perfectly satisfactory, the tank when full emptying itself in under one minute, and all expressed themselves perfectly satisfied. This is the first automatic flushing tank erected in the borough, and was designed by the Borough Surveyor, Mr. F. D. Clark, A.M.C.E., and built by Mr. Faulkner, contractor, Lesbourne Lands, Reigate.

The Portsmouth Sewage Outfall Works are seriously threatened by the action of the tide, and the Drainage Committee of the Town Council propose an expenditure of between 6,000, and 7,000, for the protection of the massive sewage tank, constructed from the plans of Sir Frederick Bramwell, C.E. on the glaciis of Fort Cumberland, and the outfall pipes from it, which extend in the direction of the Wolcsvers. Considerable quantities of shingle and soil have already been carried away by the sea, and, unless steps are taken at once to protect the huge tank and pipes, it is feared that they may soon be seriously damaged.—Standard.

Northumberland and Durham Archaeologists.—On Saturday last the members of this society held their first meeting for the present season in Northallerton district, when they visited the parish church of Kirby Sigston, which is in process of restoration, being at present unroofed, and Mount Grace Priory, at Ingleby, Arncliffe.

Society of Engineers.—At a meeting of the Society of Engineers, held at the Town-hall, Westminster, on Monday evening last, Mr. Henry Adams, President, in the chair, a paper was read by Mr. Perry F. Nursey (Past-President), on "Pick's System of Manufacturing Salt in vacuo." The author commenced by observing that the manufacture of salt was carried on in the present day mainly in the same way as it was by our remote ancestors,—namely, in open evaporating brine-pans. He then described an ordinary salt plant, and pointed out the disadvantages of the system. These included constant expense in repairs and renewal of the pans, which sealed and buckled, and, at the best, only lasted about three years; heavy cost for fuel, for land (the pans covering large areas), and for labour, and the production of noxious gases which were alike deleterious to animal and vegetable life. The author then proceeded to describe Dr. Pick's vacuum process, which is based on the Rillieux, or triple effect system. Dr. Pick's apparatus is made in three duplicate sections, each consisting of four main parts,—namely, the boiling-chamber, the heating-chamber, the collecting-chamber, and the filtering-chamber. The steam used enters the heating-chamber of the first section, and there heats the brine; and the steam given off from that brine enters the steam-chamber of the second section, and heats the brine there. The same process is repeated in the third section. The steam generated in the latter section from the brine is drawn off by means of a vacuum pump condenser. The advantages, as demonstrated by the working of an apparatus put up by Mr. Nursey at a salt-works in Staffordshire, were stated to be a saving in fuel, in labour, in area occupied, and the avoidance of the production of deleterious gases. The consumption of coal by the pan process is 12 cwt. per ton of fine white salt. By the new process a saving of 7 cwt. of coal per ton is said to be effected where waste or exhaust steam is not available. The process was shown to be automatic, and to require no skilled labour in carrying it on. With regard to space, it was stated that an apparatus consisting of three sections, each 2 1/2 yards in diameter, will turn out 50 tons of salt per day, or 300 tons per week, while a salt-pan 12 yards long by 2 1/2 yards wide, exclusive of brickwork, only turns out about 40 tons per week.

Berlin.—The new group of buildings erected for the "Tattersall" Company, which may now be considered complete, shows some clever planning on a very difficult site. Besides stabling for 300 horses and a set of coach-houses, two large riding-schools are to be found in the institute, the larger one of which (measuring some 150 ft. by 100 ft., having a height of some 75 ft., and being equipped with two extensive balconies and a minstrel gallery) is intended for gentlemen riders and instructors, whilst the smaller one will be used by the stablemen and private servants for exercising and training purposes. In planning the stables, the greater part of which has been placed on two floors, one above the other, special care has been taken to have a number of smaller divisions instead of the, in such cases, usually more extensive ones, and each of these small sets of stalls has been furnished with its own loose-boxes, harness and duty rooms, &c.; whilst the hospital, common to the whole, has received an isolated position. The general disposition may be considered highly practical, and the visitor on entering the establishment will be struck by the cheerful appearance throughout, this owing to the plentiful supply of light and air, both in the stables, as well as in the riding-school and the halls connecting. As to the interior arrangements, it need only be mentioned that whilst the stables show fittings of a most modern type (constructive parts, iron; wall surfaces in blue and white tiles), no exception to the national tendency of treating dressing-room and lavatory accommodation as badly as possible is here noticeable.

Sheffield and the Electric Light.—After having had the matter under consideration for some months, the Parliamentary Powers Committee of the Sheffield Town Council on the 22nd ult. passed the following resolution:—"That considering the present position of the question of supplying electricity in large towns, and the probability of applications for power to do so in Sheffield being made by outside companies or persons, the Committee recommend the Council to adopt the needful steps for obtaining power themselves to supply electricity within the borough."

Society for Preserving Memorials of the Dead.—The annual meeting of the members and supporters of this society took place on Saturday afternoon last in the school adjoining Lambeth Church, Mr. W. Tipping occupying the chair. The report of the Council stated that the past eighteen months had been a most trying time for the Society, and especially since the last general meeting. This state of things arose chiefly from the deaths of many of the most important subscribers, amongst them being the Earl of Glasgow and the Bishop of Durham.—The Chairman, in opening the proceedings, pointed out the important and interesting work carried on by the society on very small means, and made a strong appeal to its members to do all in their power to help on the funds. It was also announced that various works of necessary repair and preservation of ancient monuments, tombs, &c., in churches throughout the country had been ordered to be carried out or duly paid for.—The members of the Society afterwards visited the parish church, and listened with interest to a paper read by the rector, the Hon. and Rev. F. G. Pelham, on the monuments contained in it.

Land at Milford-on-Sea.—We may call the attention of our readers to an important sale of land fixed for Tuesday next at Milford-on-Sea, by Messrs. Furber, Price, & Furber. The particulars will be found in our advertisement pages.

Royal Institution.—The last Friday evening discourse will be given on June 13 by Professor Silvanus P. Thompson on "The Physical Foundation of Music."

COMPETITIONS, CONTRACTS & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
Drainage and Water Supply Scheme, &c.	Midsomer Norton U.S.A. Salvation Army Deposit Bank.	Not stated	June 14th	xi.
Design for Show-card.	do.	£3. 3s.	June 30th	xi.
Public Library.	Bermundsey Public Libraries Comms.	Not stated	July 5th	ii.
Sewerage System.	Grays Thurrock L. B.	do.	Not stated	xi.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Road Works	Beckenham Local Bd.	O. B. Cariton	June 9th	ii.
Roadmaking and Paving Works	Lewisham Bd. of Wks.	Official	June 10th	ii.
Roadmaking Works	do.	do.	do.	ii.
Fencing, Haws and Gates, Seats, Girders, &c.	Ulverston Local Board	H. Whitlow	June 12th	xii.
Supply of Timber	Admiralty	Official	June 13th	ii.
Postmen's Offices, Hampstead	Com. of H.M. Works.	do.	do.	ii.
Wood Pavements.	Com. of Sewers.	do.	do.	ii.
Sanatorium	Public School	R. Curwen	June 14th	xii.
Formation of a Parapet Space	Com. of Sewers	Official	June 16th	xi.
Smith's Work	Southend Local Board	P. Dodd	June 17th	xi.
2500 cubic yards of Flints	Eton Union	Official	do.	ii.
Mash Drainage Works	Com. of H.M. Works	do.	do.	ii.
Enlargement of Northern District Post-office	Com. of F.R. & W. Bow	Harnor & Finches	June 23rd	ii.
New Buildings, Roman-road, E.	Graysend U.S.A.	do.	do.	ii.
Broken Granite	Horsley Local Board	T. de Courcy Meade, C.E.	do.	ii.
Re-arranging and Erecting Machinery	London County Council	Official	do.	ii.
Refreshment House	St. Pancras Vestry	Professor H. Robinson	do.	xii.
Electric Lighting	Hatwell Local Board	Official	June 24th	xii.
Brown Granite	Hanlet of Mile End Old	do.	do.	xi.
Lift	Town Guardians	do.	June 26th	xi.
Vagrant Ward	Amersham Union	do.	June 28th	xii.
Warehouses	do.	C. J. C. Pawley	Not stated	xi.

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. ton	6	10	0	7	10	0
Teak, E.I. load	11	0	0	14	0	0
Sequoia, U.S. foot cube	0	2	3	0	3	0
Ash, Canada, load	3	0	0	4	0	0
Birch " " " "	3	0	0	5	0	0
Elm " " " "	3	10	0	4	15	0
Mr. Dantsic, &c.	1	15	0	3	10	0
Oak " " " "	2	10	0	4	10	0
Canada " " " "	2	10	0	6	10	0
Pine, Canada red " " "	2	10	0	6	10	0
" yellow " " "	2	0	0	5	5	0
Lath, Dantsic, fathom	5	0	0	6	0	0
St. Petersburg " " "	5	0	0	7	0	0
Deals, Finland, 2nd and 1st, std. 100	7	10	0	10	0	0
" 4th and 5th " " "	7	0	0	7	10	0
Riga " " " "	6	0	0	8	10	0
St. Petersburg, 1st yellow " " "	6	10	0	14	0	0
" 2nd " " "	7	10	0	9	0	0
" 3rd " " "	6	10	0	10	0	0
Swedish " " " "	7	0	0	15	0	0
White Sea " " " "	8	0	0	17	0	0
Canada, Pine, 1st " " "	15	0	0	26	0	0
" 2nd " " "	10	0	0	16	0	0
" 3rd, &c. " " "	7	0	0	10	0	0
" Spruce, 1st " " "	8	15	0	11	0	0
" 2nd " " "	8	10	0	10	0	0
New Brunswick, &c. " " "	6	0	0	10	0	0
Battens, all kinds " " "	5	0	0	16	0	0
Flooring, Boards, sq., 1 in, pre-ferred, Fir, &c.	0	10	0	0	14	0
Second " " " "	0	8	0	0	16	0
Other qualities " " " "	0	6	0	0	7	0
Cedar, Cuba, foot	0	4	0	0	4	0
Honduras, &c.	0	4	0	0	4	0
Mahogany, Cuba,	0	4	0	0	0	0
St. Domingo, cargo average " " "	0	0	0	0	0	0
Porto Rico " " " "	0	0	0	2	10	0
Tobacco " " " "	0	0	0	0	0	0
Honduras " " " "	0	0	0	0	0	0
Box, Turkey " " " ton	4	0	0	13	0	0
Rose, Rio " " " "	14	0	0	29	0	0
Bahia " " " "	13	0	0	18	0	0
Satin, St. Domingo, foot	0	6	0	1	8	0
Porto Rico " " " "	0	0	0	2	0	0
Walnut, Italian " " " "	0	4	0	0	0	0

METALS.	£.	s.	d.	£.	s.	d.
IRON—Bar, Welsh, in London	6	17	6	8	0	0
" " at works in Wales	6	10	0	7	0	0
" Staffordshire, in London	8	0	0	8	10	0
COPIED—British, cast and ingot	57	10	0	58	10	0
Best selected " " " "	60	0	0	61	0	0
Sheets, strong " " " "	60	0	0	67	0	0
Chili, bars " " " "	54	15	0	0	0	0
Mexican " " " "	0	0	0	0	0	0
LEAD—Pig, Spanish " " ton	13	0	0	0	0	0
English, cast, brands " " "	13	2	0	13	5	0
Sheet " " " " 3 lbs per square foot and upwards	15	0	0	0	0	0
Pipe " " " " " "	15	10	0	0	0	0
STRAITS " " " " " "	94	0	0	0	0	0
Australian " " " " " "	94	0	0	0	0	0
English Ingots " " " " " "	98	0	0	0	0	0

OILS.	£.	s.	d.	£.	s.	d.
Linseed " " " " ton	24	12	6	25	0	0
Cocunut, Cochin " " " "	29	10	0	0	0	0
Cocunut, Ceylon " " " "	25	10	0	0	0	0
Calpa, Lagos " " " "	25	10	0	0	0	0
Kapessed, English pale " " "	32	5	0	32	10	0
" brown " " " "	30	15	0	31	0	0
Refined, refined " " " "	22	10	0	0	0	0
Tallow and Oleins " " " "	21	0	0	40	0	0
Lubricating, U.S. " " " "	5	10	0	8	0	0
Stearine, Ceylon " " " "	7	0	0	12	10	0
Stockholm, U.S. " " barrel	1	6	0	0	0	0
Archangel " " " " " "	0	16	0	0	0	0

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Inspector of Nuisances	Leyton Local Board	£120	June 9th	xvi.
Private Drainage Inspector	West Bromwich Corp.	£100	June 10th	xvi.
Clerk of Works	Erden Barrow Local Ed.	£22	June 13th	xvi.
Inspector	Bath U.S.A.	£2 per week	June 17th	xvi.
Assistant	Board of Stockton-on-Tees	£120	June 19th	xvi.
Assistant	Stroud	Not stated	Not stated	xvi.

TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

BIRMINGHAM. —For bar-fittings, &c., to premises, No. 62, New-street, Birmingham. Messrs. Tiddy & Jones, architects, Bennett's-hill, Birmingham.—	Yates & Co.	£298	0	0
Chamberlain, King, & Jones, 862	235	0	0	
Norton & Co. (accepted)	220	0	0	
General Works.				
F. Whitall (accepted)	77	0	0	
BRENTFORD. —For tar-paving and kerbing part of Bole-lane footpath, for the Brentford Local Board. Mr. J. H. Strachan, surveyor:—	Nowell & Robson, Kensington	£114	0	0
W. H. Wheeler, Queen Victoria-street	98	3	4	
S. Atkins, Kingston-on-Thames	95	0	0	
W. E. Constable & Co., King William-street	39	7	10	
Mowlem & Co., Westminster	31	0	0	
W. Parker, Brentford (accepted)	30	0	0	
BRENTFORD. —For making-up roadway in the Ham, for the Brentford Local Board. Mr. J. H. Strachan, surveyor:—	Nowell & Robson, Kensington	£141	0	0
S. Atkins, Kingston-on-Thames	125	0	0	
W. Parker, Brentford (accepted)	111	0	0	

CARSHALTON (Surrey). —For the erection of a house in Denmark-road, for Mr. E. S. Arndt. Mr. W. Seckham Witherington, architect, 70, Mark-lane, E.C. 4.—	Russell, Sutton (accepted)	£1,655	0	0
CHALFONT ST. GILES'S (Bucks). —For rebuilding "The Three Crowns," for Messrs. Salter & Co., Limited. Mr. Chas. P. Ayres, architect, Watford:—	T. Turner, Limited, Watford	£872	0	0
G. & J. Waterman, Watford	818	0	0	
C. Darlington, Amersham	810	0	0	
J. Bates, Chorley Wood	790	0	0	
G. Darvell, Chorley Wood (accepted)	770	0	0	

CROYDON. —For fittings to shop and show-rooms, at No. 15, High-street, for Messrs. Gould, Wreford, & Co., Mr. Alfred Broad, architect, 27, Dingwall-road, Croydon.	C. Spry, kley, London	£400	0	0
Smith & Bullied, Croydon (accepted)	380	0	0	
DE STABLE (Heds.). —For sanitary work at "The Red Lion," for Messrs. Benkin & Co., Mr. Chas. P. Ayres, architect, Watford:—	J. H. Limbrey, Dunstable (accepted)	£102	13	6

LEIGHTON BUZZARD. —For a detached residence in Grove-road, Leighton Buzzard, for Mr. T. H. Bishop. Mr. St. Pierre Harris, architect, Basinghall-street:—	G. Gardie (accepted)	£281	0	0
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FOREST-GATE (Essex).—For the extension of the Forest Gate Sanitary Steam Laundry, in Upton-lane, E., Harlesden, N.W.:

Grissell	£1,721	0	0
G. Sharp	1,590	0	0
G. Hosking	1,380	0	0
J. Yates & Co.	1,190	0	0
W. Nell	1,172	0	0
North Bro.	1,008	0	0
W. Watson	1,094	0	0
Boiler-Setting and Chimney Stack.			
W. Noble	£263	0	0
Howlitt	249	0	0
Lunn Bros.	198	0	0
W. Watson	190	0	0
W. Nell	178	0	0
J. Yates & Co.	172	0	0
LEYTON. —For making alterations at Newport-road Schools. Mr. J. T. Newman, architect:—	Mortar	£149	0
Caines	149	0	0
Catley	149	0	0
Lamb & Son	129	0	0
Holland	119	0	0
Sayers	116	0	0
F. J. Coxhead, Leytonstone	109	15	0

LONDON.—For building mission-room, &c., in Kensal-road. Messrs. A. B. Pile & Son, architects, Bloomsbury-square, W.C.:

Martin & Barclay	£1,657	0	0
Treasure	1,521	0	0
Sealey	1,457	0	0
Eyrens	1,430	0	0
Barrett & Power	1,388	0	0
Gregory & Co.	1,387	0	0
Godson & Sons	1,337	0	0
Oliver & Richardson	1,333	0	0
Smith & Scott	1,299	0	0
Oldrey & Co.	1,292	0	0
Scharien & Co.	1,237	0	0
Clutchen	1,173	0	0
LONDON. —For alterations, &c., to the "Garibaldi," Blackfriars-road, S.E., for Mr. Wm. Gibbs, Mr. H. J. Newton, architect, 49, Victoria-street, Westminster, S.W.:	S. Godden, Bryanston-square	£1,500	0
F. Mark, Edgware-road	1,450	0	0
H. Burman & Sons, Kensington	1,329	0	0
Smith & Scott	1,317	0	0
J. Mills, Blackfriars (accepted)	1,345	0	0

LONDON. —For alterations, &c., to the "Old Bag o' Nails," Buckingham Palace-road, S.W., for Mr. Henry Guest, Mr. H. L. Newton, architect, 49, Victoria-street, Westminster, S.W.:	Prestage & Co., Finsbury	£203	0
S. Godden, Bryanston-square	350	0	

* Accepted.

LONDON.—For alterations, &c., to the "Fountain," Newcastle-street, Strand, W.C., for Mr. Frederick A. Rhodes. Mr. H. L. Newton, architect, 49, Victoria-street, Westminster, S.W. :—
 F. Mark, Edgware-road £463 0 0
 H. Burman & Sons, Keonington
 Park 469 0 0
 S. Golden, Bryanston-square 455 0 0
 * Accepted.

ORPINGTON.—For additions and alterations to private house at Orpington, Kent. Mr. St. Pierre Harris, architect, Orpington :—
 H. Somerford & Son, Clapham £215 0 0
 W. Holt & Son, Croydon 225 0 0
 W. Owen, Farnboro' (accepted) 198 0 0

ORPINGTON.—For repairs, &c., to boundary, farmhouse, Orpington, Kent, for Mr. A. Brown, Mr. St. Pierre Harris, architect, Orpington :—
 H. Somerford & Son, Clapham £106 0 0
 W. Holt & Son, Croydon (accepted) 100 0 0

ORPINGTON.—For alterations and repairs at a private residence, Orpington, Kent. Mr. St. Pierre Harris, architect, Orpington :—
 W. R. Taylor, Orpington £133 0 0
 H. Somerford & Son, Clapham 110 0 0
 W. Holt & Son, Croydon 105 10 0
 R. A. Lowe, Chislehurst 90 18 0
 D. Payne, Bromley 98 0 0

SILVERTOWN (Essex).—For factory buildings at Silvertown, Essex, for Messrs. Suter, Hartmann, & Rahjens' Composition Company, Limited. Mr. T. K. Wagstaffe and Mr. Chas. W. Merrin, joint architects :—
 F. & J. Wood, Cleveland-street,
 Mile End (accepted) £8,906 0 0

For Piling and Foundations.
 S. Chafin, Trudley's road, Dept-
 ford (accepted) 994 0 0

SURBITON (Surrey).—For new cottage and stabling, Surbiton-hill-road, for Messrs. M. A. Sedgwick & Co. Mr. Chas. P. Ayres, architect, Watford :—
 J. H. Jarvis, Surbiton £733 0 0
 W. B. Hunt, Watford 717 0 0
 G. Ridge & Sons, Kingston 694 0 0
 Brightman, C., Watford 679 0 0

SUTTON COLDFIELD.—For the erection of a house and outbuildings, stabling, &c., for Mr. R. Shutt, Messrs. Titley & Jones, architects, Bennett's-hill, Birmingham :—
 House. Stabling.
 Jones & Lloyd, Sutton £1,875 .. £287.
 J. Whittall, Birmingham 1,245 .. 270
 J. Simons, Birmingham 1,230 .. 275
 W. Westacoe, Walsall 1,195 .. 360
 J. Lynex, Walsall (accepted) 1,355 .. 250

WATFORD (Herts).—For new house at Nascot-wood, for Mr. J. F. Watkins. Mr. Chas. P. Ayres, architect, Watford :—
 Miskin, St. Albans £2,166 0 0
 Brightman, Watford 2,003 0 0
 Judge, Watford 1,957 0 0
 Heal, Watford 1,905 0 0
 Clifford & Gough, Watford 1,945 0 0
 G. & J. Waterman, Watford 1,935 0 0
 Andrews & Sons, Watford 1,898 0 0
 H. M. Dove, Watford 1,798 0 0
 E. Sear, Watford 1,665 0 0
 T. Turner, Limited, Watford* 1,592 0 0
 * Accepted.

WATFORD (Herts).—For new stabling at the Shrubbery, Watford, for Mr. W. T. Colco. Mr. C. P. Ayres, architect, Watford :—
 Bonnet, Watford £246 0 0
 Clifford & Gough, Watford 244 0 0
 Brightman, Watford 239 10 0
 Waterman, Watford 233 0 0
 Judge, Watford 222 0 0
 Andrews, Watford 228 0 0
 E. Sear, Watford 228 0 0
 Dove, Watford 223 10 0
 G. Wiggs, Watford 219 10 0

WEST HAM.—For alterations and additions to the "Park Tavern," Forway, West Ham, E., for Mr. Charles Roden. Mr. Fred. A. Ashton, architect, 117, Romford-road, Stamford, E. Quantities supplied :—
 Mark Gentry £2,405 0 0
 James Maites 2,373 0 0
 North Bros. 2,350 0 0
 Hearle & Son (accepted) 2,335 0 0

WOOD GREEN (Middlesex).—For decorating and repairs to two villas at Caxton-road, Wood-green, for Mr. W. Peters. Mr. J. M. Jones, architect, 122, Trafalgar-road, Old Kent-road, S.E.
 J. H. Pugh £170 0 0
 A. and W. Garuar 135 0 0
 J. P. Scipes 135 0 0

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W. E. M. (Shankel)—C. D.—W. A. P.—W. H. R.—L. B. W. (no space)—A. G. (ditto)—"Light and Air" (next week)—H. L. (ditto)—W. A. T. (ditto).
 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. Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.
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The Builder.

Vol. LVIII. No. 2471.

SATURDAY, JUNE 14 1890.

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British and Foreign Marine Insurance Company's Offices, Liverpool.—Messrs. Grayson & Ould, Architects Double-Page Ink-Photo.
The Salisbury Chantry, Christchurch, Hants.—Measured Drawings by Mr. Percy D. Smith (A.A. Travelling Stud.) Two Double-Page Photo-Lithos.

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Excavations of the British School at Megalopolis.



THE end of May the students of the British School at Athens have brought to a close, for the present season, their excavations on the site of Megalopolis, in Arcadia. Work

has been carried on continuously since the middle of March, and, while several points on various parts of the site have been prospected, attention has been mainly confined to the theatre which lies on the south bank of the river, the Hellisou, its auditorium facing almost due north, being partly cut out of the low hill side, and made up at the ends by artificial embankments supported by strong double retaining walls.

When the School started work here nothing was visible above ground except the general curve in the hill side which indicated the site, and a few fragments of the end retaining walls; the auditorium was overgrown with thick brushwood and small trees, and the ground in front, over the orchestra and stage, was ploughed land. Trenches were first dug across this latter in order to get at the position of the stage walls. Traces of these were come across at a depth of from 6 ft. to 8 ft. below the surface, and they were followed up east and west, and gradually the general outlines of the stage buildings were laid bare. At the same time the remains of a large square court were discovered in front between the stage and the river, and the lines of the auditorium were unearthed, where the first four lower rows of seats were found to be *in situ*, and almost entire, with the gutter running round in front of them.

The accumulation of earth over the general level of the orchestra has been as much as from 10 ft. to 12 ft., which has necessitated a considerable amount of heavy cutting in the trenches, and, of course, it has been impossible to completely clear the whole area of the orchestra and stage in the short period during which the excavations have been in progress. This must be reserved for another season, but enough has been done to show the general nature of the plan, and to give us an idea of the size and arrangement of this, the largest of the theatres of Greece.

The results of the excavations show us a theatre with an orchestra of about 100 ft. diameter. The auditorium is slightly more than a semi-circle, about 7 ft. or 8 ft. on each side, and the line of the arc is continued round beyond the semi-circle, as at Epidaurus, and not run in straight towards the stage as at Athens. The face of the Greek stage is about 30 ft. in front of the ends of the seats, so that there is hardly room for a complete circular orchestra as at Epidaurus. The auditorium has nine sub-divisions, with stairways between each, and one at each end. These stairs are 2 ft. 6 in. wide, and rise two steps to each tier. The lowest row of seats takes the form of continuous benches, with seats 16 in. wide, arms at each end next the stairs, and slightly sloping backs, 1 ft. 9 in. high. They are solid, and cut out of large blocks of stone from 4 ft. to 5 ft. long. Each bench is 16 ft. 6 in. long, and formed of three or four stones in length. The front of the lower part of these, under the seat, is cut back to allow of more room for the feet. They stand on a level with the gutter, which is built of stone blocks, is 1 ft. 8 in. wide by about a foot deep, and falls towards the west. The space between benches and gutter, a foot wide, is very narrow, hardly enough to let one person pass another. Round the orchestra side of the gutter is a stone kerb, presumably level with the floor; nothing remains to show what the covering of this floor has been; it was probably merely beaten earth, as at Epidaurus. No traces have been found of a base stone to receive the central altar, although a trench was dug specially to search for this. Opposite each end of the auditorium, and a few feet within the orchestra, two circular pedestals have been found; these measure about 2 ft. 6 in. in diameter, and have bases and capitals, as well as inscriptions, showing that they supported statues. As yet, however, the statues themselves have not been brought to light, but they may lie hidden in the adjacent masses of earth still to be removed.

Behind the front benches runs a passage-way 3 ft. wide, entered from each end. This must have been the only approach to the lower seats, as the gutter is not bridged across at the foot of each stairway, as we find it in the Athenian theatre, to allow of the people passing out and in through the orchestra. The seats behind are merely plain stoues, 12 in. wide and about 15 in. high, slightly hollowed in front, and standing up about 4 in. from the footways, which are 18 in. wide. The

footways and seats are not cut out of one stone, as at Athens, but are separate pieces.

As the one passage and the narrow stairs do not seem to provide a sufficient access to the whole of the upper part of the theatre, it is possible that there may have been end staircases; the existence of the double retaining walls some distance apart seems to supply a place for these, but this problem wants working out by further excavation. These double retaining-walls only commence about 50 ft. or 60 ft. back from the front of the auditorium, and the single wall which serves on each side as far as that point, is finished with a broad raking coping splayed at the sides and about 2 ft. 3 in. above the line of steps adjoining; this in its turn abuts against an oblong pedestal with cap and base, and which is lineable with the first row of plain seats behind the passage.

A most interesting discovery has been made in the series of inscriptions cut in large letters on both sides of the backs of the front benches. These inscriptions are of two dates, and, of course, will be published in detail by-and-by. The earlier one records the donation of the seats themselves; the later, the names of the tribes to whom they were allotted. This may refer either to the benches only, or to the whole tier of seats behind them as well.

The remains of the Greek stage consist of a series of courses of stone setting in from the front edge irregularly like steps, but broad and narrow alternately, and which run straight along the face of the orchestra. The lowest one is about 1 ft. above the level of the orchestra floor and the top one about 2 ft. higher; 15 ft. back from this line is the main outer wall of the stage 2 ft. 6 in. wide, and with cross walls at right angles opposite the ends of the benches. In this outer wall are traces of three doorways, the centre one projecting outwards about 2 ft. from the wall. The threshold of the east side door remains in position and shows the sinkings for the hinges and rebates for the wood and bronze covered jamb linings. This door has been 5 ft. wide, and the central one, of which only the foundations remain, was possibly 1 ft. or 2 ft. wider, and may have had pillars on each side. The level of this threshold is about 1 ft. higher than the top of the steps of the inner wall.

The inner wall of the stage extends along on each side as far as the line of the second row of seats of the auditorium. About 10 ft. in front of this has been discovered the wall of what must be a later stage of

Roman times. The top of this wall is 1 ft. above the orchestra floor, and thus level with the lowest step of the Greek stage. Fragments of columns have been found *in situ* on this wall and others lying near. These columns are 1 ft. in diameter; they have no bases, and have plain projecting fillets about 2 in. wide running up each side to allow of the insertion of the movable scenery in the spaces between the columns. The front faces show marks of chisel-dressing and the backs, which would have been hid behind scenery, are much rougher. The pieces found vary in length, so it is difficult to say what their total height has been. The wall on which they rest returns back to the line of the Greek stage at the ends.

Between the ends of the auditorium and the line of the original stage where we usually find the Parodoi or entrances, are, on each side, spaces about 30 ft. wide by 63 ft. deep from the face of the seats. These spaces are closed in across each by high walls which show no means of communication with the outside. In fact, it seems as if the ground beyond must always have been at a much higher level. What these spaces were used for has yet to be determined. At either end of the stage, at right angles to the long walls, are two passages which probably supplied the means of entrance to the orchestra in this case.

Outside the main wall of the stage, and parallel with it, have been discovered the foundation-stones of six pillars which point to the existence of a stoa in front. As the level of these bases is 2 ft. or 3 ft. below the sill of the door in the wall, there must have been a broad flight of steps down under the stoa, although no traces remain of supporting walls for these. Unfortunately, very few fragments of the superstructure of these stage-buildings have been found, and no reconstruction can be made of their architectural treatment; but we hope sufficient remains yet lie buried, which, when brought to light, will supply the necessary data, and make a reconstruction of the whole design possible.

This stoa has been superseded in Roman times by a large square atrium or court 220 ft. wide and projecting 175 ft. in front of the stage-buildings. This has been enclosed all round by a wall, the outer stage wall having been continued for this purpose on each side.

In the interior on three sides are large piers 4 ft. 3 in. square, seven piers on front and five on each side, counting the corner ones. These are some distance in from the face of the outside walls, and the space between was probably roofed in and formed a covered stoa, the central part having been open to the air.

Scattered about are a number of drums of Doric columns, varying from 2 ft. 6 in. to 3 ft. in diameter, also one cap and portions of an entablature, having the characteristics of late Roman work. They are of porous stone covered with gesso, and it is quite probable that they belonged to this colonnade. Entrances have been discovered in the side walls of this court. The floor of the stoa was probably about the same level as that of the stage, the ground having been filled up and the foundation of the original stoa buried under.

Almost in the centre of the court, and at a considerably lower level, are foundation stories of four columns, which formed a square; one stone still bears a drum of a circular, unfluted pillar. These either belong to an early shrine which stood just outside the original stoa, or perhaps the colonnade went round the court as a terrace, with the central part at a lower level and approached by steps. Further excavations may throw more light on this, at present, rather complicated problem.

The outside walls of the atrium are well built of large squared blocks in courses, the stones roughly dressed with a hammer and projecting in the centre and cut in towards the joints. With the exception of the columns mentioned the stone generally is the rather coarse white-grey marble of the district.

A somewhat similar court is known to have existed in front of the Odeum of Hierodes Atticus at Athens, and of many of the Roman theatres.

A short distance to the west of this court a large altar has been unearthed. It is about 36 ft. long by 6 ft. wide, and is built of metopes and triglyphs standing on a double-stepped base, the whole being of porous stone covered with gesso. None of the cornice has been discovered. It was probably one of the main altars of the city. Its design confirms Dörpfeld's theory regarding that of the great altar of Zeus at Olympia. Trenches were sunk west of this on the chance of finding traces of a temple, but without result.

A small altar has also recently been discovered east of the theatre. In this part many pits were dug where columns and other fragments showed above ground, but nothing of importance has been brought to light; the columns were mostly found to be out of their original position.

No further progress was made on the north side of the river, where operations had to be suspended early in the season owing to the standing crops of corn.

The gold ornaments discovered at the tumulus in the small, round, marble sarcophagus, and which at first were thought to be prehistoric, on further examination turn out to be of Roman or late Greek time. Nothing further of particular interest has been found here.

A number of general objects of pottery, terra-cottas, bronzes, &c., have been turned up from time to time during the progress of the works, but the collection contains nothing of any consequence.

It is probable that work may be continued in October, when it is hoped the whole area of the orchestra and stage buildings of the theatre may be completely cleared of earth, and an effective start also made with the sites on the other side of the river, which look very promising.

Meanwhile, the School is to be congratulated on the results of its first season's work on Greek soil. The site is a particularly interesting one to architects, and we look forward to getting, as the result of further excavation, much valuable information regarding the arrangement and design of the public buildings of a Greek city of the fourth century before Christ.

HYMERS' COLLEGE, HULL.



As this competition has been decided, as it must necessarily have been, almost entirely on practical grounds, it is most to the point, in offering some remarks on the plans exhibited, to consider how they fulfil the practical requirements of a school of this class as now understood. The result of our inspection of the designs, mainly in regard to this quality of practical suitability, is somewhat of a surprise. The instructions to architects, supplemented afterwards by a general statement in reply to queries, were particularly minute and detailed. What was to be expected was a large amount of uniformity, if not of monotony, of treatment. The very reverse is the case. The designs are as different as can well be. They are the more interesting for that reason. But the fact that the competitors have found it possible to diverge so widely makes it all the more probable that they have ventured to work somewhat outside their instructions. A detailed examination shows this to have been the case in a large percentage of the plans. It is to be regretted. Numerous meritorious designs are put out of court at once; many because of disregard of the central instruction, viz., that the building must be constructed to admit of perfect supervision, and not a few because the cost of executing the plans was out of all proportion to the amount stated to be at the disposal of the Building Committee.

The one pivot of the whole of the instructions was stated by the assessor as follows: "The controlling idea in the arrangement of

the plans is that of perfect openness to supervision, and generally to carry out the spirit of the hall-passage system thoroughly." The failure to grasp this condemns at least two-thirds of the plans. Out of thirty-seven competitors more than twenty made supervision difficult. The ways of doing it were varied. The first method, and the favourite one, was to build a wall between the administrative block and the hall, so that the headmaster, secretary, and porter should be unable to have any supervision whatever. No less than eleven designs contain this fault. A second set placed a pair of staircases in front of the windows of the headmaster and porter, with almost equal disregard of the requirements of those officials. This was done in two of the very best designs, those of "Three Stars" and "Minerva." A third set put the headmaster and his administrative staff far back from the hall, or round a corner, or separated from the hall by an entrance hall. This was the case in the artistic set of drawings marked "Wilherforce," which received the third premium. A few put class-rooms outside the hall, and therefore out of the reach of supervision. On these and similar grounds not less than twenty-three competitors seem to have disqualified themselves. The most extraordinary design is that of "Sic," in which the class-rooms are represented as flying out from the central hall like the spokes of a wheel; the author of this design has succeeded in introducing no less than six corridors and four staircases.

A very general misconception appears to have prevailed as to the functions and utility of the central hall. The very name, "hall-passage," should have shown what it is intended for. The hall is to be minimised, therefore, not to be emphasised. And not only for reasons connected with scholastic management, but on grounds of expense. The one great flaw in the so-called "hall-passage" type, as opposed to the old corridor type of school, is that while, on the one hand, the advocates of the central hall hold that a hall is of very little value nowadays; on the other hand, in order to avoid corridors, they are obliged to build their central hall of inordinate size. Surely, then, the first consideration of the designer should be to get the hall not as large, but as small, as possible. This has been the last consideration with most of the competitors. Twenty-one have constructed halls of 5,000 to 8,300 ft. area, the assessor's requirement being a minimum of 4,000 ft. Many of the halls, moreover, to obtain fine effects, externally and internally, are unnecessarily lofty, and, consequently, costly. Very beautiful halls, indeed, many of them are, especially that of "Three Stars," which shows an interior that seems to be a reminiscence of a Belgian church. However, it is needless to say that the temptation to make a fine feature of the hall was a very strong one. Those who have succumbed to it have thereby raised the cost of their building out of all bounds. The successful firm, Messrs. Botterill, Son, & Bilson show a hall of 4,232 ft. area, with an estimate of 14,970*l.* for the complete block of buildings. "Three Stars" has a hall of 5,000 ft. area, and a total cost of 20,000*l.* The lofty hall of "Balbus" helps to bring up his total to 27,200*l.* Matters have been made worse in many cases by the construction of spacious corridors all round the hall, still further increasing its area, height, and cost.

Another problem that has vexed the competitors has been the position of the staircases leading from the gallery into the central hall. Only two designs contain the right solution. The solution depends on three points. First, the staircase must not encroach on the area of the central hall. Secondly, it must not be constructed to block the inspection windows of the headmaster, porter, or assistant-masters. Thirdly, it must not be constructed on the west side of the hall, for the great mass of the class-rooms should be on the east side. The successful design had it right; so also had Mr. Wigram ("Balbus"), who obtained the second premium. The proper position for this main staircase is face to face

with the windows of the administrative block, so as to be under perfect supervision. Some placed it in the very centre of the hall; a few round a corner in a corridor. The following designs seem to have been most successful in carrying out the spirit of the hall-passages plan: "Supervision," "Balbus," and "Aula" (Messrs. Beazley & Burrows), and "Equo Animo" (Mr. Norman M. Brown), or, as the Hull printers have it, "Egus Amino." Of these, that of "Supervision" is assessed, as before said, at 14,970*l.*; that of "Aula" at 20,900*l.*; that of "Equo Animo" at 22,400*l.*; that of Mr. Wigram at 27,200*l.* There is also a good plan by "Quodlibet." "Supervision" is the only one of the five which at all approaches the sum mentioned by the assessor, 10,000*l.*

Externally there is no place for towers. Several competitors have introduced them. Towers have no business in a hall-passages plan. They do not grow out of it, or point to it, and they enormously increase the expense. The tower is unnecessary in the excellent plan of "Balbus," and puts his design out of court by the additional expense entailed. The other premiated design, "Wilherforce," (Messrs. Chorley & Connon, of Leeds,) also has a highly ornate and costly tower. In some cases the towers seem to be present merely as attractions to the eye of the Committee-men, the architect not in the least expecting them to be built.

Very few of the competitors have been able to provide, for 10,000*l.*, more than a central hall with eight class-rooms. The successful design, with a few others, offers twelve class-rooms. "Balbus" does not propose to build even the central hall at first.

Good as the ground-plans of "Supervision" and "Balbus" are, a careful study of them suggests several improvements. There are at least three matters in which both have erred. It is only fair to add that they erred in accordance with instructions. In the first place, the lavatories are badly placed, in a corridor or behind a staircase, and therefore being out of reach of adequate supervision, the arrangement is condemnable, as being contrary to the spirit of the hall-passages plan. Boys' lavatories should not be placed in the central block at all, but among the external offices; partly to have no slopping of water in or near the central hall, and partly because when boys need to wash their hands,—viz., at the end of games,—the porter is outside the building, supervising the games, urinals, &c. The porter is not supposed to be in the hall, except when the boys are all in the class-rooms or hall. When they are out of doors, he must be. The supervision of the hall, with its cloak cupboards, would, most properly, be entrusted to a master or masters in the half-hour or so before school, when the pupils are allowed to come early for their games. Secondly, the cloak-room attached to each class-room on the ground-floor is objectionable. The addition of these cloak-rooms very greatly increases the area of the class-rooms, and consequently the area and height and cost of the internal hall. The smell of wet clothes would probably find its way into the class-room. And during the half-hour before school begins, when the class-rooms must be kept locked, the cloak-rooms would be inaccessible to boys who wished to deposit their books and overcoats before joining the games. On very ground the system of cloak cupboards as used at St. Paul's School, by which each boy has a lock-up cupboard of his own, is far preferable. It is approved by Dr. Abbott, and Mr. Walker finds that it works well. A special merit of the cupboard system is that since each is fitted with a small shelf, a boy can deposit on it part of the large stock of books which is required in the higher forms of a public school, and for which sufficient space cannot be found in the ordinary box-est. These cupboards should be arranged round the walls of the hall. If more room still is required, they may well be arranged between the piers of the central hall on which the three galleries rest. As this second set of cupboards would face the inspection windows of each class-room, from

which each master has a view of the hall, they would be perfectly under supervision. Moreover, they would form a screen about 5 ft. high, separating the central space of the hall from the corridors running round it, and thus securing privacy in the central space of the hall, when examinations or prayers are going on there; for boys in the centre of the hall, when seated, would be unable to see over the screen of cupboards thus formed. A third error is to design all the class-rooms of the same size. In no school are the classes all of equal size; nor should the class-rooms be. The highest class, composed of boys on the eve of entering the University, tends to be small. The lowest class is usually small for another reason; it is composed of young children, and they require too much individual attention to allow of many being placed in the same class. Therefore, at least two of the eight class-rooms on each floor may be diminished in area, without making the block in any way less adapted for use. This diminution of the area of the class-rooms again means a corresponding diminution of the area, height, and cost of that *article de luxe*, the hall. In fact, by cutting away the cloak-rooms, putting the lavatories out of doors, and curtailing the size of two class-rooms on each floor, the area of the central hall of a two-story school for 500 boys may be brought down to 3,200 square feet.

Messrs. Botterill, Son, & Wilson propose to lay wood blocks in the hall, where no one ever treads except at prayers or examinations, and noisy, boarded floors in the class-rooms, where, of all places, noise is to be avoided. This arrangement should be reversed. The hall corridors, indeed, need to be either wood blocks or granitic cement; but not the area within the hall piers. From considerations of cost they lament that they can offer nothing but open fires by way of heating; and, in spite of their agreement with Sir Henry Roscoe's pamphlet, they plaster the class-room walls. It is to be desired that the Governors of the school should not allow a plan, in other respects so admirable, to be spoiled for want of adequate funds to secure proper heating and pure air. A minor point is the deficiency in urinals; the percentage of one for twenty-two boys is far too low. At most schools there is a break in the middle of the morning and afternoon schools, and a crowd collects round these offices, and unpleasant results follow. With the modifications suggested above, the two first designs are admirable instances of planning, and the selected design fairly represents the furthest point of excellence which school planning has hitherto reached.

THE TOWN HOLDINGS BILL.

THE principle of this Bill is one which we have for a long time consistently advocated. It is that compensation should be paid by landlords to tenants for improvements made by the latter which are of permanent benefit to the landlords' property. The Bill itself is a practical result of one branch of the interim report of the Town Holdings Committee of the House of Commons, though it seems to go somewhat beyond that report. In that document it was recommended that compensation should be made for improvements made by a tenant "for the purpose of carrying on his trade or business." By this Bill compensation is to be paid to tenants for any kind of permanent improvements, not necessarily made for the purposes of business. This is just. For it is unreasonable to limit compensation for improvements to those made for business purposes: a tenant of a dwelling-house has on every ground as much claim to be recouped money he has spent on premises, some portion of which results to the benefit of the landlord, as a tenant of business premises.

The Bill is confined in its operation to future tenancies, so that for many years it will not have the large effect which would sooner or later be the case. It also guards

against persons contracting themselves out of its provisions, since "any contract, agreement, or covenant made by a tenant" by which he would be deprived of his right to compensation is null and void. Compensation is also limited to improvements mentioned in the schedule to the Bill, which is as follows:—"Such improvements *bonâ fide* made for the purpose of carrying on a business, or otherwise, as may have added to the permanent letting value of the premises. Any work, outlay, benefit, improvement, or advantage exacted, done, or accruing (during the occupying tenancy by the occupying tenant, and his predecessors in occupancy) in, to, or upon the holding, whereby, or in consequence whereof, the holding would, in the opinion of the arbitrator in the Act mentioned, increase or augment the amount paid as rent by the occupying tenant of the holding, if the same were let for a period extending over seven years from the determination of the tenancy of the occupying tenant to a hypothetical tenant or tenants on the same terms as regards tenancy as those held or enjoyed by the occupying tenant at the time of the determination of the tenancy."

As regards the second part of the schedule, we do not see why its wording should not follow the latter part of the first portion of the schedule, and give compensation in respect of any addition to the permanent letting value of the premises. There appears also to be no clause in the Bill providing that compensation shall not be paid if the full value of the cost of the improvement has been obtained by the tenant before the expiration of his tenancy. It is quite conceivable that an improvement, whether in a trade or a domestic building, might be so used by the tenant that before he leaves he will have repaid himself the cost of the improvement. In such a case it is questionable whether the tenant should receive compensation, for he would then be money in pocket, whilst the object of the Act is to prevent him from being money out of pocket. Two months' notice of an intended improvement must be given to the landlord; if no agreement as to the improvement is then made between the tenant and the landlord, or if the landlord does not agree to do the improvement himself, the tenant may proceed to do the work, and will be entitled to compensation in respect of it at the expiration of his tenancy. Such is the basis of this Bill. That it will require some amendments in Committee we cannot doubt. Section 7, for example, requires to be broken up, and section 6 is at present unintelligible. We cannot but think that the word "not" is omitted before "unreasonable," and that it is intended to exempt from compensation improvements which the landlord has not unreasonably refused to allow. It may perhaps be as well to add that the Bill contains provisions for estimating compensation in disputed cases by means of arbitration. That this Bill must ultimately become law we cannot doubt; it has for a precedent the Agricultural Holdings Act; and it is moderate and reasonable. It does not interfere with existing tenancies, and it leaves abundant opening for landlords and tenants to make agreements between themselves in regard to improvements. It need, in fact, never come into operation at all, unless tenants or landlords behave in an unreasonable manner.

NOTES.

THE Railway Commissioners had a case before them last week in which a railway company had objected to dissect certain rates on the ground that the applicant was not a "person interested" within the meaning of the Acts. The counsel for the applicant argued that every one was interested in rates which practically competed with those charged to him, and that the applicant need not be paying the particular rate required to be dissected, since it is not those who pay exceptional rates, but those who do not, who

are usually the most concerned. Judgment has not yet been given in this case, but Mr. Justice Willis indicated his sympathy with the applicant by his remarks during the hearing of the arguments. For one thing, he made a suggestion which may advantageously be noted by others wishing to obtain similar information. He remarked that all difficulty would have been avoided if some friendly customer at the other end had been requested to ask for the required particulars under section 33. It was explained that application had been made as suggested, but without effect, the company stating that, inasmuch as the rates did not exceed the authorised maximum, it could not be said that any terminal charges were included therein. Mr. Justice Willis' rejoinder to this was still more encouraging to "persons interested." He said that the Court would not be so strictly bound by the letter of the Act as to assume that valuable services were rendered by the company for nothing, and they would not be satisfied with such an answer. It frequently happens that the letter of the law is held to be even more binding than its spirit and intention, and we are glad to note that the President of the Commission has such a regard for the latter. There are exceptional circumstances connected with the case in question which explain in some measure the reluctance of the railway company to disclose the facts, but there is seldom any difficulty now in obtaining information of this nature. The difficulty is, at present, to make any use of it when obtained, as the charging powers of the railways companies are so uncertain. When the new schedules are settled, however, and have received Parliamentary sanction, these powers will be more clearly defined.

THE Committee of the House of Commons on the Strand Improvement Bill rejected the principle of "betterment" on Monday last. It must be pointed out, however, that they strictly confined their rejection to its inapplicability to the facts of the present case. In other words they do not condemn the principle, but only its application. It may be that they do in theory privately condemn it, but it was not necessary for them to go so far openly, because they do not consider that the principle was properly applied. But it cannot be disguised that one of the chief difficulties of the "betterment" principle is the difficulty of applying it practically and deciding what the area of "betterment" is to be. If, by an improvement, a house is made lighter, there is here a direct improvement, the value of which is capable of being ascertained. On the other hand, to enclose an area and say that this area is improved, and beyond there is no improvement, is so arbitrary a method, and must always leave matters so uncertain, that this alone must render the principle very difficult of practical application. The Committee were to meet to consider the general clauses of the Bill on Thursday afternoon, as we were going to press.

FROM a paragraph that has been forwarded to us from a Hertfordshire paper, we observe that there is a talk being made about setting up a monument to Lord Grimthorpe in commemoration of his munificence—

"Firstly, because he has preserved and replenished, with unstinting bounty, a fine old Parish Church; and, secondly, because for many successive years he has been the cause of thousands of pounds per annum being circulated in our midst. It need not be pretended that, in order to concur in this idea, anyone and everyone must perforce think Lord Grimthorpe's architectural style unassailable, or his authority unimpeachable. All that we are urging is that those who exercise fairly their faculties of observation and reflection must perceive at once how tangible and real are the public obligations of St. Albans to the Abbey restorer."

The gratitude to Lord Grimthorpe for having "circulated money in our midst" while engaged in defacing a great building, is truly English. But the good people who argue in this way have missed the real point of the case. Lord Grimthorpe has by his own action abandoned any claim to recognition or admiration which he might have had

under different circumstances. As we pointed out long ago, if he had given his wealth to the repair and partial rebuilding of the church under the hands of an architect competent to do justice to such a building, he would have been a great public benefactor and would have deserved and received the gratitude due for such munificence. To gratify his own obstinacy and vanity he persisted in being his own architect, in undertaking a task for which he was perfectly unqualified, and in making a great Medieval building a plaything for the exhibition of his own bungling efforts at architectural design; a proceeding which, as we have before said, we believe would not have been permitted in any other civilised country; certainly not in France or Germany. However, if the grateful tradespeople of St. Albans, among whom Lord Grimthorpe has "caused money to circulate," are bent upon setting up a monument to him in the neighbourhood of the cathedral he has defaced, we will recommend them an appropriate motto: let them adopt that to Wren,—"Si monumentum requiris, circumspecte." Rightly read, nothing could be more neat, more to the point, or more cutting.

THERE seems no question that the removal of most if not all of the gates which bar various thoroughfares in London, at the will of Ducal owners, is only a question of time; it is against the convenience of the majority of the public, unquestionably. But we are surprised at the light-hearted manner in which the Select Committee on the subject, at their meeting on Tuesday last, settled that no compensation was due to any one for the removal of such gates. No one who knows the neighbourhood in which the Duke of Bedford's rather numerous gates are found can doubt for a moment that the removal of these gates would depreciate house property in their vicinity. We know of one case where a house in Upper Woburn-place was recommended by the owner of the lease to a proposing tenant, mainly on the ground that being close to the gates, it was for the greater part of the twenty-four hours as "quiet as in the country," no continuous through traffic being possible. This quietness is one of the greatest and rarest boons to be had in a London dwelling; surely it cannot be pretended that it is worth nothing to the value of house property.

HERR KONRAD WERNICKE'S monograph on Greek vases with "love names" has been long looked for, and its appearance will be welcomed by all students of ceramography. It is the natural sequel of Dr. Klein's well-known "Meister-signaturen." The first essential was to collect all known instances of artists' signatures; that done, it was soon seen to be imperative that all instances of inscribed "love names" should be in like manner gathered together. The book is, of course, in the main a catalogue, but one chapter is devoted to the scientific results deducible from this catalogue, and here we have a substantial contribution to the history of ceramography. Briefly, Herr Wernicke finds—1. That these "love names" do not appear indifferently at all periods of vase paintings, but are almost exclusively confined to about one century,—i.e., simply from 550 to 450 B.C.—i.e., the late black and early red figured periods. 2. That the practice of inscribing love-names was almost wholly confined to Attica. 3. That, as a rule, the same love-name refers to the same person and not to a succession of persons bearing the same name,—a conclusion most important for chronology. 4. That the names refer sometimes to the obscure favourites of the vase-painters themselves, but far more frequently to beautiful boys and youths aristocratic birth. This custom of in-

scribing vases with the names of famous beauties, Herr Wernicke reminds us, was not confined to Greeks; it obtained also among the makers of majolica ware in the first half of the sixteenth century A.D., in whose wares frequently appears a female head inscribed, "Juha bella, Angelica diva," &c.

THE "programme" of the biennial meeting of the combined societies of German architects and civil engineers, which will be held at Hamburg from August 24 to 30th next, shows that, besides a series of lectures, among which those on "Style," "Hamburg," "Modern road-building in regard to the disposition of subways," "The North Sea-Baltic Canal," and "Modern wide-span bridges" promise to be of special interest, ample preparations have been made for the facilitation of an inspection of the new harbour works, public buildings, and private residences of the city, as well as of the sights of the neighbouring towns, Lübeck and Kiel, and of the works on the new North Sea-Baltic Canal close by.

WE have received some specimens and a description of a material called "Tectolith," which appears to possess some important qualities as a covering material, somewhat in the same manner as concrete slabs have been used in this country. It is described vaguely as "a mixture of various materials, chiefly magnesite," but it appears to have come into considerable use in Germany, for the construction of houses and goods-sheds on railways, and for exportation in the shape of portable houses to the colonies. These are made of slabs of Tectolith on wooden framing, on the same principle as the Lascolles concrete cottages; or they can be fixed on iron framing, if greater durability is desired; they can also be used for flooring, for which purpose they have been already applied in some factories in Saxony. We understand that Messrs. Kirkaldy & Sons have obtained very satisfactory results in testing Tectolith for strength (which test reports, however, have not been forwarded to us), and it is claimed for the material that it is one of the most fire-resisting of materials, and has stood very severe tests in this respect. Besides being used in hard slabs, it can also, by a different mixture of the ingredients, be produced in a softer consistency, suitable for use in pugging or deadening sound in floors and partitions.*

THE case of Rendle v. J. Edgcombe Rendle & Co., Limited, which was tried on Saturday last, and is reported in another column, brought into court the well-known glazing business of which many of our readers have had practical experience. The dispute was one of a personal nature, the plaintiffs being the trustees of the will of the late William Edgcombe Rendle, and the manager of the defendant company, being a son of the "original" Rendle. The Judge decided in favour of the plaintiffs, and granted a perpetual injunction to prevent Mr. J. E. Rendle from using his name or doing anything to make the public believe that he had succeeded to W. E. Rendle's business. Many of our readers have probably received prospectuses of the defendant company, and this case should be a warning to them to be careful in the matter. Into the unfortunate personal details of the case it is unnecessary for us to enter. It is sufficient here to state, as the result of the case, that Mr. J. E. Rendle has now no interest in the original firm.

NO. 9, St. James's-square, is in course of being altered and repaired for the members of the Portland Club. This finely-built house, recently occupied by Miss Hoare and Miss Prince, stands on the northern side of the square, with its main entrance in York-street, western side. The walls are unusually

* We understand that a company is being formed for manufacturing the material in this country. It appears worth a trial.

* "Die griechischen Vasen mit Lieblingsnamen. Eine archäologische Studie von Konrad Wernicke." (Berlin: Reimer, 1890.)

† Mr. F. G. Davis, of 54, Theobald's-road, W.C. builder and contractor.

substantial; all the principal rooms are fitted with doorways carrying richly-carved pediments,—the doors, in pairs, having a depth of 2 ft. and more between them,—and these rooms, up to the third floor, are handsomely panelled and wainscotted. Two large apartments, fronting the square, on the ground and first floors, will serve, respectively, as the dining and card rooms. The chief staircase carries a noble balustrade of mahogany. This is reputedly the actual house that was inhabited, in Queen Anne's reign, by James, second Duke of Ormonde, (grandson of Dryden's "Barzilai") who suffered attainder for his share in the "15." In this case, and appearances favour the statement,* it must be one of the original "thirteen or fourteen great and good houses" for the erection whereof, upon the Earl of St. Albans' land, a warrant, dated September 23, 1664, was issued to Abraham Cowley and Baptist May—whence, perhaps, the neighbouring Babmaes-mews, in Jernyn-street—by name, at first, of the Piazza. It is known that the Duke lived on this site, and that his house was sold by the Crown for 7,500*l.*, being valued at 300*l.* a year. In his "Journey Through England," De Foë refers to it "as a noble palace, now purchased and finely adorned by the Duke of Chandos." The Duke of Chandos, it seems, thereupon abandoned his scheme for building a vast mansion along the northern side of Cavendish-square,† Ormond-yard, in York-street, commemorates the name of the attainted Duke, who went into exile at Avignon, with a pension from the Court of Spain. Dying on November 16, 1745, he was buried in the family vault beneath Henry VII.'s Chapel, at Westminster.

THE Holmewood estate, Huntingdonshire, the seat of the late Mr. William Wells, will be put up for sale by auction at the Mart on July 16 next. Yielding a rent-roll of about 7,000*l.* a year, this property extends over 6,400 acres. It comprises various farms and homesteads, some of them upon land reclaimed from the fens, together with the whole of Denton and Holme parishes and nearly all of Glatton. As is not commonly known, the last-named village gave a name to one of our now obsolete ironclads. Glatton is supposed to be a corruption of the British *glästanen*, or later *glästen*, the holm-oak. It is stated that the draining of Whitlesey Mere, some forty-five years ago, was done at Mr. Wells's expense. Amongst his collection of old plate sold at Christie's on Tuesday, June 3, were the thurible of silver-gilt, with silver chains, and the "naviculaire," or incense boat that were then dug up in the mere, and are supposed to have belonged to the wealthy Benedictine abbey at Ramsey, but a few miles distant in the same county. The former was bought for 1,155*l.*, the latter for 900*l.*, the boat being regarded as of the Early Tudor period, the thurible as of the end of Edward III.'s reign.

IN our list of "Tenders" of last week were included two tenders for carrying out some alterations, &c., at the "Bag o' Nails," now No. 6, in Buckingham Palace-road. This is a representative of one of the old taverns for which Pimlico was once famous; such as the "Gun" (demolished in 1857), the "Goat and Compasses" (dating from the Commonwealth), and others. The sign is a corruption of Ben Jonson's "Bacchanals." The original device consisted of a wood satyr, attended by a band of choice spirits. These latter, when the satyr was repainted black, became "translated," and the sign for a while was vulgarly known as the "Devil," the cloven feet being still conspicuous.

SOMETIME ago the classical temple which surmounts St. Bernard's Well, Edinburgh, was restored, at considerable cost, by the late Mr. William Nelson, pub-

lisher. The restoration was thorough, including a new marble figure of Hygeia, mosaic inlay for the domed roof, tessellated floor, and extensive terracing, &c., upon the grounds. It appears that doubts have arisen as to the real character of the water, and, in consequence of this, a customer of a firm of druggists in the city requested them to make inquiry into the matter. It had been remarked that there was an absence of the odour of sulphuretted hydrogen, which forms the chief characteristic of the water, and the presence of which constitutes its peculiar virtue. A sealed sample of the water was sent to Dr. Stevenson Macadam for analysis, without informing him of the source from which it came. After giving details of his analysis Dr. Macadam concludes:—"These results prove this sample of water contains in solution much saline matter, and is very hard in character. It further holds in solution substances derived from the decomposition of putrescent organic matters, and which render the water very impure and unfit for domestic purposes or for the watering of cattle." The City Analyst, however, assures the public that "the result of repeated analyses within the last few days of this water, at various hours, is to show that its constitution is, if anything, purer than it was at the opening of the present well, and that there is a total absence of anything indicating sewage contamination." The builders, Messrs. R. Thorburn & Son, who were employed in the restoration of the well, write to the *Scoteman* as follows:—

"When taking down the stonework of the old pump, Mr. Nelson directed us to see the tank from which the water was drawn, and, if necessary, have it cleaned out. Accordingly, we had the pavement floor lifted, and found underneath a space, with a rocky surface, the full size of the well-building, intersected with walls carrying the floor above, and in the centre a barrel sunk down in a cavity of the rock. Under instructions of Mr. Lessels, architect, this barrel was taken out and the cavity cleaned, when the water was observed coming up through the bottom in three well-defined feeders, all on the north and east sides (two next the river and one a little to the south and east). After being thoroughly brushed and cleaned out, the bottom of the cavity was covered with 6 in. of clean broken stones, on which was set a cylindrical tank made of two salt-glazed spigot of faucet pipes, jointed with cement, standing faucet downward, and having the bottom of the lowest pipe filled in with a disc of Portland cement, through which two holes were pierced. Between this tank and the walls of the cavity was packed clean broken stones for eighteen inches of the height, at which point three holes were cut in the cylinder. The remaining height up to the floor of the space under well-room was tightly packed with stone and cement. The top of the cylinder or tank finished about 9 in. or 12 in. above the surrounding rock by being covered over with a flag bedded in clay and pierced in the centre for the pump pipe. There was always a good deal of water on this rocky floor, apparently coming from the high ground and mill lade to the south, and having made certain that it could not get into the tank, we cut an overflow hole through the wall of the well to the north to allow of its escape to the river. While the tank was being fitted up, visitors were supplied from a cistern previously filled; and it was a matter of remark that in a few hours the water had lost its peculiar odour and flavour."

The mill lade to the south, from which it was "made certain" that no water could get into the tank, is little better than a common sewer, and the certainty of the measures taken for preventing contamination from that or any other source should be carefully investigated.

TWO additional galleries of the Scottish National Portrait Gallery were opened to the public on Saturday. These contain a large and interesting collection of engraved portraits of Scottish historical characters, drawings of old Edinburgh by the late James Drummond, R.A., a set of engravings illustrative of the art chiefly of French masters of the seventeenth and eighteenth centuries, and casts of classical celebrities. These last formed part of what is known as the Albani collection, purchased in 1839 by the Board of Manufactures for the Trustees' Academy.

THE eastern half of the building in Queen-street, Edinburgh, which is to be appropriated by the Scottish Society of Antiquaries, is not yet in a fit state for occupation, but we are given to understand that it will probably be so before the lapse of another year.

THE Stover collection, the property of the late Edward, Duke of Somerset, will be put up for sale by auction, at Christie's, on June 28 current. The pictures for the greater part are by old masters of the Dutch and Italian schools, such as Hobbema, Backhuysen, and Adrian Ostade, Bronzino and Claude. There are also Paul Potter's "Dairy Farm" (1646), formerly in M. de la Hante's gallery; Reynolds's portrait of Anne, eldest daughter of James, fifth Duke of Hamilton, who married, in 1761, Arthur, first Marquess of Donegal; Gainsborough's Duke of Hamilton and his brother, Lord Douglas, afterwards summoned to the House as Duke of Brandon. The claim of the elder brother, James, seventh Duke, who died, unmarried, in 1769, to the Douglas estates was disallowed on appeal to the Lords in the famous suit known as the Douglas cause. Also a female portrait by Hoppner; and portraits by Van Dyck (Queen Henrietta Maria), Lely, and Dobson; together with Rubens's sketch for his "Daniel in the Lions' Den." These paintings were purchased by Archibald, ninth Duke of Hamilton, who died in 1819, and given by him to his daughter Charlotte, wife of Edward, eleventh Duke of Somerset. Thus they passed to the late nobleman, who, when Lord Seymour, married, in 1830, Jane, granddaughter of Richard Brinsley Sheridan, who took the part of the Queen of Beauty at the Eglintoun Tournament.

THE architectural and topographical library of the late Thomas Henry Wyatt, F.S.A., was sold a few days since by Messrs. Puttick & Simpson in their auction-rooms at Leicester-square. Amongst the more important works were included the following:—Nash's "Collections for the History of Worcestershire," 1781-2; E. Hasted's "History of Kent," 12 vols., 1797-1801 (Hill, 5*l.* 3*s.*); Winkles's "French and English Cathedrals," 4 vols., 1836-7 (2*l.* 16*s.*); G. E. Street's "Gothic Architecture in Spain," 2nd edit., 1869 (Quaritch, 1*l.* 12*s.*); A. W. Pugin's "Glossary of Ecclesiastical Ornament and Costume," roy. 4to, 1814 (Quaritch, 2*l.* 18*s.*); Dollman and Jobbins' "Examples of Ancient Domestic Architecture," 2 vols., 4to, 1858 (1*l.* 1*s.*); Dollman's "Priory of St. Mary Overie, Southwark," imp. 4to, 1851 (1*l.* 3*s.*); "Revue Générale d'Architecture," &c.; several volumes unbound, "Paris, 1840-77" (2*l.*); "Architectural Association Sketch-Book," vols. 3 to 12, 1869-80 (Batsford, 6*l.*); Richardson's "Old English Mansions, Plate, and Furniture," vols. Nos. 1, 3, and 4, imp. fol., 1841-8 (Batsford, 4*l.* 10*s.*); "Vitruius de Architectura cum Emendationibus et Illustrationibus," A. Marinio, 140 plates, 4 vols., Rome, 1836—with King Louis Philippe's monogram on covers (1*l.* 2*s.*); V. Petit's "Châteaux de la Vallée de la Loire," 2 vols., imp. fol., Paris, 1861 (Batsford, 5*l.* 2*s.* 6*d.*); P. Letarouilly's "Édifices de Rome Moderne," 4 vols., imp. fol., Paris, 1843-57; F. Mazois's "Les Ruines de Pompei," 198 plates, 4 vols., atlas fol., Paris, 1812-38 (Batsford, 5*l.* 12*s.* 6*d.*); V. Place's "Ninive et l'Assyrie," with F. Thomas's designs for restorations, 82 plates, 3 vols., atlas fol., Paris, 1867 (Batsford, 4*l.* 17*s.* 6*d.*); James Neale's "Abbey Church of St. Alban," 60 plates, imp. fol., 1877 (Wyatt, 1*l.* 10*s.*); Pugin and Heath's "Paris and its Environs;" and C. Wieck's "Spires and Towers of the Medieval Churches of England, 3 vols., imp. fol., 1853-9 (Quaritch, 8*l.*). Copies of Mr. Norman Shaw's "Architectural Sketches," with 100 plates of famous buildings in France, Italy, and Germany, 1858, and J. S. Cotman's "Architectural Antiquities of Normandy," 2 vols., imp. fol., 1822, were bought for 16*s.* (Berry) and 17*s.* (Parsons) respectively.

* We have since learned that No. 9, St. James's-square is part of the house of the great Duke of Ormonde. His house extended to Ormond-yard.
† Confer Mr. H. B. Wheatley's "Round about Piccadilly," 1879, ad loc.

A MOSAIC has just been completed, from the design of Mr. Holman Hunt, by Messrs. Powell & Sons, as a reredo for the chapel at Clifton College. The subject is Christ discussing with the Rahhis in the Temple. Messrs. Powell have produced a fine piece of mosaic work, but the subject has not, in our opinion, been treated by the artist in a sufficiently decorative manner, considering the position it is intended to occupy; the head in the figure of Jesus is certainly too large for the body, and the whole would have been vastly improved by a simpler scheme of colour.

MR. DRESSLER has at his studio, in Chelsea, a copper relief representing the Holy Family, one of two for a side chapel of St. Xavier's Church, Liverpool. The panel measures about 4 ft. square. The Virgin and St. Joseph are seated on a panelled dais with the Child between them. The background is occupied by arcading, the spaces being filled by a representation of the Deity in the centre, and angels playing on musical instruments on either side. The principal figures seem to have been carefully modelled; the weak point in the panel is the architectural background, which can scarcely be considered a success.

TWO elaborate cabinets, made by Boule as a present for Philip V. of Spain from Louis XIV., are now to be seen at Mr. Ichenhäuser's, in New Bond-street. They were formerly in the Château de Marieumont, in Belgium, and are both of the same general design. The fronts of the various drawers are filled with representations of the victories of Philip,—a series of eight on each cabinet,—the figures being of tortoiseshell on a background of tin. Ebony has been largely used, and the hands of ornament, and the decoration of the circular columns at the angles, are of great delicacy of detail. The centre bay of the cabinet is made to open either door, the hinge being formed by the bolts attached to the locks, one on either side. Over the centre portion is a figure of Pama blowing a horn, and holding the monogram of Philip V.

THE idea so long entertained and acted upon in India, that engineers are the fittest persons to be entrusted with new architectural work in the country, though it has been somewhat modified of late years, seems to die hard. A correspondent in *Indian Engineering* of May 17 writes:—

"What are the wisecracks of the Allahabad Municipality thinking of when, having made up their minds that the capital of the North-West Provinces demands a town-hall as an illustration of its dignity and proud status, they repudiate the assistance of professionally-trained architects, and decide to entrust the design for their grand Hôtel de Ville to the assistant engineer who looks after their water-works. An accomplished and estimable young man I make no doubt. Still I hope I may be pardoned if I fail to see how having charge of water-works—even in Allahabad—can inform a man about the principles and practice of architecture *en grande tenue*, or render him an authority on that art."

THE ways of American journals are certainly interesting. We observe that the New York paper called *Architecture and Building* has been reprinting Professor Aitchison's lectures on Roman Architecture, of course from our columns, as with the exception of the first lecture they were communicated to no other journal. Not only does the American editor reprint them without a word of acknowledgment as to the source from which he obtained them, but even one or two editorial comments of our own on points in the lectures, printed as footnotes, are duly reproduced with the affix "Ed." at the end of them, leaving the reader to suppose that this is the comment of the American editor.

Erratum.—In "Notes" last week, line 3 of first column on p. 412, for Meadows v. Marshall read "Meadows v. Taylor."

ARCHITECTURE AT THE ROYAL ACADEMY.—VI.

1840. "St. Swithin's Church, Mither Green, Kent": Mr. Ernest Newton. This is shown in a bird's-eye view, which gives rather too great a prominence to the expanse of roof; it is an exceedingly solid-looking building with massive plain buttresses and windows with equally massive tracery between them. The west end is rather oddly treated; there is apparently a narrow narthex between two deep buttresses, and above this what looks like a chimney rises in the centre of the front up to the gable, with a window on each side of it. What the meaning of this is is not apparent, unless it is a buttress to hold up the front, but as it has no visible base externally, and only rises out of the porch roof, it adds no appearance of stability. On the other hand the side aisle, instead of being a lean-to roof, is treated as a longitudinal gabled roof, the inner slope falling back against the nave wall. There is no particular objection to that, but the treatment of the west end of the nave is eccentric rather than effective, and rather spoils an otherwise good church. This drawing, being one with a high sight-line, is as usual hung at the very top of the wall as high above the eye as possible, so as to appear as if falling over. This stupidity about such a simple matter, which is constantly repeated in the hanging of the architectural drawings at the Academy, year after year, is quite inconceivable. Is there no one in the Academy who knows that a drawing looks best when viewed from the position nearest to the spectator's imagined position?

1841. "An East-end Mission-house": Mr. E. W. Mountford. A prettily-executed pen-drawing; there is no plan, but we presume that the upper portion, with the windows beneath pointed arches springing from buttress to buttress, is an open-roofed hall, and the lower portion with the square mullioned windows consists of offices or small rooms of some kind. The building is picturesquely grouped, the different portions of it being distinctly marked, and the effect of the whole is suitable to its purpose and position.

1842. "Hertford College, Oxford: New Hall and other buildings": Mr. T. G. Jackson. The prominent feature in this small drawing is an octagonal staircase lighted by a series of elliptical headed windows built on the rake following the stair line; a neat problem in masonry, but having to our thinking a rather crippled effect architecturally. The addition is entirely in keeping with its surroundings, which is an excuse for the flower-pot finials at the top, which otherwise we do not much sympathise with.

1843. "Industrial Schools, Knowle, Bristol: Entrance Front": Mr. J. D. Sedding. A reproduction from this drawing is published in the present number. It is exceedingly picturesque, though we question whether there is not a little too much determination to be picturesque about it, and whether it will not be thought in a few years rather an eccentric experiment. However, it is better than making a school a mere commonplace square mass of building, certainly; and this school has the merit of being homelike, as we think schools (especially Industrial Schools) should be, and not like jails or workhouses. No plan is given with the exhibited drawing, but we are enabled to append a plan in the present number, from which the relation of plan and design will be seen. A word is due to the drawing; a slightly-executed water-colour, which, however, in regard to feeling for colour, tone, and composition, is one of the best things in the room. It is a pity that, with all these merits, the little cupola on the left, the most prominent object, should be crooked and out of drawing.

1844. "Home of Rest, Littlehampton, Sussex": Mr. Halsey Ricardo. A good deal of the picturesque effect of this is due to the drawing, in which all the sides of brick piers in shadow are shown with every brick shaded dark, the front being left nearly untouched. This is a purely artificial effect, but it gives a look of originality and picturesqueness to a drawing. The building is characteristic enough in treatment: the upper stories oversailing and carried on large piers of brick wall projecting on the ground story.

1845. "Proposed New Catholic and Apostolic Church, Westminster": Mr. John Belcher. Elevation plan, and section; the plan is cleverly treated on a long site with one end to a street cutting it at an oblique angle. The east end

faces the street, and the entrance is by a door at one side of the chancel and a passage parallel to the latter. The central portion of the plan is treated as a hexagon, the piers opening out somewhat on the same principle as in St. Stephen, Wallbrook; this space is roofed by a semicircular dome, a plain semicircle externally, but internally the treatment is of Late Gothic type, the dome having groining ribs, twelve in number; the springing of the dome is a narrower hexagon carried on arches thrown from centre to centre of the bays of the lower hexagon, across its angles. Externally we see a rather poor little gable with a Tudor type of traceried window in it; and a brick tower on which is bluntly set an iron and lead campanile contrasting picturesquely with the plain brick-work which carries it. The main arcade round the hexagon is treated with large Tudor shaped arches with the main portion of the "arch" perfectly straight in line from the apex to the small curve at the springing; not a very strong sort of arch nor very agreeable to the eye. There is however a great deal of originality and interest in this set of drawings.

1846. "St. Mary's, Clumber; the side chapel": Mr. G. F. Bodley, A.R.A. A regulation coloured drawing of a regulation Gothic interior.

1850. "British and Foreign Marine Insurance Company's Offices, Liverpool": Messrs. Grayson & Ould. This drawing is reproduced in the present number. It is an effective sepia drawing, with the two angles of the foreground buildings forming a frame to the principal one, and is a creditable attempt to give architectural effect to a business building, as well as a certain meaning in the decorative details, the ship keystones, the pictorial panels (of mosaic) contrasting the ancient with the modern ship. The tracery diaper over the second-floor windows has a good effect, but we fear there is rather a want of refinement in details, and the third-floor windows appear to belong to another building, and have no architectural relation to the rest of the detail.

1854. "New Grammar School, Bedford": E. C. Robins. This is an example of a kind of drawing not often seen at the Academy, a perspective view in which part of the exterior is broken away to show the interior construction. The portion shown is the great hall, with a lofty arcade and aisles, and galleries round it at two levels, with an open timber roof. A plan is appended, showing that the school is one of the type in which the hall is really the access to and meeting ground of the class-rooms. These all open on the corridors and galleries, and the master's room and common room are at one end, opening on the great hall, with a dais immediately in front of them reached by a few steps from the hall. The plan is an admirable one; the exterior design is what may be called "Collegiate Gothic" of a type now rather passé.

1855. Offices of the *Glasgow Evening Citizen*: Mr. T. L. Watson. This, which is obviously with intention hung next to No. 1,850, is another example of the class of costly business buildings which are becoming so common now. It is a building of the "handsome" order, but rich and dignified in effect. The newspaper office only occupies a portion of the facade, being distinguished from the "Citizen Buildings" forming the other portion by a slight projection forward of the ground-floor story, which is treated with a Corinthian order of Renaissance type, between terminal pilasters, while the "Citizen Buildings" portion is treated with circular-headed openings with deep reveals and heavy panelled piers. Above the projecting portion of the ground story are bay-windows on the first-floor, over which the wall and cornice lines run through on the same plane. The top story below the gables is treated very richly, with round arches on low square piers, carved on the panels, the spandrels of the arches, and the large brackets supporting the main cornice being also richly carved. The plain masonry of the gable walls produces a good effect of contrast over this, though we do not like the dog-legged outline of the scrolls which diversify the corbie-steps. Taken as a whole, however, there is more power and originality of design about this than about most buildings of the type to which this belongs—that of the "handsome" street building.

1856. "Triumphal Arch at Timgad, Algeria, Restored": Mr. Alexander Graham. A French architect would have given drawings of the entire remains as existing, so that one could see the basis of the restoration. An English architect who sends a drawing of a restoration never

thinks of that; and very probably, if he did, the Academy would not hang the drawings. All we can see is that there is a charming tinted water-colour drawing of a Roman arch with an order attached on either side of the archway in the usual fashion, and that it is shown with a great deal of truth and precision of effect, and need not have been hung so high.

1859. "New Church, St. Peter's, Ealing; exterior view." Mr. J. D. Sedding. It would take a long description to do justice to the extent of originality in this design; fortunately we can refer the reader to an illustration in the *Builder* of Nov. 16, 1889, for the general design, which, however, has been altered and improved in various details in the exhibited drawing. The ink-line drawing, like that of No. 1,777, is hasty and scrawly in style, but not without effectiveness. The treatment of the end window is remarkable; it is set deep under a great arch abutting against a kind of buttress turret on each side; two large plain deep buttresses stand edgewise to the window plane opposite the principal mullions, and are connected with them by a kind of small flying buttresses. Between these buttresses below is the segmental arched doorway, with a parapet filled with figures over it. The treatment of the tower with its arcades, with the angels filling in the spandrels over the window, is very rich and picturesque. The whole thing is a piece of real originality in design, which it is refreshing to come across after seeing so many repetitions of old forms, Classic and Gothic. It is to be regretted that the affectation of archaism in the drawing produces an effect of eccentricity which is really not inherent in the design itself.

1860. "Pulpit, Siena Cathedral." Mr. Thos. Maclaren. This is a really beautiful specimen of pencil drawing, soft in general effect but clearly and decisively finished in detail. The bas-relief sculpture at the top is drawn with great care, and the capitals of the columns, and the smaller ornamental details, are shown very minutely and effectively. It is a pleasure to see such a drawing as this, at once artistic and architectural.

1861. "Exeter College Chapel, Oxford." Mr. Cecil B. Roper. This is another of the ink-line drawings, similar to those by the same hand which were exhibited last year, in which an unusual degree of aerial softness of effect in line drawing is aimed at, and realised, by a system of working entirely in small detached strokes. The drawing is executed with great care and patience, and the resulting effect is exceedingly delicate, but there is rather a tendency to lose distinctness and meaning in the detail by this method, as in the treatment of the marble shafts. On the whole the style and effect are artistic rather than truly architectural, but the author may be said to have made an original hit in drawing.

1864. "View of Premises, Wigmore-street." Mr. T. E. Colcutt. We may refer the reader to the *Builder* of May 24 for an illustration of this drawing, which is a line drawing. It is one of the best and most refined designs for a street front in the room, though perhaps the vertical striping with narrow slips of pilasters is rather over-done; but the details are all good and refined, and the drawing ought to have been hung lower.

1865. "New Buildings at the Cross, Chester." Mr. T. M. Lockwood—an example of the modern reproduction of the old Chester timber style of street house. The drawing, a monochrome in sepia, is a boldly-executed one, but there is not much to distinguish the design from others of its type which have been carried out in Chester of late years. The timber-work is richly treated, in foliated panels, &c.; but the whole is a little heavy in effect. If local building acts permit the continuance of this manner of building in the streets of a town, there is something more to be done with it architecturally than has usually been done; and in this case the most unusual point, the projection of a stump of timber into the middle of a panel, is hardly a good method of treatment, as it is entirely at variance with construction; and this kind of building should be, emphatically, timber construction, treated in an effective and decorative manner, but still construction.

The Society of Arts' Conversazione is fixed to take place at the Natural History Museum (by permission of the Trustees of the British Museum), on Friday, June 27.

ARCHITECTURAL ASSOCIATION VACATION VISITS:

I.—SHIPLAKE COURT, NEAR HENLEY.

The first vacation visit of the Association this year was made on Saturday by some thirty members to Shiplake Court, near Henley, which is now approaching completion, having been erected from the designs of Messrs. Ernest George and Peto, for Mr. Robert Harrison.

The house is charmingly situated on the high bank of the Thames, and commands an extensive view over the surrounding country to the south and south-west. The designs have been worked out in fifteenth century style, the materials used for the external parts being red bricks from Bracknell, and black headers for diapers, while the dressings and tracery are of Bath stone, which has been stained to bring it to a tint more harmonious with the red and black brickwork. By a careful selection of the bricks, the crudeness that might have been expected has been most happily avoided. Thick stone slates from the Forest of Dean are used for the roof, which is capped by a solid stone ridge. The entrance front has considerable charm and picturesqueness, and may certainly rank as one of the happiest efforts of Mr. Ernest George. The chief entrance is emphasised by carrying up a part of the building in a low square tower with an octagonal turret corbelled out from one angle, and this forms the central point of the grouping of this front.

The garden front, looking towards the river, is far more symmetrical in treatment, inasmuch as the greater portion of the facade is taken up by the great hall, which forms the chief feature by the internal arrangement. A halustrated terrace carried out in flint work, and handed with red bricks, forms an important part of the design of the garden front. Internally, as already mentioned, the great hall is the chief feature of the plan; this is 70 ft. in length, and has an open-timbered roof with moulded purlins and wind braces, while the walls are panelled in oak to a portion of their height, and finished with stone ashlar above it. A screen and minstrel gallery are intended at one end of the hall, but these are not yet in position. In the centre of the long side opposite the windows, is an important feature in the projecting fireplace and chimney, which is carried out with a considerable amount of detail in warm-coloured Hamhill stone.

The dining-room and billiard-room are at one end of the hall, and library and morning-room at the other. The principal staircase was at the time of the visit not sufficiently advanced to allow us to form any adequate idea of its effect, but from the drawings which were exhibited, and the detail already commenced, there can be little doubt that this will be yet another of the many charming features to be found in the house. Besides the main building, stables have been erected at some little distance, and in connection with them one of the most notable features in the composition, the great tower devoted to the storage of water and provision for the electric lighting plant consisting of boiler, engine, dynamo, and accumulators; this tower contrasts very notably with the design of the house tower and the church tower adjacent, by reason of the very foreign character of its general outline; the object of the designer has probably been to avoid competition between these three towers, and to produce a harmonious group of dissimilar elements. The entrance-ledge next the main road has been treated in a Jacobean spirit, with dark-stained woodwork and white rough cast above a ground floor of red brick; here again stone slates have been used, though of a finer variety (from Boughton-on-the-Water) than those on the main house; we are inclined to think that a tile roof however would have been more happy in this case, as there is a decided want of contrast between the tones of the roof and of the rough-cast in the upper story of this lodge.

The halli's house and dairy have also been erected from Messrs. Ernest George and Peto's designs; this block is kept entirely subordinate in design to the main building, perhaps too much so, as, *per se*, it rather lacks interest in design from the apparently too great regularity of the haak diaper and the dulness of the dark-stained wood window frames.

The Artists' Benevolent Fund.—The eighty-first anniversary dinner of this Fund is fixed for Wednesday, June 25, at Freemasons' Hall, Sir Richard Temple in the chair.

THE INSTITUTION OF CIVIL ENGINEERS:

ANNUAL MEETING.

The annual general meeting of corporate members—"to receive and deliberate upon the report of the Council on the state of the Institution, with the annual statement of the accounts and to elect the Council and officers for the ensuing year"—took place on Tuesday, the 3rd inst., Sir John Coode, K.C.M.G., the President, being in the chair.

This meeting was held on the sixty-second anniversary of the incorporation of the Institution by Royal Charter. At that time the number of members was 156, and the gross annual receipts were 447. At the close of the past financial year the number of members was 5,872, and the gross receipts for the twelve months amounted to 22,478. This increase—thirty-seven-fold in numbers and fifty-fold in revenue—sufficiently indicated the position which the Institution had taken in connexion with the profession it was designed to promote. It should always be borne in mind that a large rate of increase was by no means desirable. There was no object, however, in limiting the numbers, as was the custom in some exclusive bodies, for the Institution had always opened—and it was hoped always would open—its doors to all engineers who had an honest title to be entered on its register; but it refrained from augmenting its numbers by the admission of persons who were merely attracted to it for their own advantage. Above all things, the Council desired it to be understood that membership in the Institution should be a real guarantee of the professional standing and (as far as possible) also of the personal character, of those on whom it was conferred. For these reasons the Council repeated the recommendation, often previously made, that every member should take care not to attach his signature to any proposition, unless fully satisfied as to the truth of the representations it contained, and as to the general eligibility of the candidate.

During the past year, there were elected 3 Honorary Members (Sir Henry Bessemer, F.R.S., Sir William Thomson, LL.D., F.R.S., and General Edward Frome, R.E.), 32 Members, 263 Associate-Members, and 3 Associates, while the name of 1 Member was restored to the list. On the other hand, 138 names had been removed from the register, 87 of which were losses by death. Among the latter, the Council recorded with regret the names of three Honorary Members, the King of Portugal, Dr. John Percy, F.R.S., and General Edward Frome, R.E., who died shortly after his election. The roll of the Institution therefore showed a net increase of 104, the number of members of all classes (irrespective of students) being now 4,903. This represented an increase at the rate of about 3½ per cent. per annum. Owing to more stringent regulations as to the admission of Students, there had been a decrease of 20 in the number of that class. The admissions had included 156 Students, and 1 was restored to the list, whilst 73 had been elected Associate-Members and 104 had passed out of the list.

At the ordinary meetings, papers on important constructive engineering works had been read, and also on many branches of mechanical and electrical engineering. It was hoped that some branch of metallurgy might have been brought forward, but in that hope the Council had been disappointed. It was, however, confidently believed that the omission would be made good next session. For two of the papers the Institution was indebted to Mr. Lyster, Member of Council, and to Sir Frederick Bramwell, Bart., D.C.L., F.R.S., Past-President. In conformity with long-established usage, these communications were not taken into consideration in the adjudication of the premiums. Telford Medals and Telford Premiums had been awarded to Messrs. John Robinson, C.O. Burge, and F. T. G. Walton; Telford Premiums to Messrs. S. W. Barnaby, W. H. Wheeler, James Price, jun., C. Hopkinson, H. G. Sheppard, and W. Army; and the Manby Premium to Messrs. W. P. James Fawcus and E. W. Cowan. For papers read at the supplemental meetings of students, a Miller Scholarship had been awarded to Mr. C. Frewen Jenkin, and Miller Prizes to Messrs. C. H. Wordingham, A. E. Young, L. A. Legros, F. P. Reynolds, J. Hale, and G. H. Sheffield.

Since the last annual meeting four volumes of "Minutes of Proceedings" had been issued.

The Council trusted that the members would continue to contribute to this part of the work of the Institution, as being that which was of the greatest permanent importance. It was intended shortly to issue a pamphlet of about sixty pages, enumerating those public educational establishments in the British dominions which included special preparation for the engineering profession. The abstract of receipts and expenditure showed, on the credit side, income, 17,677l. 13s. 10d.; capital (that was admission-fees and life-compositions), 3,794l. 14s.; trust-fund receipts, 1,057l. 6s. 9d. (including the Crompton Bequest of 500 and the Trevithick Memorial Donation, 100l. 0s. 9d.), making a total of 22,477l. 14s. 7d. On the other side of the account, the general expenditure had been 14,696l. 6s. 3d., the investments on account of capital, 6,900l. 19s., and payments or investments of trust funds, 1,049l. 2s. 4d. At present the Institution invests in Consols, Metropolitan Board of Works Stock, and Railway Debenture Stocks aggregated 43,560l.; the freeholds of the three contiguous houses in Great George-street, 40,000l.; the Whitworth legacy, 5,400l.; and Trust Funds, 15,286l. 0s. 10d., making a total of 104,186l. 0s. 10d.

In conclusion, the report referred to the visit, last summer, to Europe, of a representative body of members of the American Societies of Civil, Mining, Mechanical and Electrical Engineers, which their Institution had the honour of entertaining for six days. Many and various were the means which the reception committee took to arrange for the amusement and recreation of the visitors. On the whole the visit might be considered to have been a great success, and was one full of pleasant memories for the hosts.

The adoption of the report was moved, seconded, and carried, and it was ordered to be printed in the "Minutes of Proceedings." Cordial votes of thanks were then passed to the President, to the Vice-Presidents and other Members of the Council, to the Auditors, to the Secretaries and Staff, and to the Scrutiners.

The ballot for Council resulted in the election of Sir John Coode, K.C.M.G., as President; of Mr. G. Berkeley, Mr. H. Hayter, Mr. A. Giles, M.P., and Sir Robert Rawlinson, K.C.B., as Vice-Presidents; and of Mr. W. Anderson, D.C.L., Sir Benjamin Baker, K.C.M.G., Mr. J. Wolfe Barry, Mr. E. A. Cowper, Sir Jas. N. Douglass, Sir Douglas Fox, Mr. J. Clarke Hawkeshaw, M.A., Mr. C. Hawksley, Sir Bradford Leslie, K.C.I.E., Mr. G. Fosbery Lyster, Mr. J. Mansergh, Mr. W. H. Peerce, F.R.S., Sir E. J. Reed, K.C.B., F.R.S., M.P., and Mr. W. Shelford, and Mr. F. W. Webb as other members of the Council.

The Session was then adjourned until the second Tuesday in November, at 8 p.m.

The following is a detailed list of the awards made for communications submitted during the past session:—

For Papers Read and Discussed at the Ordinary Meetings.

1. A Telford Medal and a Telford Premium to John Robinson, M.Inst.C.E., for his Paper on "The Barry Dock Works, including the Hydraulic Machinery and the Mode of Tipping Coal."
2. A Telford Medal and a Telford Premium to Charles Ormsby Burge, M.Inst.C.E., for his account of "The Hawkesbury Bridge, New South Wales."
3. A Telford Medal and a Telford Premium to Frederick Thomas Granville Walton, C.I.E., M.Inst.C.E., for his description of "The Construction of the Dufferin Bridge over the Ganges, at Benares."
4. A Telford Premium to Sydney Walker Barnaby, M.Inst.C.E., for his Paper on "The Screw-Propeller."
5. A Telford Premium to William Henry Wheeler, M.Inst.C.E., for his Paper on "Bars at the Mouths of Tidal Estuaries."
6. A Telford Premium to James Price, jun., B.E., M.Inst.C.E., for his account of "Lough Erne Drainage Works."
7. The Manby Premium to William Paul James Fawcus, and to Edward Woodrowe Cowan, Assoc.M.M.Inst.C.E., for their joint Paper descriptive of "The Keswick Water-Power Electric-Light Station."

For Papers Printed in the Proceedings without being Discussed.

1. A Telford Premium to Charles Hopkinson, B.Sc., M.Inst.C.E., for his Paper on "Hydraulic Packing-presses."
2. A Telford Premium to Herbert Gurney Sheppard, Assoc.M.Inst.C.E., for his Paper on "The Reclamation of Lake Aboukir, near Alexandria, Egypt."
3. A Telford Premium to Wilfrid Atry, B.A., M.Inst.C.E., for his Papers, "On the Action of Quick-sands," and on "The Probable Errors of Surveying by Vertical Angles."

* Has previously received a Watt Medal and a Telford Premium.

† Has previously received Telford Premiums.

‡ Has already received Telford and Manby Premiums.

For Papers Read at the Supplemental Meetings of Students.

1. The Miller Scholarship to Charles Frewen Jenkin, B.A., Stud.Inst.C.E., for his Paper on "Some Applications of Electricity in Engineering Workshops."
2. A Miller Prize to Charles Henry Wordingham, A.K.C., Stud.Inst.C.E., for his Paper on "Telephonic Switching."
3. A Miller Prize to Alfred Ernest Young, Stud.Inst.C.E., for his account of "The Deflection of Spiral Springs."
4. A Miller Prize to Lucien Alphonse Legros, Stud.Inst.C.E., for his Paper on "Economy Trials of a Compound Mill-engine and Lancashire Boilers."
5. A Miller Prize to Frank Paul Reynolds, A.K.C., Stud.Inst.C.E., for his description of the "Roof over the Carbide Markets."
6. A Miller Prize to John Hale, Stud.Inst.C.E., for his description of the "Hydraulic Station and Machinery of the North London Railway at Poplar."
7. A Miller Prize to George Harrison Sheffield, Stud.Inst.C.E., for his Paper on the "Principles of Iron Foundry Practice."

It has been determined to print the first three Students' Papers, either in whole or in part, in the Minutes of Proceedings.

LONDON AND MIDDLESEX ARCILEOLOGICAL SOCIETY.

A MEETING of this Society was held on the 3rd inst. at Brewers' Hall,* previously to which the members and friends assembled in the Bank of England to view the site of the church and churchyard of St. Christopher-le-Stocks in the courtyard of the Bank, which is now a very pretty garden, with a large fountain in the centre. Dr. Freshfield, the President of the Society, met the members, and pointed out the site of the church which was taken down when the Bank was enlarged in 1781. Part of this church escaped the Great Fire, and that part which was rebuilt was of the Tuscan order. Dr. Freshfield then described the course of the Wall Brook, which flowed past this church towards St. Margaret's Church, Lothbury, which latter church the members afterwards entered. Here again the course of the old Wall Brook was pointed out as running under the chancel window and past the altar. Having inspected the font and carved woodwork in the church, said to be by Gibbons, the President led the party up Tokenhouse-yard, still pointing out the course of the Wall Brook in a northerly direction as far as London-wall. The members then proceeded to Brewers' Hall, in Adde-street, Aldermanbury. Dr. Freshfield here presided, and introduced Mr. Charles Welch, F.S.A., one of the hon. secretaries of the society, who read a paper on "The Early History of the Brewers' Company as told by their own Records." The Brewers' Company is the fourteenth on the list of the City companies. It was incorporated in the sixteenth year of Henry VI., which was afterwards confirmed in the nineteenth of Edward IV. The charters and the old minute-books and books of accounts of these periods were exhibited to the meeting, and afterwards inspected.

Mr. E. W. Brabrook, F.S.A., who had written a paper on "Some Eminent Members of the Company," was unfortunately unable to be present, so, at the request of the President, the paper was read by Mr. John E. Price, F.S.A., and after inspecting the hall and other rooms the members dispersed.

SURVEYORSHIPS.

Cheltenham.—The *Western Morning News* reports that on the 6th inst., Mr. Joseph Hall, Surveyor to the Torquay Local Board, was appointed Borough Surveyor to the Cheltenham Town Council, at a salary of £550 a year. Mr. Hall, who was elected by a majority of seventeen to six over the local candidate, was unanimously recommended to the Council for the appointment, as the result of a visit to Torquay a few days since of the Mayor of Cheltenham and four other members of the Corporation, and their inspection of the roads and pleasure-grounds. Mr. Hall, who was formerly chief assistant to the Borough Surveyor of Leeds, has been Surveyor to the Torquay Local Board nearly nine years, succeeding Mr. John Little, one of the present County Surveyors.

Bournemouth.—At a meeting of the Bournemouth Improvement Commissioners, held on the 3rd inst., it was unanimously resolved to increase the salary of Mr. F. W. Lacey, the Surveyor, to 5000l. a year, to commence from the half-quarter. Mr. Lacey has held this appointment since March of last year.

* For a descriptive account of the Brewers' Hall, vide *Builder* of July 6, 1889, p. 10.

NEW BATHS FOR ST. GEORGES', HANOVER-SQUARE.

The new public baths, &c., which have been erected by the Commissioners of Public Baths and Washhouses for the parish of St. George, Hanover-square, situate in Buckingham Palace-road, were recently opened by the Duke of Westminster.

In an address presented to the Duke on the occasion, it was stated that the new baths and washhouses have been erected for the benefit of the residents of the southern part of the parish. The buildings were commenced in August, 1888, the necessary outlay having been approved by the Vestry of the parish. In open competition, the design selected was that of Mr. Francis James Smith, architect, of Winchester House, Old Broad-street. Tenders for the construction of the buildings were invited by public advertisement, and the lowest tender was that of Messrs. J. Mowlem & Co., for a sum of 28,209l., which was accepted. But we understand that the total outlay will considerably exceed this sum. The building has been erected in a thoroughly substantial manner, and advantage has been taken of every modern improvement and appliance suitable to this class of work.

The accommodation provided is as follows, viz.:—First-class swimming bath, 90 ft. by 30 ft.; second ditto, 57 ft. by 33 ft. First-class private baths (men), twenty-three in number; first-class ditto (women), ten in number; second-class ditto (men), twenty-nine in number; second-class ditto (women), fourteen in number. Laundry accommodation for forty-four washers. Private laundry for use of the establishment. In connexion with these several departments provision has been made for the requisite offices necessary for their successful working. The fittings and machinery, which include mangels, hydro-extractors, drying-horses, steam and hot-water washing machines, washing troughs, with a "Vowel" washing machine, are worked by steam-power. A lift, by which access is gained to the laundry, is worked by hydraulic power.

An ample supply of surplus water is secured by the provision of a large tank erected over a portion of the back building, which has a storage capacity of 60,000 gallons. The basement are placed four 30-horse-power boilers for generating steam for the machinery, and providing hot water for the baths and laundry. There are two engines, one of which drives the laundry machinery, and the other works the "Siemens" dynamo which generates the electric current for lighting the buildings throughout. These engines are both of special type. The electric lighting system adopted is that of the storage battery, with sufficient power for a supply of twelve hours' duration.

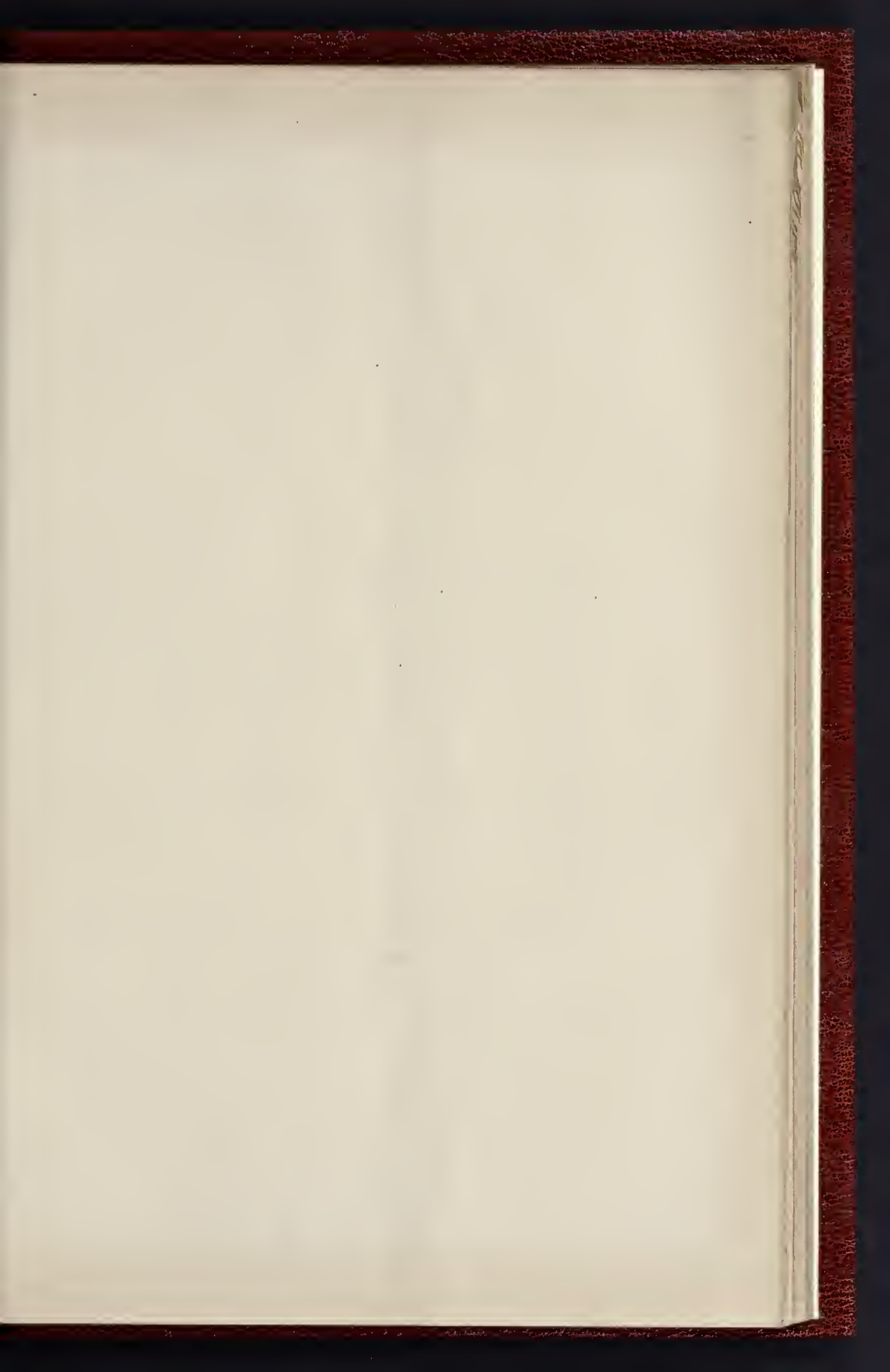
Special attention has been paid to ensure the rapid filling and emptying of the swimming baths, with the result that the large bath can be filled in eighty minutes and emptied in twenty-five minutes, and the smaller one can be filled in forty-five minutes and emptied in fifteen minutes. They are heated by means of steam injectors, which is asserted to be the best and most economical method of heating large quantities of water.

The foregoing is a brief description of these buildings. The engineering portion of the work has been ably executed under the contractors by Messrs. H. Young & Co., of Pinlco. The electric light installation, the lift, and general furnishing of the buildings were not included in the original contract. The front of the elevation towards the Buckingham Palace-road is of red brick and Corshill stone. The entrance to the laundry and second-class baths is on the north side.

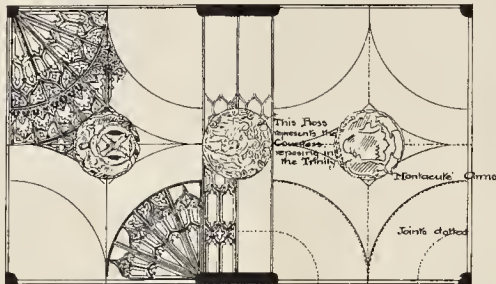
NEW PREMISES, HOLLOWAY:

THE "ARKTOS" REFRIGERATOR.

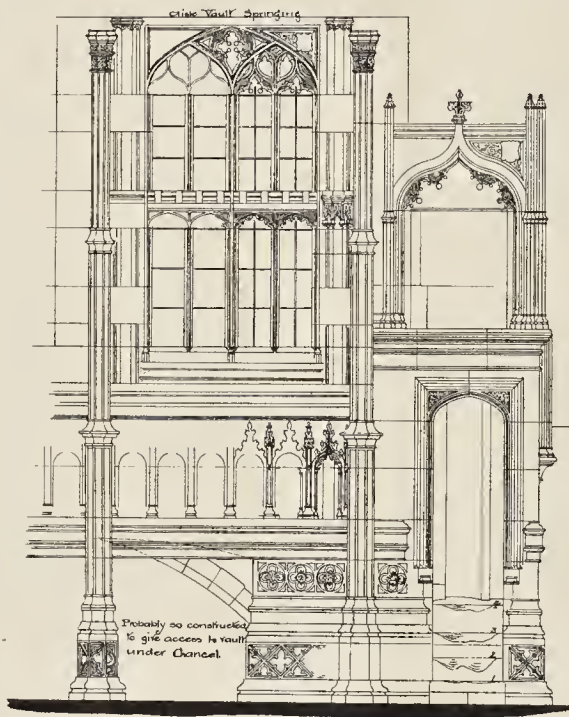
The large block of buildings for Mr. W. Beale, which was in course of erection for about twelve months, has lately been opened for business. The block combines restaurant, baker's and confectioner's shop, jeweller's shop, provision, poultry, and fish store, machine bakery, and electric-lighting station. Situate at the junction of Holloway-road with Tellington-road, and being directly opposite Camden and Caledonian roads, the site is a prominent one. The building is six stories high, including the central raised portion, which forms a caretaker's residence, and



"Salisbury" Chantry, Christchurch, Hants. 1541.

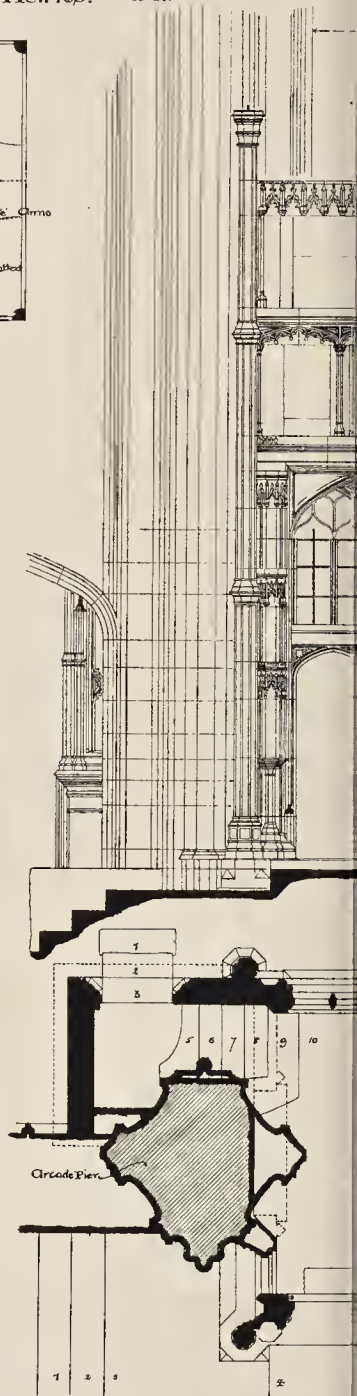
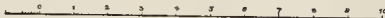


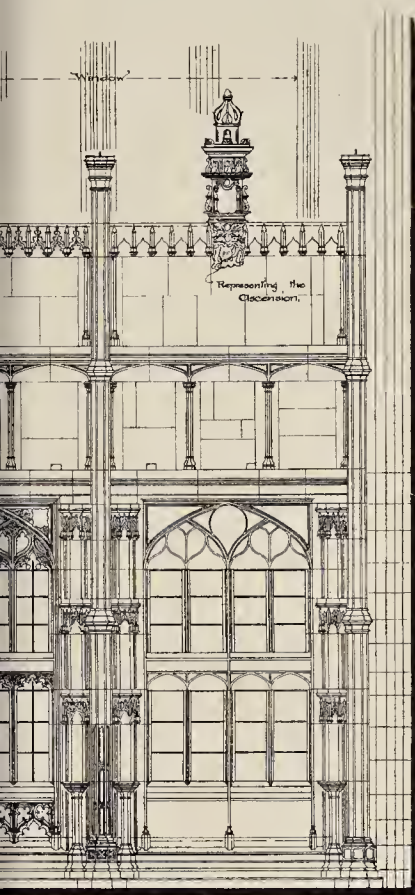
Ceiling Plan.



Part Elevation to Aisle.

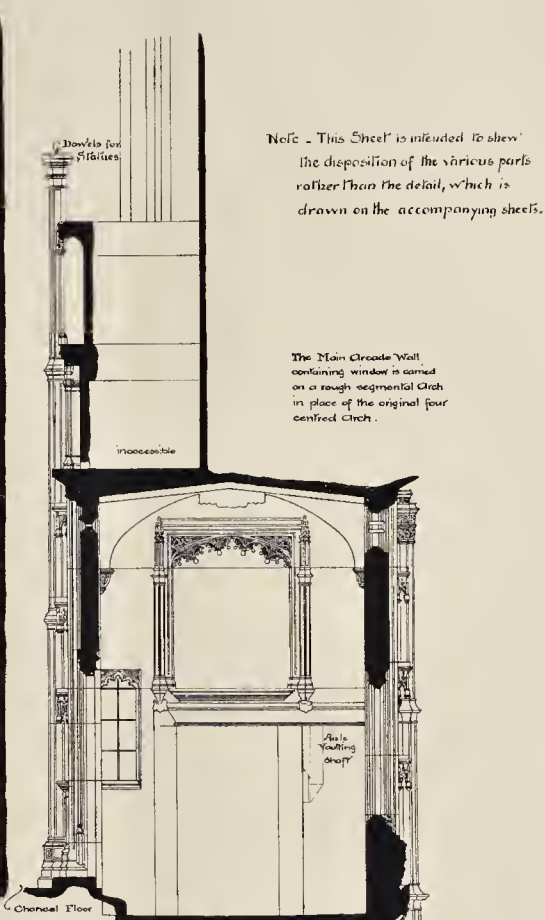
Scale of Feet.





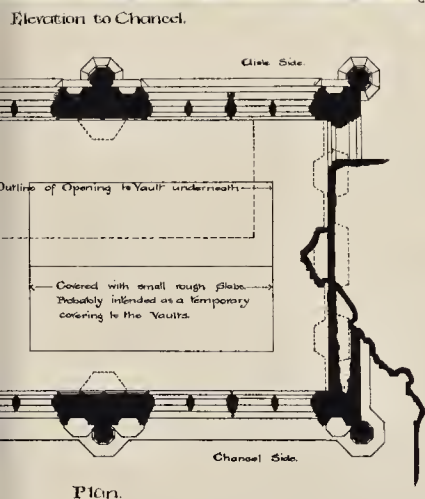
Note - This Sheet is intended to shew the disposition of the various parts rather than the detail, which is drawn on the accompanying sheets.

The Main Arcade Wall containing window is carried on a rough segmental Arch in place of the original four centred Arch.



Simple Vaults originally intended for the Cloisters of Salisbury, and has son Cardinal's Seal.

Entrance to vault under Channel now bricked up.



Section looking West.

Built in Coen Stone throughout.

Ascribed to Torregiano.

Measured & Drawn
March & April 1890.
Percy D. Smith

is surmounted by a small turret and dormer windows.

The elevation is of red brick, with stone dressings and Gothic tracery panels, moulded string-courses, mosaic floral panels, and Gothic window-heads surmounted by crocketed finials in relief. The upper portion has a large frieze in mosaic work, originally intended, we believe, for figures, but that idea has been abandoned, and the panel is mainly occupied with the letters forming the name of the proprietor. Provision was made by the architect in the elevation just above the first-floor window-head at the angle of the building for a stone statue on a pedestal at the corner of the building, standing underneath a stone canopy. This has been abandoned in favour of a time-ball, worked by electric current direct from Greenwich, and rising and dropping at a given hour of the day.

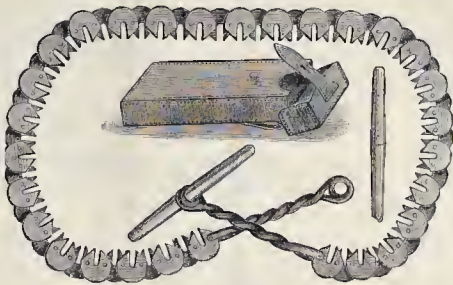
There are some good examples of joinery work in the shop, restaurant, and café. The front is of polished teak framing, glazed with bevelled plate and geometrical leaded lights, the counters and cases having twisted standards and satinwood panels. The café screen is in keeping, and is glazed with ornamental glass in device, with octagonal semi-columns with fret-work frieze panels, and carved terminals. This has been executed by Messrs. F. Sage & Co.

There are five public entrances to the premises, one leading to the front shop, at the side of which there is a hold entrance, with stone staircase leading to billiard-room, dining-room, and banquetting-hall. There is a distinct entrance to the electrical station, others to the baker's and provision shops, and a stone staircase leading to the counting-house.

The entire premises cover an area of 8,510 square feet, including a jeweller's shop at the corner, occupied by Messrs. Jones & Son.

The ground-floor and basement contain the electrical engineering station for supplying current not only to these premises but to the neighbouring shops, and for lighting the adjacent portions of the public thoroughfares. The entire electrical plant will comprise four tubular boilers of 52 horse-power each, two high-speed steam engines of 30 horse-power each, and two similar engines of 40 horse-power each, making a total of 240-horse engine power. The smaller engines have been running for some time, each operating two 350-light dynamos, running at 450 revolutions per minute, and one large one operating a 700-light dynamo running at 425 revolutions. The rest of the plant is in course of erection, and is needed for the requirements of the new shops being built between Tooting-road and the "Nag's Head." A concession has been granted by the Vestry to lay mains to this section, and five customers are already being supplied with electric light and power. Above the engine-room is a machine bakery, equipped with two of Perkins' patent steam ovens, and all kinds of modern machinery for the trade. This, together with the lifts, hoists, and cranes, are all driven by electricity, Messrs. Sharp & Kent being the contractors.

In the basement is to be seen in use one of Messrs. Perkins & Sons' patent refrigerating rooms, called "The Arkots" for storing or freezing all kinds of perishable edibles. This being a new development of applied science, a few notes on its construction will not be out of place. In size it is about 10 ft. cube. The walls, 2 ft. thick, are composed of a double metal lining, filled with insulating material. The refrigerating process is effected from the outside by means of two horizontal pipes, connected with each other, charged with liquid ammonia, which are also attached to and form part of the liquefier and refrigerator inside the cold room. The application of heat (by a small gas jet, or a fire as here employed) to the horizontal tubes containing the liquid ammonia separates the ammonia from the liquid, and causes it to pass through the condenser into the refrigerator in its original gaseous form. The density of the gas in the tubes absorbs the heat of the chamber, reducing it to any required degree, even as low as 30 below zero. On the occasion of our visit it registered 18 degrees below zero. When reaching a certain temperature the heat is removed, and the gas returns to the combiner and is again united with the liquid. This is generally done when the thermometer reaches 270 deg. Fahr. In most cases it is only necessary to apply heat every alternate day, but in this instance the fire is usually lighted for a few hours in the morning and again in the afternoon. The process is automatic, and the system of pipes is hermeti-



Stanley's Portable Saw.

cally sealed. On entering the cold room we find a dry, cold, healthy atmosphere, the pipes being covered with hoar, absolutely undistinguishable from a natural hoar-frost. Mr. Beale regards the refrigerator as a valuable adjunct to his business in giving him complete control over his perishable comestibles. As this is one of the first installations in use it is satisfactory to learn that the system is completely successful. The water required for the condenser is procured from a well on the premises. A lift-pump for this purpose is driven by an electric motor.

The first and upper floors of the building contain dining, billiard, and smoke-rooms, a pastry bakehouse, kitchen, larders, &c. A banquetting-hall, about 40 ft. by 30 ft., and 24 ft. high, is approached from the first-floor landing. The walls are lined with an oak-framed dado, with pitch-pine panels, with doors and pediments to match. A gallery of oak and pitch-pine extends the width of the hall, and is entered from the second-floor corridor.

The premises are warmed throughout with Messrs. Perkins' patent steam-pipes, supplied by the patentees and manufacturers of the "Arkots." The electric lighting of this room is a special feature, including large incandescent ceiling-lamps and wall-brackets equalling 2,000 candle-power, besides several movable electric table-lamps. Messrs. Sharp & Kent, of 34, Victoria-street, Westminster, have carried out the complete installation, and supplied the entire electrical plant, boilers, engines, and fittings. The building and the floors are fireproof. This and other ironwork has, we understand, been supplied by Messrs. Homan & Rodgers. Messrs. Rust & Co. are responsible for the vitreous mosaic work, and Messrs. Cliff & Sons for the facade pilasters.

Mr. Frederick Wallen is the architect, and Messrs. Oldrey & Co., of Westbourne Park, the builders.

The entire cost exceeds 30,000l.

STANLEY'S PORTABLE SAW.

This saw, of which an illustration is subjoined, is made of hardened steel plates rivetted together in double series; the rivets are sufficiently loose to form joints; each plate is shaped on one side to form a pair of saw-teeth cutting in opposite directions. A cross handle at each end of the saw fits into a ring for use; these handles are withdrawn from their rings for packing; for inaccessible trees, &c., ropes may be attached to the rings in place of the cross handles. It can be used by one man; weights complete only 2½ lb., including case, which measures over all 1½ in. by 4 in., by 8 in. It is manufactured by Mr. H. T. Tallack.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday last at the offices in Spring-gardens, Sir J. Lubbock, Vice-Chairman, presiding, in the absence of the Chairman, Lord Rosebery.

Management of Parks and Open Spaces.—The consideration of the following paragraph of the annual report of the Parks and Open Spaces Committee was proceeded with:—

"We have to submit for the consideration of the Council an important proposal with respect to the future management of the parks and open spaces, and the organisation of the staff employed in connexion therewith. We have previously been in communication with the Standing Committee on this subject, and it will

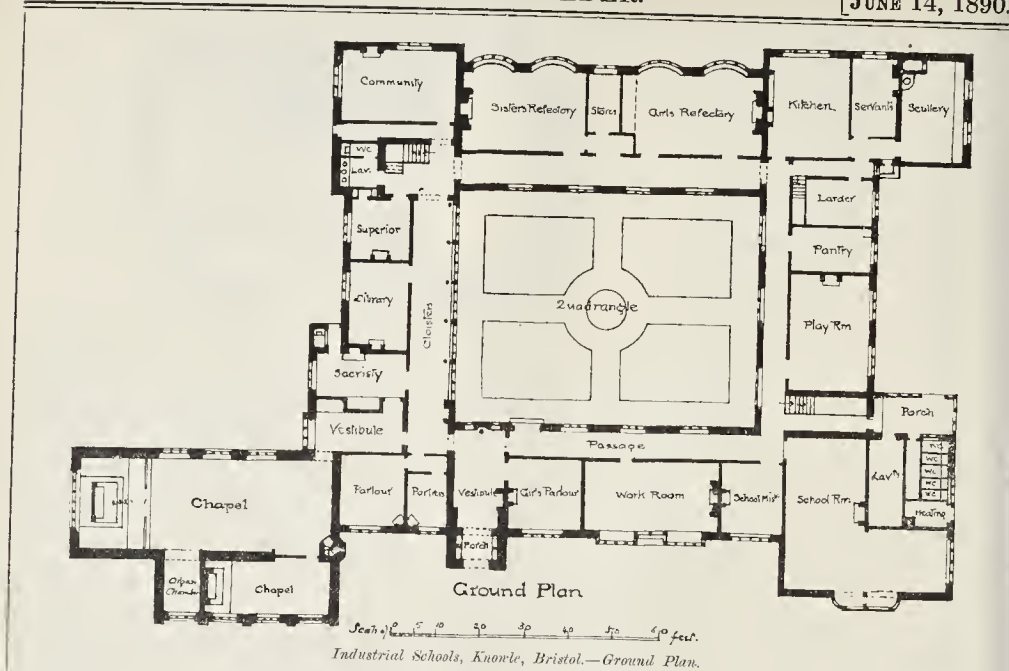
be within the recollection of the Council that on February 11 last the Standing Committee brought up a report suggesting, as the result of the conferences that had taken place between us, that the business connected with the parks and open spaces should no longer form a branch of the Architect's department, but that a separate sub-department of the Council should be formed to deal with it. Subsequently, on March 26, the Standing Committee, after considering our proposals, informed us that we had better bring up direct to the Council any suggestions that we had to make with respect to the constitution of the new sub-department.

We may preface what we have to say by the statement that we have been impressed with the necessity of a reorganisation of the staff employed upon parks and open spaces work, with a view especially to uniformity of system and unity of direction and control. During the last twenty years the area of the parks and open spaces of London under municipal control has increased from 178 acres to more than 3,000 acres, and the number of persons employed is nearly 400. The annual expenditure is now nearly 50,000l. for maintenance only, whilst the combined expenditure on capital and working accounts amounts to no less than 100,000l., a sum which does not promise to diminish.

These figures are sufficient to indicate the necessity of a thoroughly good organisation, and, as we believe, of efficient control under a single responsible head. We are, therefore, of opinion that there should be a separate Parks and Open Spaces Sub-Department, and for the sake of clearness we may explain that in using the word Sub-Department we do not mean that the sub-department should be either an adjunct or subordinate to any other department. What we wish to convey is that the new organisation and its head should not claim to be equal in point of official position and salary with the other departments of the Council's service.

The question of the kind of man to be placed at the head of the new sub-department is one of great importance, to which we have accordingly given much attention, and the conclusion we have come to is that he should be a professional landscape gardener of a high class, having a thorough technical knowledge of everything connected with the formation and maintenance of parks and gardens, together with such general business capacity and experience in the management of men as would enable him to direct the large staff of men that would be placed under his control. We are of opinion that the Council could obtain a person possessed of these qualifications for a salary of 600l. a year, but hardly for less, and that is the salary which we should accordingly recommend the Council to pay.

We deem it essential that the new head should have complete control of all the persons, of whatever class, employed exclusively in connexion with the parks and open spaces, subject of course to the limitation that the Clerk of the Council should continue to be responsible for recording the proceedings of the Parks Committee as of all other committees, and for the control of the official correspondence; and it would be the duty of the head of the parks sub-department to give the Clerk all the information and assistance he may require for this purpose. Hitherto, whilst the Architect has had the superintendence of all the men employed in the parks, whether keepers or labourers, and also of the labourers on the open spaces, the common-keepers have been under the control of the Clerk of the Council. He has directed



them through his assistant, Mr. C. W. Nairn, who has acted for many years as clerk to the Parks Committee, and has also been superintendent of common-keepers. This division of responsibility we propose to do away with, so that the whole staff may be under one control. To give effect to the views above expressed, we submit the following recommendations:—

(1) That a separate Parks and Open Spaces Sub-department be formed, consisting of all persons employed exclusively in connexion with the parks and open spaces, subject to the reservation of such work as properly devolves on the Clerk of the Council.

(2) That the head of the new sub-department be a professional landscape gardener of a high-class, thoroughly versed in the management of parks, gardens, and open spaces, and possessed of business capacity, and experience in the control and direction of men.

(3) That the head of the new sub-department be designated "Superintendent of Parks and Open Spaces," and that his salary be £600 a year.

(4) That such superintendent do supervise and be responsible for the whole of the sub-department, and do control all the officers and servants employed therein.

(5) That in consideration of Mr. Nairn, of the Clerk's department, being deprived of his position as superintendent of common-keepers, and of the allowance of £52 a year which he has received (in addition to his salary of £60) by way of payment for extra work and travelling expenses in connexion with that position, his salary as an assistant in the Clerk's department be in future £50 a year.

The presentation of this report gave rise to a long discussion, and an amendment was moved to postpone the consideration of the matter for a year. This was lost, as was a subsequent amendment to postpone the matter for six months. The report was then substantially agreed to, the questions of the salaries proposed being referred to the Standing Committee for consideration.

The Property of the Livery Companies.—The Corporate Property Committee reported that they had last month drawn attention to the subject of the Livery Companies of London, and, in view of steps which they had reason to apprehend were in contemplation by some of the Companies as to the alienation or division of their property or part of it, they made a recommendation that the Council should address a further communication to the Government, drawing attention to the desirability of some action being taken in the direction indicated by the report of the Royal Commissioners on this subject in 1884, one of the recommendations of the Commissioners being that the Companies should be placed under restrictions to prevent the alienation of their ancient corporate property, and the other recommendations having reference to its better application for the

future. The matter was referred back to them by the Council, since which their attention had been drawn to a Bill now before Parliament, and awaiting second reading in the Commons, entitled the Corporate Associations (Property) Bill, by which it was proposed to restrain certain corporate associations established for other than trade purposes (and including apparently the City livery companies), or rather the individual members thereof, from terminating the existence of such associations by arrangement and dividing the property among themselves. The objects of this Bill were less extensive than those recommended by the Royal Commissioners, but as an intermediate or preliminary step towards effecting the recommendations of the Commissioners, the Bill appeared to the Committee such as the Council should support. They therefore recommended "That the Council do petition Parliament in favour of the Corporate Associations (Property) Bill, and that it be referred to the Parliamentary Committee to prepare such petition."

The consideration of the report was deferred.

Proposed Iron Chimney-shaft.—The Building Act Committee, in their report, recommended "That the application of Messrs. Maudslays, Sons, & Field, Limited, for approval of the construction of a wrought-iron chimney-shaft at the Engine Works, Blackwall-lane, Greenwich, be not granted, as the Committee are of opinion that the construction of iron furnace chimney-shafts is objectionable." Some opposition arose to this proposal, but it was explained by Councillor Hutton, the Chairman of the Committee, and by Councillors Roberts and Marsland, that in view of the public safety the Committee had no option but to refuse permission for the erection of iron factory chimneys, which were likely to become dangerous after twenty years or less. Eventually the Committee's recommendation was agreed to by a large majority, and

After transacting other business the Council adjourned.

Alton Parish Church.—A new clock, by J. W. Benson, has just been made and fixed for the parish church at Alton, Hants. It is made with all the latest improvements, and shows the time upon a copper dial 8 ft. in diameter. The clock chimes the St. Mary's, Cambridge, quarters, upon the second, third, fourth, and seventh bells of a peal of eight, and the hours upon the tenor, which weighs 20 cwt.

Illustrations.

INDUSTRIAL SCHOOLS, KNOWLE, BRISTOL.

THE illustration shows the main front of the new buildings for the House of Charity, St. Raphael's, Bristol. The scheme provides accommodation for children, the inmates of the Home, and a community of eighteen sisters. A large chapel is to be built at the south-east corner of the quadrangle, and a detached laundry forms part of the design. The whole is to be built of local stone quarried on the site, with Doubling stone dressings, and overhanging upper stories of half timber-work or rough-cast. The roofs will be tiled. The building is to be commenced immediately, and the estimated cost, exclusive of the chapels, is £10,000. The architect is Mr. John D. Sedding. The drawing is hung in the Architectural Room at the Royal Academy Exhibition.

BRITISH AND FOREIGN MARINE INSURANCE COMPANY'S OFFICES, LIVERPOOL.

The building illustrated has been erected in Castle-street, Liverpool, for the British and Foreign Marine Insurance Co.

The lower portion is faced with polished red granite, and the upper portion with Dumfries red stone, and Ruabon terra-cotta.

A special feature in the building is the frieze under the first-floor windows, the subjects in which have been executed in glass mosaic by Messrs. Salviati, from cartoons by Mr. Frank Murray. They represent ancient and modern shipping, in bright colour on a gold ground.

The whole of the work has been carried out by Messrs. Jones & Sons from the designs of Messrs. Grayson & Ould, architects, of Liverpool.

The drawing from which the illustration is taken is hung in the Architectural Room at the Royal Academy.

SALISBURY CHANTRY, CHRISTCHURCH, HANTS.

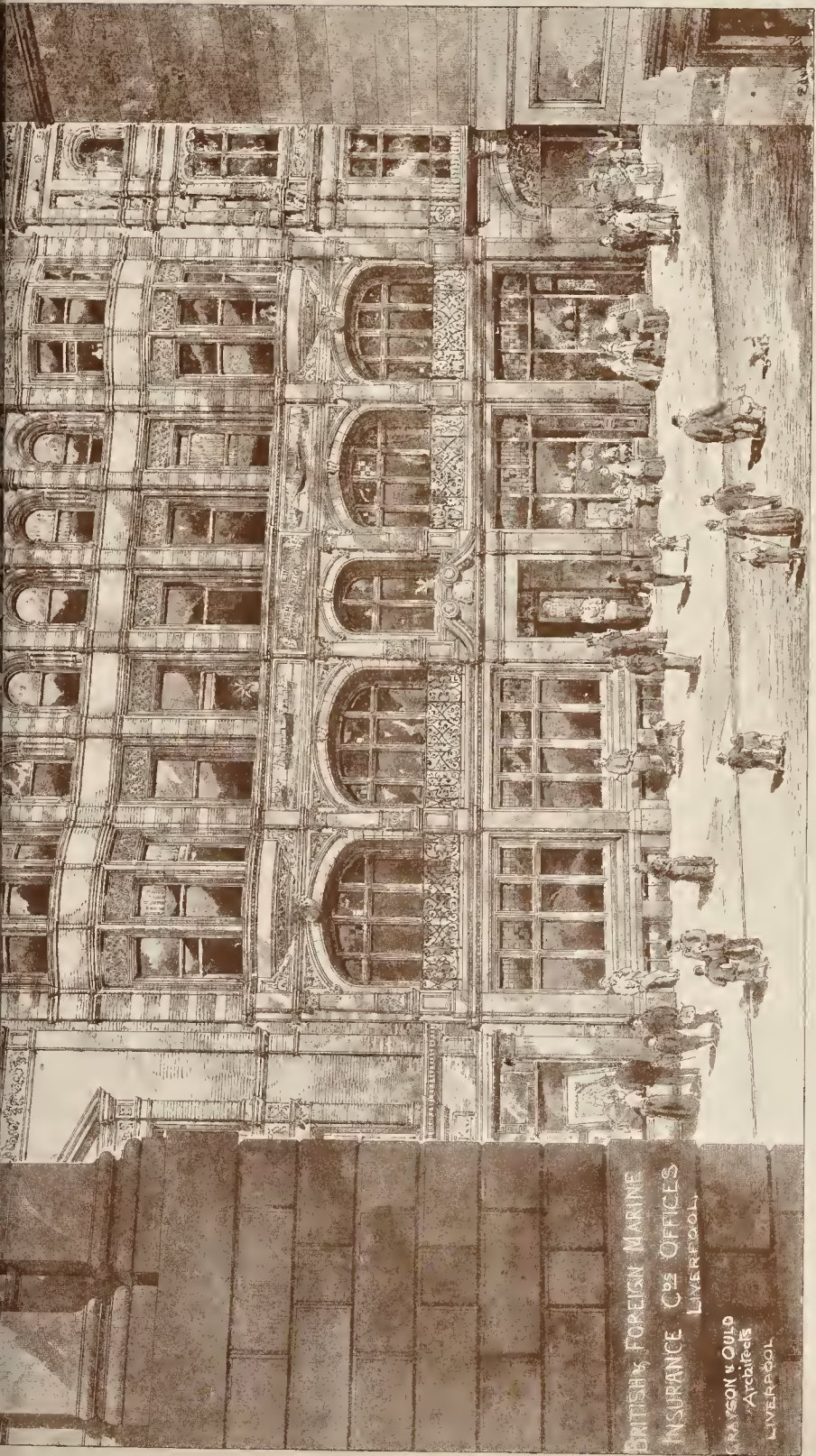
THIS interesting little chantry, built by the Countess of Salisbury, and intended for her own burial-place, shows a curious mixture of Gothic and Renaissance. The work is ascribed to Torregiano, and has never been restored, but was cleaned down in 1813.

We are indebted to the successive white-washings of preceding centuries for the mark-



THE BUILDER, JUNE 14, 1890.



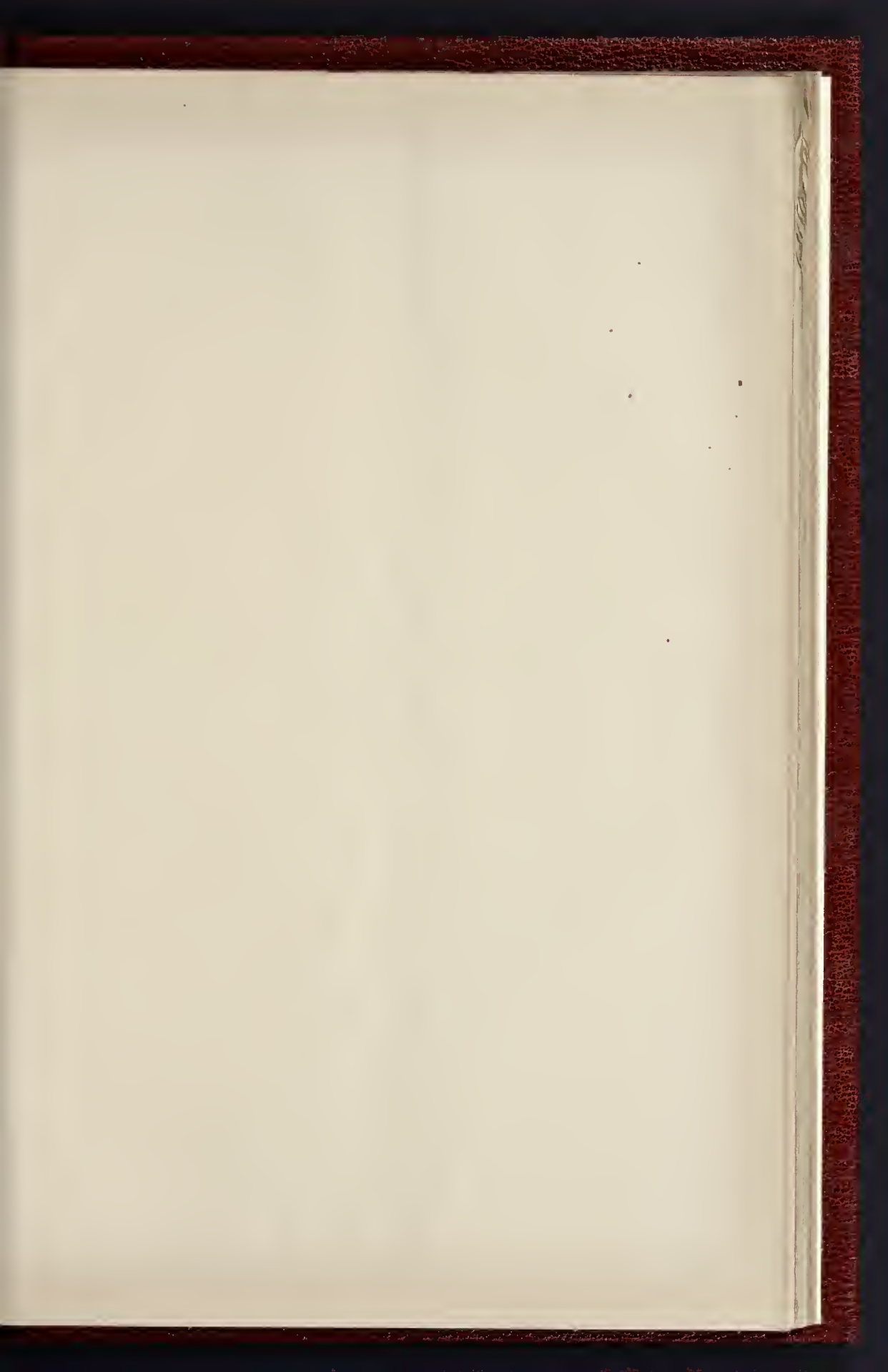


THE GREAT EASTERN BUILDING, LIVERPOOL, 1850.

BRITISH & FOREIGN MARINE
INSURANCE CO'S OFFICES
LIVERPOOL.
FRAYSON & OULD
ARCHITECTS
LIVERPOOL.

1850 Royal Academy Exhibition, 1860.

1850





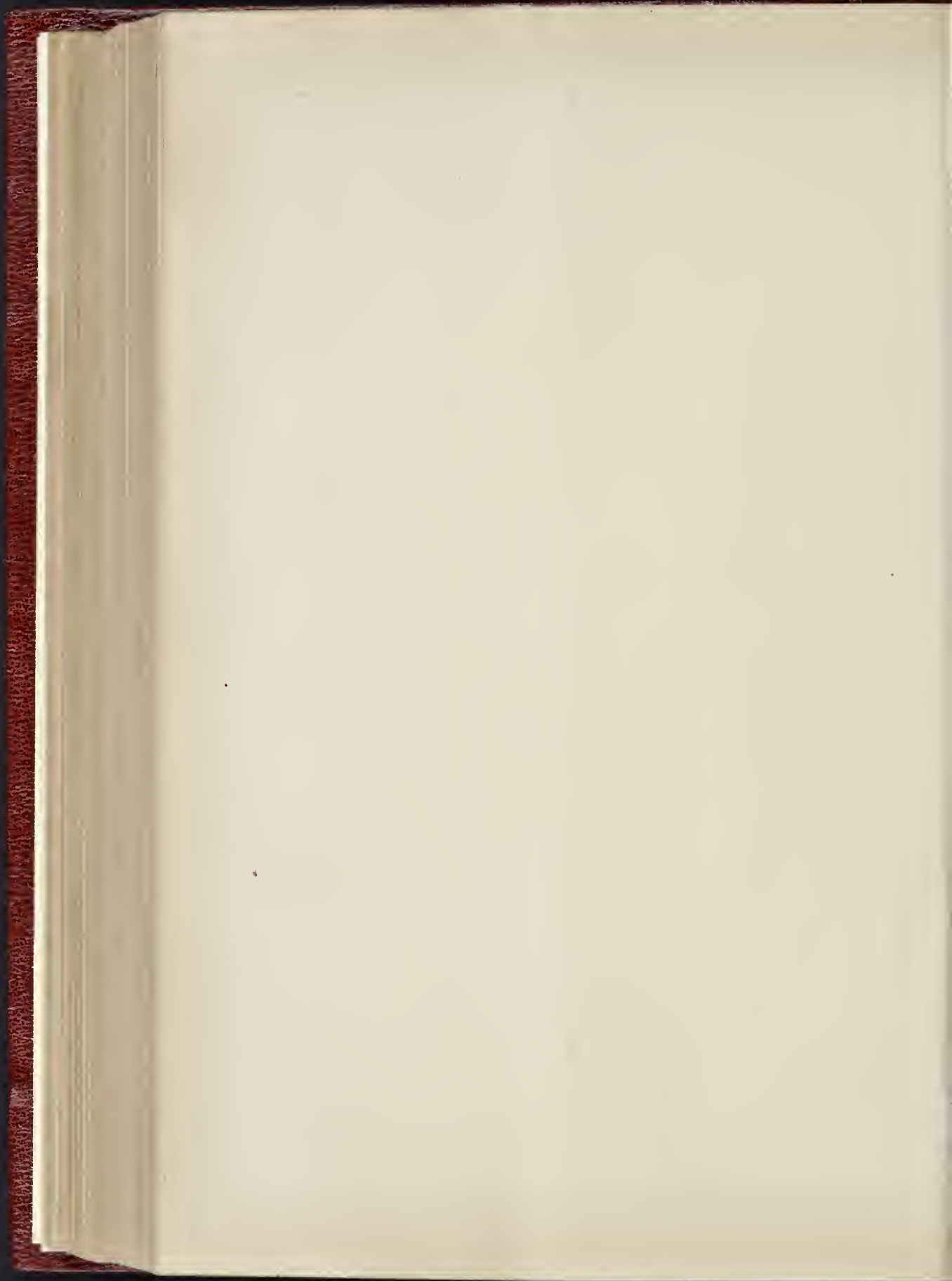
No. 1843 Royal Academy Exhibition, 1890.

INDUSTRIAL SCHOOLS, KNOWLE, B



INK PHOTO SPRAGUE & CO. 22 MARTINS LANE (FAYON ST) LONDON E

—MR. J. D. SEDDING, F.R.I.B.A., ARCHITECT.





Details of Mouldings, &c., Salisbury Chantry, Christchurch, Hants.

ious preservation of the delicate carving, which is as good now as ever it was.

PERCY D. SMITH.

* The sheet of mouldings here given, it should be explained, is not from Mr. Percy Smith's own drawing, which was unsuitable for reproducing, but from a tracing made by him.

ARCHITECTURAL SOCIETIES.

Northern Architectural Association. — The second summer gathering of the Northern Architectural Association took place on Saturday last at Sunderland, when there was a large assembly representing the profession in the whole of the district. They were received at the railway station by a number of Sunderland

gentlemen, and also by Mr. Brightwen Binyon of Ipswich, who subsequently conducted them over the new Municipal Buildings in Fawcett-street, designed by him. On their arrival at Roker, the party were received by Mr. H. H. Wake (Chief Engineer) and Mr. G. T. Nicholson, his assistant. They proceeded to the Commissioners' Offices on the works, where Mr. Wake, by means of a large plan, ex-

plained the nature of the important pier works which the Commissioners are now carrying out under his direction, and also exhibited a model of the huge crane used at the end of the pier in laying the blocks, together with other working models. The party were next conducted by Mr. Wake through the Concrete House, where they saw the process of mixing the materials of which the blocks are made. They were then shown blocks which have been allowed to solidify, and of which a large number has been accumulated during the winter months. One block, weighing about 43 tons, was hoisted on to a waggon and drawn by a locomotive to the extreme end of the pier. About 15 tons of concrete were deposited on the second course of the pier, and on that the block was placed. The operation, at once difficult and delicate, was watched with the greatest interest. It may be stated that close upon 2,000 ft. have been laid, and that 760 ft. more remain to complete the North Pier. There is some expectation that the South Pier, its complement, will be started next year. The scheme is now under consideration. After a thorough survey had been made, and the process of dropping a concrete bag, weighing 105 tons, in the sea from the barge had been witnessed, and the subway had been inspected, the visitors returned to shore, and proceeded to the new Municipal Buildings, where Mr. F. W. Rich said he had very great pleasure in moving the best thanks of the Association to Mr. Wake for his kind reception of them, and for the careful manner in which he had explained the pier works at Roker. Mr. John Tillman seconded the motion, which was carried by acclamation, and Mr. H. H. Wake replied.

Glasgow Architectural Association.—The twelfth annual report of this Association, covering the Session 1889-90, says that the following were the office-bearers for the Session:—Honorary President, Mr. David Barclay, F.R.I.B.A.; President, Mr. John Keppie; Vice-President, Mr. William J. Anderson; Secretaries, Mr. Alex. M'Gibbon and Mr. Wm. Ritchie; Treasurer, Mr. George Tudhope, who, retiring in September, was succeeded by Mr. L. Douglas Penman; Librarian, Mr. Fred. M. Miller; Members of Committee, Mr. Wilson Beaton, Mr. Wm. Tait Conner, Mr. John Jas. Joass, Mr. Chas. R. McIntosh, Mr. Wm. H. M'Nab, and Mr. Wm. M'W. Petrie. Beside the change of Treasurer, occasioned by Mr. Tudhope going to Edinburgh, of the Committee, Mr. Petrie resigned in August, and Messrs. Conner and Joass at the beginning of this year. There are now on the roll, 9 Honorary, 60 Ordinary, and 20 Corresponding Members, in all, 80; a decrease of 14 upon last year's report. Twelve new members have joined and 26 left. Among these the Committee have to regret the loss by death of Mr. Robert S. Symington, architect, Paisley, and of Mr. Angus M'Anslane, whose death occurred during his passage home from the Gold Coast on furlough. Two ordinary members have, after passing the Examination, become Associates of the Royal Institute. There have been eleven ordinary monthly meetings held, at which essays, exclusively by members, have been read and discussed; these in their order were:—"Neo-Greek Architecture," by Mr. John A. Campbell; "Modern American Architecture," by Mr. Wm. H. M'Nab; the President's opening address, which dealt with "Architectural Education"; "The Three Periods of the Italian Renaissance," by Mr. William J. Anderson; "Mohammedan Architecture in India," by Mr. George Mackenzie, but read by another, as he a few days previous to its delivery left for that country; "The Decorated Style of English Gothic," by Mr. Wilson Beaton; "The Perpendicular Style of English Gothic," by Mr. John Jas. Joass; "The Elizabethan Style," by Mr. Charles R. McIntosh; "Elgin Cathedral," by Mr. Wm. Tait Conner; "Domestic Furniture," by Mr. Fred M. Miller; and "French Renaissance," by Mr. Henry D. Walton. The visits, nine in number, made during the session have been more interesting than perhaps those of any previous series, and notable as including two made conjointly with the Edinburgh Architectural Association. The measurement of Glasgow Cathedral has progressed but little, although to encourage interest in the work, the Association Prize is this year offered to be competed for by apprentices for measured drawings, of portions of the nave, north aisle. Undoubtedly it calls for no little self-sacrifice to labour at the less interesting work which necessarily bulks largely in such a large building if

it is to be accurately illustrated, work not at all calculated to evoke much enthusiasm. The credit of the Association being in some measure bound up with the furtherance of this work, our thanks are due to those who have engaged in it. Specially would we acknowledge the kindness of Messrs. A. & D. Mackay slaters, in providing ladders for the members' use. In October the Association became affiliated to the London Architectural Association. This was a step taken only after due consideration, as for long there had been felt a desire for closer union among the scattered Associations, if not their amalgamation. It would be unfortunate if the movement were hindered by the fact, that at the first there may be little actual return to such Association as ours for the subscription given the central body,—for that goes to the support of what undoubtedly is the principal educational body in the country,—the nearest approach to a College of Architecture. Any enlargement of its sphere of influence is of interest to us all, and it is likeliest that such growth of influence will be for good only as the wants of the junior members of the profession are known and recognised, and this can best be done by some such organisation as affiliation implies.—The usual monthly meeting was held on the 3rd inst., when the President gave an address on the study of architectural styles. He referred to the fact that the greater part of the papers read by members dealt with this important subject in detail; not too much, in his opinion. The right knowledge and appreciation of the work of the past is the surest guide for good modern architecture. The methods in vogue for attaining this knowledge, measuring and sketching actual buildings, and the study of books that illustrate works abroad, were discussed, and some hints added, the result of his own experience, that beginners might find useful. A short discussion followed. A copy of Mr. Anderson's book, "Italian Architecture," presented to the Association library, was laid on the table.

Dundee Institute of Architecture, Science, and Art.—The members of the Dundee Institute of Architecture, Science, and Art held the first excursion for the season on Saturday last. The place chosen was Lintlogow, and the party, numbering about seventy, left the Tay Bridge Station by the 9.55 a.m. train, travelling by the Forth Bridge to Forth Bridge Station, where the train was specially stopped to allow the party to alight. Brakes were in waiting to drive through the beautiful grounds of Hopetoun House, permission for this being kindly granted by Mr. Phillips, Lord Hopetoun's factor. Passing the mansion, the palatial character of its front was much admired, and the road was taken to Abercorn Church. Here, by the courtesy of the Rev. Mr. Crawford, the church was open for inspection, and he kindly pointed out the various parts of interest to the architect and antiquary. The church dates from the twelfth century, and is a very interesting specimen of architecture. The party then walked through the Den to Mid Hope House, an interesting specimen of an old Scotch mansion, dated 1582, containing a handsome oak staircase. Getting into the brakes again, Lintlogow was reached at half-past two, after a beautiful drive, partly through the Hopetoun policies. Luncheon was served in the Star and Garter Hotel, after which the old parish church and palace were visited. Mr. Russell Walker, architect, Edinburgh, who is publishing a work on the pre-Reformation churches of the Lothians, kindly acted as guide to the church, and gave interesting information as to its history and architecture. After inspecting the church, the palace was visited, under the leadership of the Messrs. Henderson, of Lintlogow, who were at much pains to explain the various sections of the ruin. The fine Parliament Hall and chapel were much admired. The room in which Queen Mary was born, and the bower in which Queen Margaret "wept the weary hour" watching for the return of King James IV. from Flodden were regarded with great interest, while the view from the bower amply repaid the toil of ascending the long staircase, the towers of the Forth Bridge looming in the distance. Having inspected the dungeons, torture-chamber, kitchens, stables, &c., connected with the Palace, the various interesting sights of the burgh were examined, such as the fish hatcheries on the loch and the portrait tablet of the Regent Murray, erected opposite the spot on the street where he was shot by Hamilton of Bothwellhaugh in 1570.—*Dundee Advertiser.*

OBITUARY.

Mr. Robert Hodge.—The death is announced of Mr. Robert Hodge, C.E., late Borough Surveyor of Plymouth. Mr. Hodge, who was born in the parish of Cardross, Dumfriesshire, has lived in Plymouth for nearly fifty years, but in his early life he was officially connected with a number of important engineering enterprises in Glasgow and neighbourhood. He was resident engineer on the first locomotive line constructed in Scotland. He was engineer of the Glasgow and Garmkirk Railway and the Govan Railway. He put up the first malleable iron-plate bridge in Scotland, and he superintended the erection of the St. Rollox chimney-stalk and the construction of the locks on Monkland Canal. In 1854 he was appointed Borough Surveyor of Plymouth, an office which he held till 1879, when he retired, and was retained as consulting surveyor-engineer.

Mr. Hugh Symington, the well-known railway contractor, died suddenly at his residence, Stewarton House, Coatbridge, on the 3rd inst., in his 58th year. During his career Mr. Symington carried out successful work for all the Scotch railway companies, the Glasgow and Greenock Corporations, and the Greenock Harbour Board.

RENDEL'S SYSTEM OF GLAZING: THE RIGHT TO THE NAME.

RENDEL & CO., LIMITED.

THIS case, reported at length in last Saturday's *Times*, came before Lord Justice Kay, and may serve as a warning against what is not an uncommon practice in trade of a person endeavouring to avail himself, through an identity or close similarity of name, of the reputation acquired by an old-established business. It was a motion by the plaintiffs in the action, the trustees of the will of the late William Edgcombe Rendle, roofing contractor, and also proprietor of the Clarendon Hotel, Brighton, to restrain the defendant company and their manager, John Edgcombe Rendle, a son of the testator, from carrying on the business of glass-roofing contractors under the name of J. Edgcombe Rendle & Co., Limited, or any other name calculated to mislead the public into the belief that the defendant company were, as assignees of the defendant, John Edgcombe Rendle, or otherwise, entitled to the system of glazing used by W. Edgcombe Rendle & Co. for the purpose of carrying out the contracts carried out by W. Edgcombe Rendle & Co. mentioned in the defendant company's prospectus and circulars, or that the defendant, John Edgcombe Rendle, was the inventor of Rendle's system of glazing, or was the senior partner in the firm of W. Edgcombe Rendle & Co., or that he introduced their most successful patents; and to restrain the defendant, John Edgcombe Rendle, from engaging in any business of a description in any way similar to the business carried on by the defendant William Edgcombe Rendle, under the style of W. Edgcombe Rendle & Co., or from doing anything to prejudice the business of that firm, or affect the sale thereof. Upon the death of the testator, William Edgcombe Rendle, in September, 1881, disputes arose in the administration of his estate, which comprised his business of W. Edgcombe Rendle & Co., formerly carried on by him in Victoria-street, Westminster, and at Battersea, and an action was commenced for the administration of his estate by the Court, which action is now pending. Subsequently, the action was commenced in which the present motion was made. The other facts of the case sufficiently appear from his Lordship's judgment.

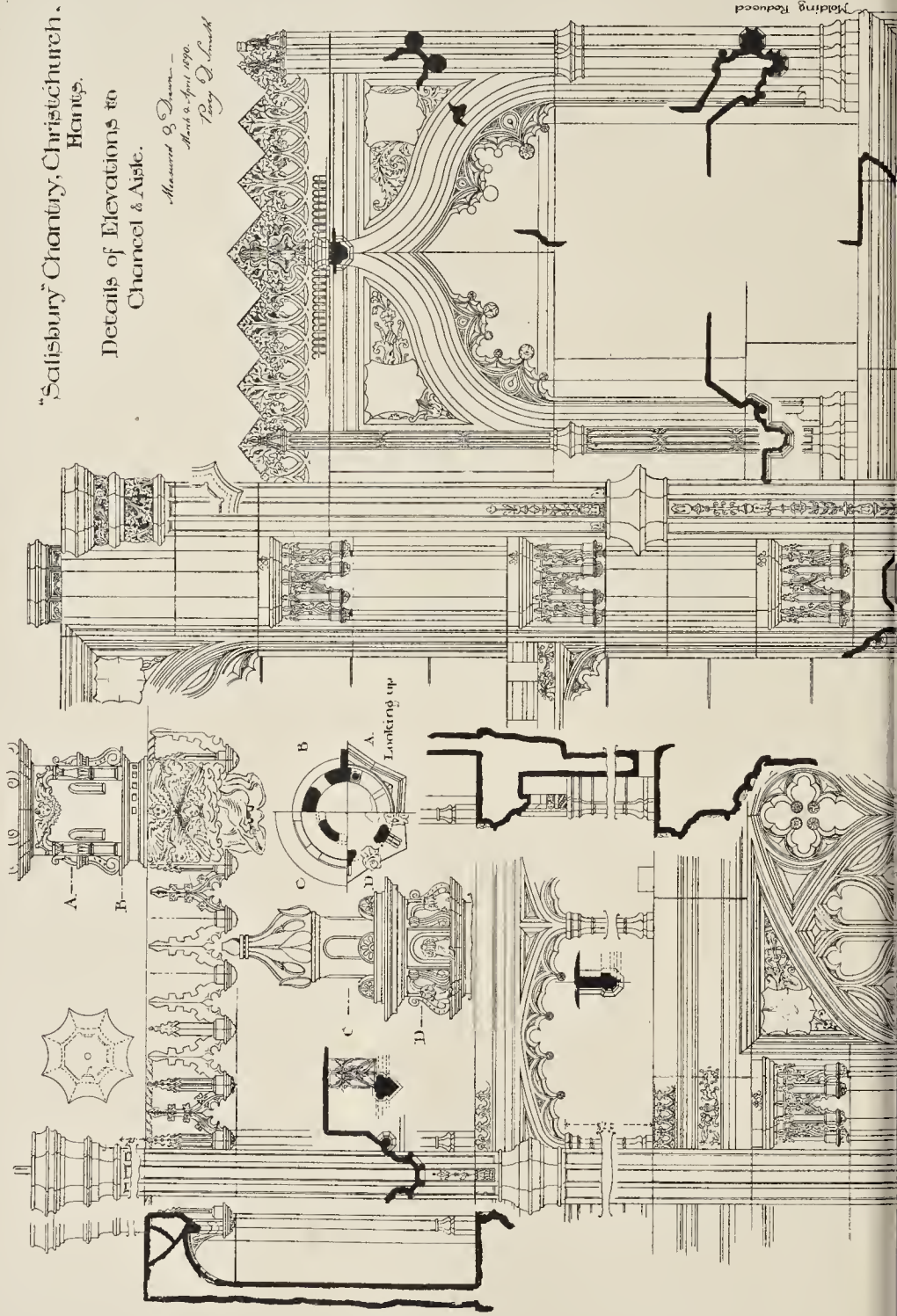
His Lordship granted a perpetual injunction in the above terms, and ordered the defendants to pay the costs of the action.

Stuart's Granolithic.—We understand from the *Scottish Leader* that Messrs. Stuart & Company, Limited, of Edinburgh and London, have had placed in their hands several large contracts for Granolithic. One of these is connected with the New Hôtel Métropole, Brighton, which contains 1,300 rooms. Every room in the building, including corridors, is to be paved,—261,360 square feet, or six acres of paving in all,—thereby rendering the building fireproof. The surface of the paving is to be covered with cloth felt, on which the carpets are to be laid. This firm has also received contracts for the paving for the Local Boards of East Ham, Willesden, and South Hornsey, the new town of Barry, and other places. Altogether, it is stated that over 700 miles of the pavement have been laid in Great Britain, America, and the Colonies since 1882.

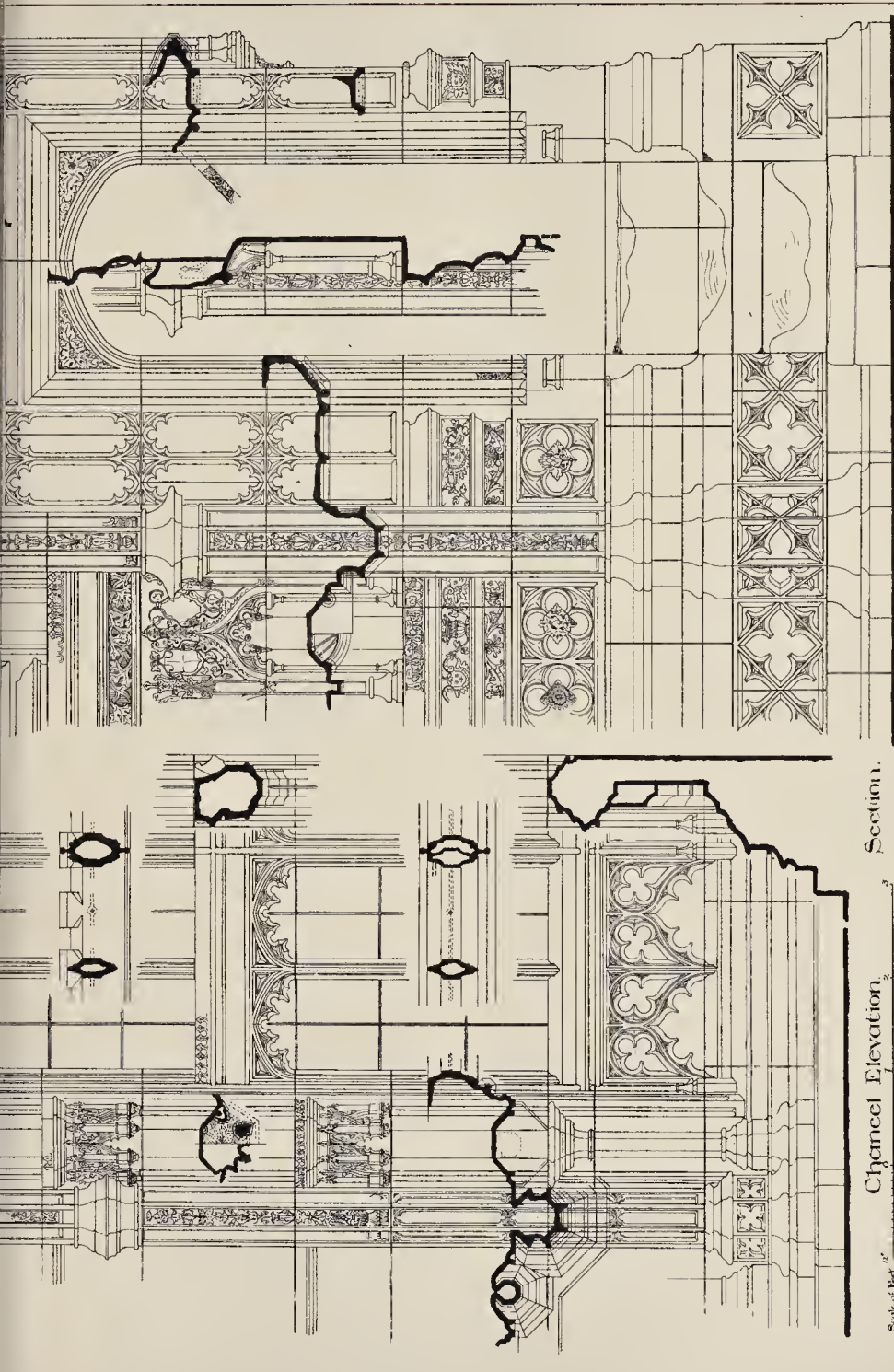


"Salisbury Chantry, Christchurch,
Hants.
Details of Elevations to
Chancel & Aisle.

*Measured & Drawn—
March & April 1890.
Henry D. Smith*



Holding Reduced



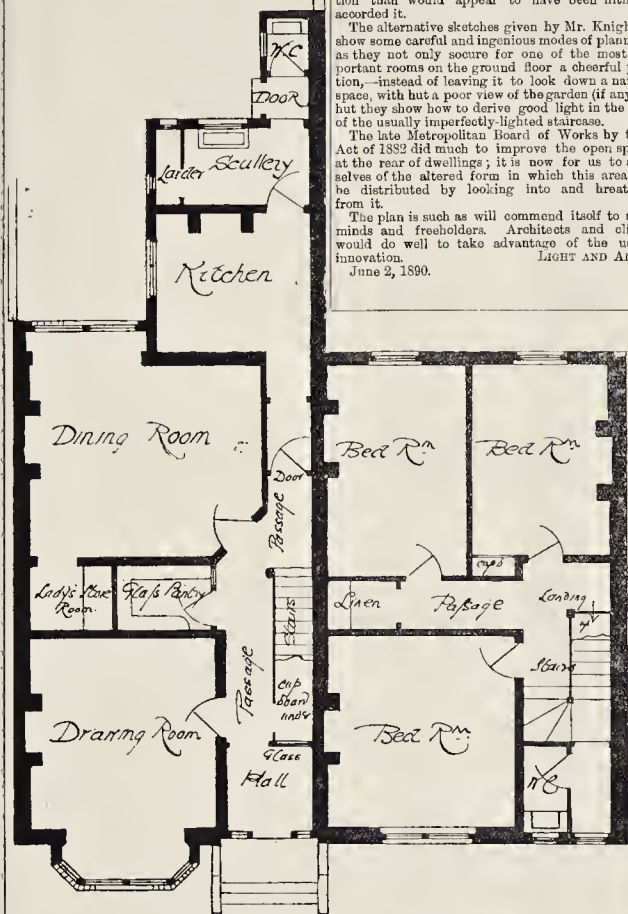
Chancel Elevation Section.

Scale of Feet 1"

SALISBURY CHANTRY, CHRISTCHURCH, HANTS.
 MEASURED AND DRAWN BY MR. PERCY D. SMITH

PHOTO-LITHO. SIMMONS & CO. 25, MARK LANE, LONDON, E.C.

Plans accompanying letter by
Mr. W. A. Pite.



Ground Plan - Upper Plan

together, and which goes to show that it should not be so hurriedly condemned.

WILLIAM A. PITE.

SIR,—Mr. Knightley's letter, and the plans accompanying it in the *Builder* of the 31st ult., deal with a subject which deserves more consideration than would appear to have been hitherto accorded it.

The alternative sketches given by Mr. Knightley show some careful and ingenious modes of planning, as they not only secure for one of the most important rooms on the ground floor a cheerful position,—instead of leaving it to look down a narrow space, with but a poor view of the garden (if any),—but they show how to derive good light in the case of the usually imperfectly-lighted staircase.

The late Metropolitan Board of Works by their Act of 1882 did much to improve the open spaces at the rear of dwellings; it is now for us to avail selves of the altered form in which this area can be distributed by looking into and breathing from it.

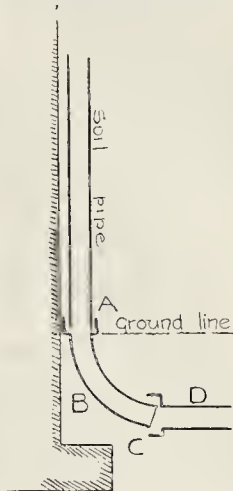
The plan is such as will commend itself to most minds and freeholders. Architects and clients would do well to take advantage of the useful innovation.

LIGHT AND AIR.

June 2, 1890.

I speak from experience, many cases having come under my own observation.

This evil is not necessarily due to downright carelessness, though the more carefully drains are laid, the less they will settle and shift afterwards. Let it be assumed the drain has been so well hedged that the pipe, D, remains stationary without settling in the least degree, and let the pipe-bend be hedged



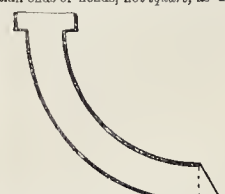
on, clay, at B, with considerable oare. Still the impact of the continually-repeated discharges of fluid, descending from a considerable height upon B, compresses the bedding of clay, and eventually forces the bend so far backward as to dislocate the joint of bend with D, discharging a large percentage of each flush from the w.c. through the joint at C into the foundations.

I have seen gable walls split from foundation to coping from having their foundations sapped in this filthy fashion.

Thanks to this bel of Achilles-Sanitarus, now, in 1890, in every large town, I believe there are thousands of dwellings, including those of the higher classes, standing thus on their own cess-pools.

How can this be remedied?

I suggest the absolute necessity for bedding the upper end of pipe D, and the whole of the bend, on solid concrete of considerable horizontal spread or area. I also suggest that drain-pipe makers form the outfall ends of bends, not square, as usual and



"A PLEA FOR THE IMPROVEMENT OF SIX- AND EIGHT-ROOMED HOUSES."

SIR,—In all probability I am not the only one of your constant readers who, while admitting, with Mr. Knightley [see p. 398, ante] that there is vast room for improvement in the planning of six- to eight-roomed houses, are quite unable to accept the four alternatives which he submits as being in any way an improvement on what he terms the "everlasting plan," which, when carefully examined, has undeniable advantage over its companions.

In each case access or egress to or from the drawing-room for an afternoon caller is through a passage, the darkness of which is black as the historical "hole of Calcutta," where "twilight" never comes, and dirt is never seen, averaging about 30 ft. in length, passing the staircase, which surely is most objectionable, while in three cases odoriferous waftings from the kitchen, to say nothing of the condition of the scullery on washing-day, have to be met; while in two instances the rotting of the waste-preventers to the water-closets in such close proximity to the drawing-room is certainly detrimental to the comfortable occupation thereof.

Much more could be said upon the subject, but a little personal examination will suffice.

The annexed diagram is only a casual suggestion, showing Mr. Knightley's "everlasting plan" pulled

SIR,—I think Mr. Knightley's plans for six- and eight-roomed houses are ingenious, but he does not go far enough. Will he publish some plans of the upper floors?

JUNCTION OF SOIL-PIPE WITH DRAIN.

SIR,—I desire to draw attention to a danger and evil which seems to have escaped the notice of sanitarians.

Vertical soil-pipes frequently discharge their fluid from great heights. At the foot of the soil-pipe the vertical stream is diverted to a nearly horizontal direction by means of the earthenware bend which unites the vertical soil-pipe with the underground drain-pipe.

Great care is generally exercised by the architect, clerk of works, and builder, to make a good joint where the plumber's soil-pipe joins the earthenware bend. But the danger of leakage is much greater at the joint of this earthenware bend with the drain into which it discharges. I believe in the vast majority of cases if this last-named joint were examined a few years after the pipes have been in use, it would be found to be discharging a large percentage of the sewage into the foundations; and in this way converting the sites of single dwellings and of whole towns into concealed cesspools!

as here dotted, but to a slight bevel, as per firm line on sketch, giving the pipe, so to speak, a slightly longer underlip than is now customary. And I also suggest that the architect or clerk of works and the surveyor for the local sanitary authority should henceforth personally examine the joint C of old as well as new drains; and I think if a general examination of such joints were instituted a vast danger to public health would be exposed in such hideous repulsiveness as to hasten a general overhaul and repair of such open joints as are now secretly vomiting death and corruption wholesale amongst us.

FRANK CAWS.

"BREAKWATER CONSTRUCTION."

SIR,—Referring to a description of a proposed mode of constructing breakwaters, &c., by Mr. F. H. Chacewright, Assoc. M. Inst. C.E., published in your issue of the 7th inst., I do not wish to suggest that the inventor has been guilty of plagiarism, or that the proposed mode, or modes, of construction are not *bona fide* inventions, so far as those associated with them are concerned; but, the basis of the idea, the employment of ironwork in the construction of breakwaters, was advocated by me in the columns of *The Engineer* over two years ago. I proposed to use old railway rails.

W. GALLON, Assoc. M. Inst. C.E.

Highbury, N., June 8, 1890.

SPRAY JETS FOR WASHING.

We notice a letter signed "W." in your issue June 7, 1890, p. 421. We shall be happy to give your correspondent any information he may require with regard to the washing apparatus referred to by Sir Edwin Chadwick. We made this for him some years ago, and it was exhibited, we believe, at the Inventions Exhibition, and we have the original apparatus in stock here now.

Lambeth, S.E. DOULTON & Co.

PRICE-BOOKS.

Sir,—Referring to the correspondence on this subject, there will always be a difficulty in estimating from a price-book, because of the variation in the cost of material alone. At one time I contemplated issuing a complete price-book for competition work, but there is so small a patronage for these kind of works that it would not pay for the time spent on it. Such a work would take a huge amount of labour for one man. I have reviewed several price-books, and my opinion coincides with your last review.

THE AUTHOR OF "ESTIMATING."

HYMERS' COLLEGE, HULL.

Sir,—May I ask you to make a correction with regard to the above competition? The design placed second was by Messrs. Wigram & Rawlinson, not Wigram alone. EDGAR T. A. WIGRAM.

VIBRATION OF TOWER FROM BELL-RINGING.

Sir,—There is a beautiful peal of bells in a church tower in my neighbourhood with a lofty spire, and, though the bells were mounted with every care by, I believe, Messrs. Taylor, of Loughborough, about twenty years ago, there is considerable vibration when the full peal is rung. The tower and spire are excellent examples of good masonry, and in perfect preservation.

Can you suggest any way of reducing this vibration by use of a compensating weight or otherwise? If a compensating weight is hung inside the spire, what rule is there to determine the length of the chain supporting the weight, and the dimension of the weight?

I can find no reference to this in any work on architecture. Perhaps some of your readers can help me.

WILLIAM HENRY JOHNSON.

WOODEN WATER-PIPES.

Sir,—I have read with much interest the remarks in your paper upon this subject.

I have now in my possession a fine specimen of a wooden pipe with a bore of about 7 in., hollowed out of a trunk of wych-elm.

The spigot end is reduced in the manner shown on page 420 of the *Builder* of June 7, and measures about 8 in. diameter. This pipe was taken out of the river here yesterday, and I am told that various specimens have been found in Sheen and Mortlake from time to time.

I shall be most happy to afford any of your readers every facility for inspecting the pipe, and taking such drawings or particulars as they may consider desirable.

HENRY RICHARDS,
Member of the Association of Municipal and Sanitary Engineers and Surveyors.
Murtle Villa, St. Leonards, Mortlake, June 11.

SYMBOLISM OF THE PASTORAL STAFF

Sir,—We frequently meet with the statement that the head of the pastoral staff, by its turning either inwards or outwards, indicates the extent of the jurisdiction enjoyed by the personage commemorated by the effigy; a bishop, signifying the extensive jurisdiction of his See, and an abbot or abbess will have his or hers turned inwards, denoting the more limited jurisdiction over his or her establishment.

May I venture to say that such an opinion, though expressed by many very eminent men, is not, I believe, borne out by an inspection of the effigies remaining, and by adducing the following examples I shall attempt to disprove a statement which, so far as I know, is quite unsupported by facts, and an assertion alone, though I am well aware of that high value.

The brass of Richard Bewforiate at Dorchester, Oxfordshire, c. 1529, represents the abbot with the head of his staff turned outwards.

The brass of Elizabeth Harvey, at Elstow, Beds, c. 1530, shows the abbess with her staff turned outwards.

The effigy of Bishop Hugh Tattershall, in Lichfield Cathedral, c. 1243, has the head of his staff turned inwards.

The effigy of Bishop Vesey, in the church of Sutton Coldfield, Warwickshire, c. 1550, shows the bishop with the head of his staff turned neither one way nor the other, but standing straight out, a very valuable example for my purpose, as apparently indicating that no importance was attached to the position of the crozier head.

HENRY LITTLEHALLES.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—XXIV.

"HIGH AND LOW PRESSURE."

THE expressions "high pressure," "low pressure," or "high tension," "low tension," are very commonly used in speaking of mains distributing electrical power. As their precise meanings are somewhat arbitrary, the following quotations from the Board of Trade Regulations will show the sense attached to them by that body:—"Low-pressure conductor" means a conductor in which the difference of electric potential either between that conductor and the earth or between that conductor or any part thereof and any other conductor on the same poles or supports does not exceed 300 volts, if the supply be on the continuous current system, or the equivalent of 150 volts if on the alternating current system. A difference of potential on the alternating current system shall be deemed to be the equivalent of a difference of potential on the continuous current system, when it produces an equal heating effect if applied to the ends of a thin stretched wire or carbon filament. "High pressure conductor" means a conductor in which the difference of electric potential as above described is greater than that of a low pressure conductor.

"Pressure" or "tension" may, therefore, be taken to be a popular way of saying "difference of potential."

For some time past a paper warfare has been waged between the advocates of high-pressure and low-pressure systems as to the relative amounts of danger involved in the use of each. Any person, having the smallest real knowledge of electrical science, can judge of the risks attendant upon the use of either system. We have no intention of entering upon the controversy, but it may be of assistance to those who read the arguments brought forward by both sides to put the customary premises and deductions in a partly algebraic form. Danger from electricity supply occurs when electrical power gets misplaced, and it is roughly proportional to the quantity of misplaced power. Now it has been shown (article v.) that quantity of power can be calculated by any one of the three products (i) EC , (ii) CR , (iii) $\frac{E^2}{R}$.

The advocates of high-pressure select product (i), and point out that danger varies as the square of the current, therefore a low-pressure system using 2,000 amperes is 400 times as dangerous as a high-pressure system using 100 amperes, since $(2,000)^2 : (100)^2 = 400 : 1$. The advocates of low-pressure select product (ii), and point out that danger varies as the square of the electro-motive force, therefore a high-pressure system using 2,000 volts is 400 times as dangerous as a low-pressure system using 100 volts, since $(2,000)^2 : (100)^2 = 400 : 1$. Both statements are of great interest, showing as they do what may be done in a controversy by judiciously concealing a part of the truth. We leave those who care to do so to make similar deductions from product (i).

FUSES.

Having considered the generation and distribution of electrical power, it is necessary to turn to some of the more important appliances, by means of which electricity supply can be safely used for various purposes. It may be convenient to trace the course of the current round some circuit, and to note the different pieces of plant or apparatus through which it flows, though in a few cases different devices have to be used for the continuous and alternating currents.

The main current may be supplied direct from dynamo-machines, or from secondary cells, or from machines and cells placed abreast. A most important difference must be pointed out in the cases where cells are and are not connected to the mains. If the resistance in the circuit of a secondary battery be lowered, the E.M.F. of the cells will not fall, at all events for some little time; the current from them will therefore increase in proportion, and should the resistance of the circuit be sufficiently reduced, the battery may give a current one hundred times that which it discharges under ordinary working conditions. Such a current, if allowed to flow for a short time into the mains, would make them red-hot and finally melt them. When dynamo-machines

are used, unaided by cells, the consequences of unduly lowering the resistance of the circuit will not be nearly so serious. The characteristics of all machines (articles xv., xvi., xvii.) show that when the current flowing from them exceeds a certain amount, the electromotive force, owing to increased armature reaction, falls with extraordinary rapidity; indeed a machine running at its usual speed cannot give many times its normal output of current. Again, a large dynamo-machine is almost invariably driven by a steam-engine, capable of developing only a relatively small amount of horse-power in excess of its normal load, so that even supposing the dynamo-machine could give four or five times its working current, the steam-engine would certainly fail to maintain the speed. The only injury likely to be done to the mains themselves is that arising from an undue rise in their temperature, and this is hardly likely to occur if they are dynamo-fed. But whether the nature of the supply is such that the mains are likely to suffer or not, the fact that the resistance of the circuit has fallen, and excess of current is passing, clearly indicates that some accident has occurred and that current is going where it should not flow, probably doing great damage.

To avoid risks arising from excess of current, a "fuse" should be placed at both ends of each set of mains in the generating station, and also throughout the whole circuit, wherever a conductor branches off from one of a higher current-carrying capacity. There are many forms of fuses, but they all consist of a short length of conductor, usually made of some metal or alloy that melts at a comparatively low temperature, wholly enclosed in a case of some unflammable material, such as earthenware or slate. The fuse is placed in series with the wire or cable to be protected, and it is made with a cross-section so small that it will melt when a current passes that the protected cable can easily carry. If a fuse be put in a branch circuit at some distance from the junction of the smaller wire of the circuit with the main, the portion of the conductor between the fuse and the main is wholly unprotected. This is the practice of many who wire private houses for the electric light, a fuse being frequently put in the lamp-switch, and accounts for many of the so-called electrical fires which occur from time to time. A certain difficulty arises when a high E.M.F. is being used; the fuse will break at some one point, and at the instant of breaking, the resistance, per mass of conductor in the immediate neighbourhood of the break, is very large, the temperature becomes, therefore, very high, and the material of the fuse may not only melt but be converted into vapour. Vapour at a high temperature is a conductor, and the well-known "electric arc" may be formed. When this occurs the fuse is itself a source of the very danger it is intended to prevent. Mr. Ferranti, who, we believe, deals with higher electromotive forces in his mains than any one else, uses a fuse case of peculiar construction to get over this difficulty.



Fig. 66.

The fuse A, B, fig. 66, rests between two slabs of earthenware, the sections of which look like rows of arches. If vapour is formed, it is immediately cooled by being brought in contact with a mass of cold earthenware, it ceases to conduct, and the circuit is broken. Suppose, however, arcs are formed, the fuse can still be made to act; an arc opposes an E.M.F. to the current producing it, arcs can only be formed in the arches, by making a sufficient number of arches, therefore, an opposing E.M.F. is set up against which the current cannot flow.

A magnetic cut-out is frequently used as well as a fuse, the cut-out being made to act with a lower current than that which melts the fuse, the fuse being intended to go only when the cut-out fails to act. A magnetic cut-out consists of an electro-magnet with its coils placed in the circuit; to the armature of the magnet is attached a conductor which bridges over a gap in the circuit by dipping into two cups of mercury or some other form of contact to which also are joined the ends of the protected conductor. When the current exceeds a certain amount the magnet attracts its armature and pulls the bridge out of the circuit.

Books.

Blackie's Modern Cyclopaedia of Universal Information. Edited by CHARLES ANNANDALE, M.A., LL.D. Vol. VI. Blackie & Son: London, Glasgow, Edinburgh, and Dublin.

THE sixth volume of this useful work, just issued, brings it nearly to the end of the letter P. It continues to exhibit the same excellent qualities as a popular cyclopaedia, by which the former volumes were characterised, and architectural subjects and terms receive due attention in it, in proportion to the scale of the work. There is a good and tolerably long article on "Paris", another on the "Post Office," into which a great deal of information is compressed. "Norman Architecture" is briefly but correctly characterised, with a woodcut of the interior of the Abbaye aux Hommes as an illustration of the style. The Cyclopaedia ought to be a great boon to the smaller class of private libraries, in which more expensive and costly works of reference are unattainable.

Inventions and How to Patent Them. A Practical Guide to Patentees. By T. ESTACE SMITH, Barrister-at-law. Third edition. Whitaker & Co. 1890.

This is an excellent little book, clear and concise. The fact that it has reached a third edition shows that it has been found useful. It will be useful, not only to laymen, but also to lawyers who wish to get an outline of patent-law fixed in their minds, for the leading cases on which the propositions of case-law are based are given. A good index and hard binding together make up a serviceable publication.

Newspaper Reporting in Olden Time and Today. By JOHN PENDLETON. London: Elliot Stock. 1890.

THIS is one of the class of books which answers the demand now made by so many people for information as to the working of professions and occupations with which they have no other concern than what is sometimes called "enlightened curiosity." Mr. Pendleton's book is pleasantly written, and gives a sketch of the past history of Parliamentary reporting, in the days of such heroes of the old press as "Memory Woodfall," as he was called from the abnormal development of this faculty, which did for him some part at least of what the art of shorthand-writing has since achieved, and the author gives an account of the system by which the present elaborate and wonderfully rapid reporting of the Parliamentary debates is carried out. Some information on this latter head ought to be of interest to every educated reader, considering how immensely the whole political life of the country is indebted to and influenced by the full reporting of the leading daily papers. There is a chapter on shorthand, and one on "Experiences and Adventures of Reporters" which retails a good many anecdotes and anecdotes, good and bad, among which we may cite that of the reporter at the Salvation Army meeting who was asked, "Are you saved?" and replied, "No, I'm a reporter." A list of publications on newspapers and reporting is added to the book.

Sewerage Works, Walton-on-the-Hill, Liverpool.—The Walton Local Board have just completed an enlargement in their sewerage system. The present 24 in. outfall has been increased to 4 ft. 6 in. by 3 ft. 6 in. length of 2,380 yards, also a length of 1,100 yards of 3 ft. 2 in. cast iron pipes has been laid in addition to the present 18 in. pipes. At the sewerage farm, a small portion abutting the River Alt has been set aside for intermittent filtration. A large tank has been built of concrete, and faced with blue Staffordshire bricks, 100 ft. by 102 ft., containing with the present tank over 700,000 gallons, so that the whole of the sewage received between six p.m. and six a.m. next day may be stored for distribution at the latter hour. In case of flood, overflows are provided running direct to the filtration beds. To prevent flooding of cellars intercepting sewer has been constructed, about one mile in length, varying in size from 3 ft. by 2 ft. to 3 ft. 6 in. by 2 ft. 8 in. The scheme has cost nearly 20,000l., and has been carried out by Mr. W. Hope, Earle-street, Liverpool, under the direction of the engineer, Mr. S. Middlebrook.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

9,011.—Chimney-top. J. J. Downes. According to this invention, the chimney-top is constructed in terra-cotta or iron, galvanised or painted, the base having a flange to stand on the brickwork, and the pot being fitted with louvres. Above the louvres is fixed a cone, contracted at the top, and the dimensions of all the parts are regulated to the position of the chimney. A similar arrangement may also be applied as a ventilator for soil pipes, or an exhaust ventilator for dwelling-houses.

9,338.—Window-sashes. J. Ingleson. The upper and outer sash is, by this invention, made narrower than the lower and inner one, to permit of the former being easily withdrawn from its race. The sash-heads are also divided at a suitable distance above the meeting-bar, and then the upper and lower portions are decreased in width to admit of the upper and outer sash being withdrawn. The object of the improvements is to provide means for withdrawing each sash separately, or both at the same time, and to dispense with the use of a large pocket at the upper portion of the frame; also those improvements may be applied to counterbalance sashes where the use of weights are dispensed with, in which case it will be found necessary to partially or wholly withdraw one sash at a time.

10,000. Glass Roofs. S. Deards. This invention has reference to "dry glazing," and the chief object is to enable this to be effected without the use of putlins in order to secure the bars that receive the edges of the sheets of glass. Bars of X section run along the top of rafters, and are secured thereto by screws passed vertically through them into the rafters. Any water getting between the edges of the glass and the bars runs down the lower part of the bars, and escapes through holes made in the lower plate, which overlaps the eaves.

11,117. Paint-brushes. J. H. Dickson. The object of this invention is to manufacture a brush with a bristle of thin sheet metal, provided with perforations so that snips or pieces may be severed from it as the bristles wear.

1,185. Extracting Cowl. C. J. Hunter. Consists of a circular pipe carrying one or more truncated cones, and terminating with a hollow cone fitted to the shaft or chimney.

1,594. Ventilating and Flushing, &c. R. H. Wilding. Ventilation is secured by outlets and pipes connected with the closet basin. The flushing arrangements are much more perfect than most other inventions, and thorough ventilation is secured.

NEW APPLICATIONS FOR PATENTS.

- May 27.—8,203, C. Showell, Metallic Sashlifters.—8,208, A. Wright, Door and Gate Checks.—8,234.—W. Birch, Device for use with Lockbolts and Latches of Doors.
May 28.—8,271, C. Crawley, Window Fastening.—8,292, J. Kirkbride, Raising, Lowering, and Securing Window Sashes.—8,301, C. Houlser, Self-acting Cutting Apparatus for Brick Presses.
May 30.—8,355, G. Farmiloe & Sons, Water-closets.—8,376, J. Thompson, Urinal Flusher.—8,402, R. Frame & C. Neft, Water-Closet Fittings, &c.—8,404, F. Ross, Traps for Gullies, House-drains, &c.—8,410, T. Brown, Ventilators for House-drains, &c.—8,412, G. & G. Strawson, Attaching Glass to Greenhouses, Roofs, &c.
May 31.—8,428, H. Goodson, Water Waste-preventing Valve.—8,444, R. Oakeshott, Stoves and Fireplaces.—8,445, H. Major, Screws.—8,468, F. MacNulty, Doors.—8,482, H. Gould, Wood Screws.

PROVISIONAL SPECIFICATIONS ACCEPTED.

4,770. F. Batting, Operating the Outlet-valve of Water-closets.—5,796, E. Jeyes, Gully-trap for Waste-water.—6,068, W. Silcock, Fastenings for Windows.—6,086, E. Edwards, Supporting Window and other Sashes.—6,147, A. Drummond, Glazing Structures.—6,171, J. Montgomery, Self-feeding.—6,187, A. Orwood, Montgomerie, &c.—6,616, T. Hughes, Door-closers.—6,747, G. Elliott, Apparatus for Exhausting or Removing Gases, &c.—6,844, O. Gray, Drain or Sewer-traps.—6,950, M. Rodgers, Ventilators.—6,952, C. Kilner, Cooking Iron, Steel, &c., with Portland Cement, &c.—7,160, W. Peace, Chimney-cowl.—7,357, A. Boulton, Chimney-pots or Cows.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

9,807, J. Upton, Bolts or Fastenings.—10,770, E. Edwards, Movable Centerings for Masonry.—12,262, R. Condy, Print or Pigment.—13,228, J. Oates, Painter's Brushes, &c.—5,268, S. Jennings, Draw-off Taps for Baths.—5,406, W. Thompson, Holding Doors or Window-sashes in a more or less open position.—5,887, D. Rawlinson, Metallic Framing for the Doors of Strong Rooms.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

- MAY 27.—By MESSRS. COBB (at Rochester).
New Brompton, Kent.—An enclosure of f. building land, 58 ac. 1p. 2550
Enclosures of f. building land, 1058. 3r. 17p. 7050
A block of f. arable land, 10a. 2r. 14p. 1750
"Barsole Farm," and 29a. 2r. 35p. l. 1750
Cliffe, near Rochester.—F. marsh land, 10a. 2r. 21p. r. 20 p.a. 480
Enclosures of marsh, garden, and accommodation land, 40a. 3r. 17p. l. 2310
MAY 29.—By THE NOOD & MARTIN (at Kingston).
Kingston, London-st.—Fourteen plots of f. land, 2,790
May 30.—By BAKER & SONS.
Hatfield, near.—Enclosures of f. land, 70a. or. 38p. 2,900
MAY 31.—By W. BROWN & Co. (at Aylesbury).
Birtton, Bucks.—"Barnet House," and 69a. or. 1p. l. 4,600
Weston Furtle.—F. accommodation land, 11a. 1,040
Aylesbury.—A fee farm rent of £2 1s. 4d. 45
JUNE 2.—By WEATHERALL & GREEN.
Lower Clapton.—3 ad. 4, Wickham-p., ul. 10 yrs. g.r. £35 300
By UFFON & CO.
Mile End-rd.—Ten plots of land 260
"The Manor House," freshold 450
By C. W. DAVIES.
Hornsey.—42 to 50 (even), Orpington-rd., n.t. 87 yrs. g.r. £35, r. 417s. 8s. 900
Finbury-pk.—150 and 152, St. Thomas's-rd., n.t. 90 yrs. g.r. £12, r. 250 525
By LANGRIDGE & FREEMAN.
Clapton.—150 to 156 (even), Powercroft-rd., f. r. 218s. 12s. 1,400
Poplar, Manild-st.—"The North Pole" house, ul. 42 yrs. g.r. £10, r. 690 850
Surliton Hill.—1, South-ter., ul. 57 yrs. g.r. £5, r. 275 p.a. 1,000
3 ad. 4, South-ter., ul. 57 yrs. g.r. £10, r. 408
Leasehold stabling, ul. 57 yrs., no g.r. £16. 280
By DEAN, BURNETT & Co.
Oxford-st.—F.g.r. of £70, with reversion in 74 yrs. 1,800
Hartlesden, Baker's-rd.—F.g.r. of £74, with reversion in 94 yrs. 1,900
Shrewsbury-rd.—F.g.r. of £31, with reversion in 94 yrs. 515
Beckingham, Cliffeon Villas.—F.g.r. of £40, with reversion in 87 yrs. 1,130
Wood Green, Dagmar-ter.—F.g.r. of £42, with reversion in 89 yrs. 968
Canford, Laurel-ter.—F.g.r. of £38, with reversion in 93 yrs. 800
Orgham Villas.—F.g.r. of £50, with reversion in 92 yrs. 875
Harrow, Shelley-rd.—F.g.r. of £56, with reversion in 91 yrs. 1,250
Wimbledon, Palmer-st.—F.g.r. of £28, with reversion in 87 yrs. 415
Walden-st., Shernhall-ter.—F.g.r. of £43, with reversion in 87 yrs. 915
Norden-lane.—F.g.r. of £11, with reversion in 95 yrs. 270
F.g.r. of £25, with reversion in 94 yrs. 588
F.g.r. of £20, with reversion in 91 yrs. 1,250
F.g.r. of £10, with reversion in 92 yrs. 270
Willesden.—F.g.r. of £34, with reversion in 94 yrs. 400
Hackney, Montagu-ter.—F.g.r. of £20, with reversion in 87 yrs. 1,170
Epsom.—Two plots of f. land in College-rd. 450
1 to 7, College-villas, f. 1,400
Mitcham.—A plot of f. land in Grove-rd., f. 600
By WARLETT & LOVEJOY.
Anley.—1 to 5, Freshmead-rd., f. r. £94 p.a. 915
Bethnal-green.—50 and 52, Cambridge-rd., f. 300
95, Cleveland-st., f. 760
A. f. site in Devonshire-st. 760
JUNE 3.—By MARCH, MENY, & Co.
Fecham.—A plot of f. land in Commercial-rd., ul. 29 yrs. g.r. £7. 9s. r. 264. 10s. 450
By A. BARTON.
Sydenham.—5, Grosvenor-p., f. r. £45 p.a. 600
By E. G. SIM.
Ilington.—157, Southgate-rd., ul. 41 yrs. g.r. £5 450
By OSBORNE & MERCER.
Malmesbury, Wilts.—A plot of f. garden land 135
A plot of f. orchard land, in. 1r. 4p. 225
By SHERWIN & COLEMAN.
Wandsworth.—102, Trinity-rd., part f. and part l., ul. 73 yrs. g.r. £10. 10s. 500
Palmer's-green.—An enclosure of f. land, 16 a. 2,000
By A. RICHARDS.
Bethnal-green.—95, Church-st., f. r. £50 p.a. 600
Whitechapel.—20, King Edward-st., f. r. £40. 8s. p.a. 420
"The Queen Adelaide" beer-house, f. 490
2 to 10, Belle-p., f. 730
25 to 20, Spring-gardens, f. r. £65 400
180, Hanbury-st., f. r. £94 p.a. 490
St. George's-in-East.—25, Prince's-st., f. r. £45 500
By NEWBORN & HARDING.
Ilington.—1 to 9, Balls Pond-p., ul. 42 yrs. g.r. £38 1,400
31, Britannia-row, f. r. 350
Mildmay-pk.—18, Mildmay-grove, ul. 92 yrs. g.r. £5, r. £48 p.a. 370
Pentonville.—48, Wharton-st., ul. 64 yrs. g.r. £8. 460
Wood-green.—2, Somerset-villas, ul. 76 yrs. g.r. £6 150
Notting-hill.—27 and 28, Elgin-mews, ul. 72 yrs. g.r. £5, r. £50 480
By BENEJAMIN TEWSON & Co.
Luton, Beds.—The Bramchurch Estate of 546a. f. 22,500
Soho.—40, Dean-st., f. r. £75 p.a. 1,300
Oxford-st.—No. 464, ul. 30 yrs. g.r. £7, r. £275 3,675
Portman-st.—50, Seymour-st., ul. 40 yrs. g.r. £10. 10s. r. £120 1,480
Dorset-st.—42, Balcombe-st., ul. 30 yrs. g.r. £30, r. £25 270

Bermodesey—16 to 22 even, Little Cherry Garden-st., and 511 to 519 odd, Southwark Pk.-rd., l. r. 4750
Worthing—An enclosure of l. land, la. Or. 4p., r. £20 p.a. 1,200

JUNE 5.—By BRAY, YOUNG, & CO.
Victoria-pk.—47, 53 and 55, Elmere-rd., l. r. £114. 8s. p.a. 995
Bow—12 and 14, Vivian-rd., l. r. £72. 10s. p.a. 740
Victoria-pk.—15, 16 and 17, Hamilton-rd., u. t. 45 yrs., g. r. £31. 12s. p.a. 445
18, 19, 101, and 20, Hamilton-rd., u. t. 45 yrs., g. r. £3. 500

By F. GILES & CO.
Putney—1, Hotham-villas, u. t. 23 yrs., g. r. £10. 2, Hotham-villas, u. t. 23 yrs., g. r. £37. 10s. p.a. 580
L. r. £2. 5s. p.a. 520
L. g. r. of £19 p. a., u. t. 23 yrs. 280
6, Hotham-villas, and a plot of land, u. t. 23 yrs., g. r. £5. 450
The residence "Hotham Lodge," u. t. 43 yrs., g. r. £8. 700
L. g. r. of £4. 10s. p. a., u. t. 23 yrs. 560

By H. J. PHILLIPS.
Tottenham—14, 15, and 16, Hyde-rd., u. t. 87 yrs., g. r. £15. 15s., r. £78. 375

By C. C. & T. MOORE.
West Ham, Church-st. North—A plot of l. land. Poplar—70 and 72, Bygrove-st., u. t. 35 yrs., g. r. £3. 5s. 130
93 and 95, Kirby-st., u. t. 32 yrs., g. r. £3. 200
Tottenham—3 and 4, Laurel Cottages, u. t. 75 yrs., g. r. £3. 200

By BRAN, BURNETT & CO.
Abergavenny—"The Hill," and 27 acres, l. 8,400

By F. JOLLY & CO.
Wood Green—29 to 34 (even), Silcock-rd., u. t. 91 yrs., g. r. £28. 15s. 950
Lower Clapton—112 and 114, Dunlace-rd., u. t. 80 yrs., g. r. £11. 10s. 360
61, Clifton-rd., u. t. 74 yrs., g. r. £10. r. £20 p. a. 185

By J. A. & W. THARY.
City-rd.—11, Brunswick-pl., u. t. 27 yrs., g. r. £35. Hackney—30, Glaskin-rd., u. t. 65 yrs., g. r. £4. 4s., r. £28. 270
Stepney—17, Rhoadwell-rd., l. r. £32. 4s. 400
Kingsland—79, Pearson-st., u. t. 23 yrs., g. r. £3. 10s. 155

Twickenham—L. g. r. of £32. 10s., u. t. 37 yrs., g. r. £19. 475
Lisson-grove—72, Salisbury-st., u. t. 21 yrs., g. r. £15. 125
Hornsey, St. Ann's-rd.—E. g. r. of £32 p. a., with reversion in about 37 yrs. 720
Wanstead—Two plots of l. land 300
Hornsey—44, 46, and 48, St. Joseph-rd., l. r. £62. 8s. 525
E. g. r. of £4, with reversion in 39 yrs. 90

By REYNOLDS & EASON.
City—20, Steward-st., l. 1,300
Brunswick-sq., Marchmont-st.—L. g. r. of £18. 7s., u. t. 10 yrs., g. r. £44. 750
L. g. r. of £20s. 4s., u. t. 14 yrs., g. r. £21. 18s. 2,920
Homerton—3 to 13 (odd), Bridge-st., l. r. £107. 18s. p. a. 1,045
31 and 32, Bridge-st., and 181, 183, 185, Morning-lane, l. r. £26. 4s. 1,030
Hackney—6 to 11, Willow-walk, l. r. £113. 15s., p. a. 900

Bechnal Green—17 to 182 (odd), Brick-lane, and 11, Peter-st., u. t. 34 yrs., g. r. £48. 2s., 244, and 246, Brick-lane, and 1, 2, and 3, Princes-st., u. t. 32 yrs., g. r. £32. 4. 5, and 6, Princes-st., u. t. 17 yrs., g. r. £29. 1,800

By NEWBON & HARRING.
Bow—42, Tredegar-rd., u. t. 83 yrs., g. r. £5. 5s., r. £26. 300
Upper Holloway, St. John's-rd.—E. g. r. of £28, with reversion in 37 yrs. 710
Miranda-rd.—E. g. r. of £7, with reversion in 37 yrs. 175
41, Old Ford-rd., l. r. £25. p. a. 700
418, Old Ford-rd., l. r. £28. p. a. 300
Homerton—18 to 46 (even), and 19 to 47 (odd), Sedgwick-st., l. 5,975

Bethnal-green—214 to 220 (even), Globe-rd., l. r. £114. 8s. 1,760
490, Bethnal-green-rd., l. r. £55. 720
2 to 22 (even), and 1 to 49 (odd), Gale's-gardens, l. r. £21. 8s. 7,570
A plot of l. land in Gale's-gardens 625
25 & 27, Peel-grove, 23 to 35 (odd), Patricie-sq., l. r. £371. 16s. 2,260
1 to 10, Victoria Mews, u. t. 63 yrs., g. r. £13. r. £103. 14s. 460
20, 22, & 24, Thorold-st., u. t. 81 yrs., g. r. £10. 4s., r. £39. 14s. 500
Stoke Newington—2, 4, & 6, Milton-rd., l. r. £91. 18s. p. a. 1,070

JUNE 6.—By DEVERELL & CO.
Marylebone—128, Great Titchfield-street, u. t. 18 yrs., g. r. £30. 450
40, Upper Marylebone-street, u. t. 8 yrs., g. r. £18. 41, Upper Marylebone-street, u. t. 33 yrs., g. r. £10. 775

By A. G. WENDSOR.
Kingsland—127, De Beauvois-rd. u. t. 31 yrs., g. r. £4. 270

By C. SLEE & SON.
Brixton—42 & 44, Josephine-avenue, u. t. 76 yrs., g. r. £21. r. £95. 920
Stockwell—30, Bellefields-rd., u. t. 75 yrs., g. r. £5. 10s., r. £30. 270
Camberwell New-rd.—L. g. r. of £26, u. t. 10 yrs., g. r. £15. 16s. p. a. 130

By RANDALL, BEARD, & BAKER.
Holloway—29, St. James's-rd., u. t. 71 yrs., g. r. £5. r. £30. 300
East Finchley—17, Vernon-ter., l. 300

[Contractions used in these Ads.—E. g. r. for freehold improved ground-rent; l. g. r. for leasehold improved ground-rent; g. r. for ground-rent; l. for rent; f. for freehold; c. for copyhold; l. for leasehold; e. r. for estimated rental; u. t. for unexpired term; p. a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

MEETINGS.

MONDAY, JUNE 16.

Royal Institute of British Architects.—(1) To ballot for candidates who desire to be admitted as members. (2) To present the Royal Gold Medal to Mr. John Gibson, Past Vice-President, for his works as an architect. 8 p.m.

TUESDAY, JUNE 17.

Society of Engineers.—Visit to the Thames Iron-works, Blackwall, and inspection of the ironclads in course of construction.
Statistical Association.—Mr. G. G. Chisholm, M.A., B.Sc., on "An Examination of the Coal and Iron Production of the Principal Coal and Iron Producing Counties of the World, with reference to the English Coal Question." 7.45 p.m.

WEDNESDAY, JUNE 18.

Meteorological Society.—Four papers to be read. 7 p.m.
British Archaeological Association.—(1) Mr. J. M. Wood on "Some of the Round Towered Churches of Essex." (2) Alderman C. Brown on "The Discovery of a Roman Column at Chester." 8 p.m.

THURSDAY, JUNE 21.

Liverpool Engineering Society.—Visit to the Thirlmere Aqueduct.

Miscellaneous.

The Pharmaceutical Society of Great Britain.—About three years ago this Society built an examination hall, dispensaries, research laboratories, &c., at the rear, in Galen-place, but the approach was a very bad one, and the connexion with the old building extremely inconvenient, besides which more accommodation was necessary for committee-rooms and offices, &c. Consequently, it was resolved to secure the two old houses adjoining, viz., 15 and 16, Bloomsbury-square, and erect thereupon the auxiliary structure. Messrs. Lansdown & Harriss are the architects who have connected the whole block conveniently with the existing building, and designed an elevation facing the square. The lower part is Portland stone, supporting two large bays on the first floor, and the upper part is red brick, with Portland stone dressings and cornices. From the entrance doors the examination hall is reached by a straight corridor, the old building being accessible by doorways with iron doors. The new building is adapted for the whole of the official work, and comprises secretary's and clerks' offices, stores, strong-room, lavatories, committee-rooms, president's room, and handsome council-chamber with oak door, dado, sashes, floor and carved chimney-piece. Messrs. Kirk & Randall are the builders, and Mr. H. R. Butson, the clerk of works; and the following specialist firms have contributed to the work:—Electric light, bells, gas, hot water and speaking tubes, Messrs. Strode & Co.; stone staircase from the Hopton Wood Quarries. Works worth, Derbyshire; wrought iron panels to ditto, Messrs. Jones & Willis; ventilation, Messrs. R. Boyle, Son, & Co.; chimney-pieces, Messrs. A. J. Arrowsmith & Co.; sanitary fittings, Messrs. J. Tyler & Sons; Parian plastering (including cornices and mouldings) and granolithic floors, Mr. J. Bickley; art decoration to ceilings and friezes, Messrs. G. Jackson & Sons; mosaic paving, Messrs. De Grelle, Hondret, & Co.; tiling to stair-case dado, Messrs. Minton & Co.; lift, Messrs. Waygood & Co.; locks and fastenings, Messrs. Kaye & Sons' "push and pull;" fanlight and sash openers, Messrs. W. & R. Leggett; fire main, hydrant, &c., Messrs. Shand & Mason; strong-room, door, &c., Messrs. Chubb & Son. The opening of the whole premises as being completed was inaugurated by a conversation, when a large and distinguished company congratulated the architects upon the success of their labours.

Removals.—Mr. T. Fairbairn, Hon. Sec. of the Edinburgh Architectural Association, asks us to note that he has removed from 5, N. St. David-street, to 35, S. Castle-street.—Mr. H. L. Beckwith, Hon. Sec. of the Liverpool Architectural Society, asks us to mention that the Library of that Association has been removed from No. 5, Cook-street to 15, Cable-street.

Water Supply, Earls Barton.—We are informed that the Wellingborough Rural Sanitary Authority have instructed Mr. W. H. Radford, C.E., of Nottingham, to prepare a scheme for the Water Supply of Earls Barton, as an alternative to a scheme previously submitted by a local engineer.

St. Werburgh's, Derby.—We are informed that at a meeting of the general committee for the rebuilding of St. Werburgh's, Derby, it was unanimously agreed that Sir Arthur W. Blomfield, A.R.A., be the architect for the rebuilding of the church, which is to cost 9,000l., towards which about 5,000l. are already forthcoming.

The English Iron Trade.—Although there has been a reaction in the Glasgow and Middlesbrough markets, the English iron market, taking it on the whole, has not gained in strength, notwithstanding the favourable nature of the Board of Trade returns for May. The Glasgow warrant-market has seen better prices this week, and shown greater firmness, while some branches of Scotch makers' iron are quoted higher. Cleveland iron has improved to the extent of 1s. 3d. per ton since last week, and the market is a little stronger. From other districts, however, reports as to the state of the pig-iron trade continue unfavourable. Some makers of Bessemer iron in the north-west are ready to sell their produce as low as 51s., or 4s. lower, while hematite warrants rule at 50s. 6d. The finished iron market is unsettled, and there is considerable depression in the sheet and hoop iron departments, while shipbuilding iron and steel is in declining demand. The feeling in steel has not improved, and the competition for orders is keen. Shipbuilders are no better off as regards fresh work, both engineers are doing fairly well.—Iron.

Fire at the Works of Messrs. Peto Bros., Pimlico.—On Wednesday about midday a fire of great magnitude broke out at Pimlico, in a great area of ground, bounded by Gillingham-street, Hindon-street, Berkeley-street, and Wilton-road; and the property on which the fire originated was the extensive series of workshops and stores owned and occupied by Messrs. Peto Bros., builders. According to the Times, the flames suddenly burst out in the centre of the block of buildings, while the works were in full operation and all the hands busily engaged. The fire extended rapidly. The fire was not overcome until after many hours of hard work; and although the destruction of the dwellinghouses and shops surrounding the fire was fortunately prevented, Messrs. Peto's large buildings were entirely gutted, and, as is shown by the official report, very serious damage was caused to other property.

The Sanitary Institute's Congress at Brighton.—A deputation from the Institute visited Brighton on Saturday, and met the Mayor and other members of the committee for the purpose of further considering the Congress and Exhibition to be held in the Pavilion Buildings at the end of August. The large Dome of the Pavilion, the Corn Exchange, and the Picture Gallery are all devoted to the Exhibition, but the applications for space are considerably in excess of previous years, and probably some difficulty will be found in accommodating exhibitors.

Institution of Mechanical Engineers.—Sheffield is to be visited this summer by the Institution of Mechanical Engineers, and arrangements are being made to give the members a fitting reception. A committee for this purpose was appointed a short time since, of which the Mayor is chairman, the Master Cutler the vice-chairman, Mr. R. A. Hadfield honorary treasurer, and Professor Ripper and Mr. R. Heber Radford the honorary secretaries. It is expected that nearly 400 members will be present.

Camden-place, Chislehurst.—This historic mansion and park, which formed the subject of a paragraph in our columns on May 17, are to be sold at the Auction Mart on the 27th inst. by Mr. David J. Chattell. The first edition of the "Particulars," now before us, gives a view of the mansion, and two suggested plans for the "development" of the property by cutting the greater part of the park into building plots.

The Edinburgh Public Library was opened on Monday last by Lord Rosebery. It will be remembered that in 1886 Mr. Carnegie, of Pittsburg, offered to the City of Edinburgh the handsome sum of 50,000l. to build a public library if the citizens would adopt the Public Library Acts. In October of the same year they resolved to do so, and subsequently steps were taken to carry out the resolution in conjunction with the Corporation, the members of which are, in the first instance, charged with certain responsibilities connected with the provision of suitable buildings and furnishings for the Library. From among several competing designs, those of Mr. Washington Browne, architect, Edinburgh, were selected, and the Library has been built from his designs on the site of the old Hope House, Cowgate. We gave interior and exterior views and plans of the Library in the Builder for July 16, 1887.

PRICES CURRENT OF MATERIALS.

Table with columns for material names (e.g., Greenheart, Teak, Mahogany), units, and prices in £, s., and d. Includes sub-sections for TIMBER, METALS, and OILS.

LONDON.—For alterations and additions to St. Saviour's National Schools, Paddington, W. Mr. F. G. Coward, architect:— Pollock & Son 44,926 1 9

LONDON.—For altering the old Wells-street College, Hackney, into an auxiliary workhouse. Messrs. A. & C. Harston, architects. No quantities:— Todd 44,520 0 0

LONDON.—For iron and concrete fire-escape stairs, and some lavatory buildings at the workhouse, Bethnal-green. Messrs. A. & C. Harston, architects. No quantities:— Flew & Co. 2,028 0 0

LONDON.—For internal distempering and painting at the Poplar and Stepney Sick Asylum, Bromley-by-Low, Messrs. A. & C. Harston, architects. No quantities:— Webb 4,350 0 0

CONTRACTS AND PUBLIC APPOINTMENTS.

Extractions of Advertisements in this Number.

CONTRACTS.

Table with columns: Nature of Work or Materials, By whom Required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page. Lists various construction contracts.

LONDON.—For painting and other works at the Paddington Poor-Law Infirmary. Messrs. A. & C. Harston, architects. No quantities:— Vidor & Co. 2,388 0 0

LONDON.—For the erection of factory, for Mr. J. G. Gibberd, boot and shoe manufacturer, Old Kent-road:— Cauling & Mullins 21,070 0 0

LONDON.—For alterations and additions to the "Lyric Hall," Hammersmith, for the Mortgage Insurance Corporation, Limited. Mr. Isaac Mason, architect. Quantities supplied:— G. Ansell 22,588 0 0

LONDON.—For alterations and additions to No. 57, Gloucester-road, Camberwell. Mr. William A. Burr, architect, 65, Chancery-lane, W. C.:— Lark & Sons 1,157 0 0

LONDON.—For painting, &c., to the external portions of the Workhouse and Infirmary, St. Leonard, Shore-ditch. Mr. F. J. Smith, architect and surveyor, Winchester House, 50, Old Broad-street, E. C.:— Thomson & Sons, Hackney-road 1,325 0 0

PUBLIC APPOINTMENTS.

Table with columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Lists public appointments.

TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

COLCHESTER.—For the alterations and additions to farm buildings, Stansway Hall, proprietor supplying all bricks, cement, lime, ballast, and sand. Mr. J. W. Start, architect, Cups-chambers, High-street, Colchester:— Gardner & Son, Coggeshall 21,483 0 0

LONDON.—For the erection of new Registry Office at the General Post Office (West), St. Martin's-le-Grand, for H.M. office of Works. Mr. Henry Tanner, architect:— W. Duckridge, Kensington* 22,247 0 0

LONDON.—For alterations at "The Rose and Crown," Devere-road, Bromley-by-Bow, E., for Messrs. Smith, Garrett & Co., Limited. Messrs. Fletcher & Mizgott, architects:— Lusk 5,744 0 0

LONDON.—For painting and plumbing work at the St. Marylebone Infirmary, Ruckham-street, Notting-hill, for the Guardians of the Parish of St. Marylebone:— W. G. Lilly, 5, Whitcomb-street, W. C. (accepted) 4,637 0 0

COVENTRY.—For building work at Messrs. Taylor, Cooper, & Binfield's Cycle Works. Mr. E. J. Purcell, architect, Coventry:— C. G. Hill 55,495 0 0

LONDON.—For rebuilding No. 49, Great Portland-street, W., for Mr. Joshua Thompson. Mr. Albert E. Pridmore, architect, 2, Broad-street-buildings, E. C.:— R. Perkins 2,967 0 0

WANSTEAD.—For making-up roads for the Wanstead Local Board of Health. Mr. John T. Bressley, Surveyor:—

Table with columns: Marlborough road, Sprattall-road (part of), Sylvan road, Wellington-road (part of), Cowley-road (part of), Hall-road. Rows list various locations and their respective measurements in £ s. d.

* Tenders accepted.

LYNTON (Devon).—For the erection of banking premises for the Devon and Cornwall Banking Co., Limited. Mr. Arnold Thorne, architect, Barnstaple:—

MALDEN (Surrey).—For the erection of a new Police-station at Malden, for the Receiver for the Metropolitan Police District. Mr. John Butler, architect. Quantities by Mr. W. H. Thurgood:—

Table listing quantities and costs for Malden Police Station, including items like Messon, Patman & Fotheringham, Sweet & Loller, etc.

THAME.—For gas-holder tank, for the Thame Gas and Coke Co.:—

Table listing quantities and costs for Thame gas-holder tank, including items like B. Holland, Thame, Kimberley, Banbury, etc.

TRENOWTH (Cornwall).—For the erection and completion of a new dwelling-house and farm-buildings at Trenowth, Grampond Road, for Mr. Robert Harvey. Mr. Silvanus Frevall, architect, Truro. Quantities supplied by the architect:—

Table listing quantities and costs for Trenowth buildings, including items like J. P. Berry, Plymouth, W. Giles, Jun., St. Austell, etc.

WOOLACOMBE (near Northoe, Devon).—For the erection of two dwelling-houses for Messrs. Arnold Perrett & Co., Limited. Mr. Arnold Thorne, architect, Barnstaple:—

Table listing quantities and costs for Woolacombe houses, including items like E. Ellis, Bideford, A. Sless, Ifracombe, etc.

No Senders Names.—Lists of tenders for works at Fulham and elsewhere, without senders' names being communicated to us, are ineligible for insertion.

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TO CORRESPONDENTS.

C. S. W.—C. H. B. (we could hardly send so far specially).—W. F. P.—T. E. (we sympathise with your enthusiasm, but we fear the decorative scheme suggested is not one to be recommended).—J. W. B.—D. J. (we do not publish tenders under 100s.).—T. W. S. (hardly to the point).—D. C. (we have not seen the particulars preferred to).—H. D.—T. H. (sent too late).—E. C. (ditto).—T. W. C. (shall have attention).—M. & T. (ditto).

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SPRAGUE & CO., PHOTOLITHOGRAPHERS, 22, Martin's-lane, Cannon-street, E.C. [Advr.]

QUANTITIES, &c., LITHOGRAPHED accurately and with despatch. METCHIM & SON, (Estab. 1841), 20, Parliament-street, S.W. "Quantity Surveyors' Diary and Tables." 6d. [Advr.]

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The Builder.

VOL. LVIII. No. 2472

SATURDAY, JUNE 21. 1896.

ILLUSTRATIONS.

The Abbey Church, Altenberg, near Cologne.—Drawn by Mr. H. W. Brewer	Double-Page Photo-Litho.
Northington Church, Hants.—Mr. T. G. Jackson, M.A., Architect.	Double-Page Ink-Photo.
Laundry and Stables, Askham Hall, York.—Messrs. Chorley & Common, Architects.	Two Single-Page Photo-Litho's.
Sculpture: "Music" and "Dancing."—Mr. E. Onslow Ford, A.R.A., Sculptor.	Two Single-Page Ink Photo's.

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"Historic Towns": Carlisle and Winchester.



RIOUSLY contrasted in the nature of their history and their interest are the two towns treated of in the latest volumes of the "Historic Towns" series.* To the

modern public Carlisle is a great railroad junction, the name of which has been rather painfully familiar in newspapers lately; while Winchester, considered from the same point of view, is little more than a roadside station. The ordinary traveller who passes it is little aware that the town whose name is painted up at the modest station was in the early days of English history the great centre of English political and ecclesiastical life and strife (the two things were nearly synonymous then), not second to London, even at times and in some lights more important than the London of those early days. But this is not all. In the history of architecture and archaeology Winchester is as interesting as in her political history, and whilst the author of the book on Carlisle expressly points out that he has treated Carlisle in reference to national history and not to local detail (probably conscious of the insufficient interest of the town in itself), the author of "Winchester," although dealing with a town of far greater ancient importance politically than Carlisle ever was, has so much of interest to relate in regard to the town itself that there is no excuse for going outside the subject; the archaeology of Winchester itself is of sufficient interest, independent of the great interests which cluster round it.

Considering the far inferior interest of Carlisle, we may be content with a brief reference to Mr. Creighton's well-written but rather discursive little book. Carlisle (Cærluel) was always essentially a border city, as it is now a border railway station; and in ruder times led the troubled life naturally incidental to a border city; and the epithet "merrie Carlisle," which Scott adopted from an older source, probably referred to the character of a city where there was always some fighting going on or

* "Historic Towns": Edited by E. A. Freeman and A. W. Hunt. "Carlisle"; by M. Creighton, M.A., D.C.L., LL.D.; "Winchester," by G. W. Ritchie, D.D., F.S.A.; Dean of Winchester. London: Longmans, Green, & Co. 1889.

likely to go on. The architectural importance of Carlisle may be said to be centred in the east window of the cathedral, a world-renowned specimen of tracery which has redeemed the building from obscurity. Mr. Creighton mentions its foundation by Norman Walter in 1083, "the same year in which Bishop William of St. Carilef laid the foundations of the great minster at Durham, which the church of Carlisle greatly resembled in design. When it was dedicated the choir, and perhaps the transepts had been built; the building of the nave was slowly carried on as the state of funds allowed." The author thinks that it was this financial operation which led, in this case, to the church being a double one, the choir and transepts belonging to the canons, the nave forming the parish church; the resources of the town not being equal to two separate churches on a large scale. Speaking of the rebuilding of the choir in the thirteenth and fourteenth centuries, the author pays a tribute, not undeserved, to the energy and ambition of the builders who, in spite of the continual misfortunes from fire and violence which befell their building, were determined at least to aim high, and produced a choir which, if fully completed according to its original design, would have been worthy to form a part of a cathedral of the first class, and the famed east window at all events is a continual memorial of the artistic feeling and refinement of the worthy, whoever he was, who set out its beautiful tracery lines. Had the whole cathedral been completed and kept up with the same beauty of detail, Carlisle would have been one of the architectural shrines of the country; but times were too turbulent for this, and the cathedral remains an unhappy monument of the fact.

No one could have been a better or more suitable author for a short history of Winchester than the Dean of its Cathedral, who combines archaeological taste and knowledge of the place and neighbourhood with a good literary style. His book is a model of its kind, easily written, readable, yet full of information. Some gift of imagination and picturesque description is needed to take the reader back to the distant epoch when the future site of Winchester first presented itself to the Roman invader; for one need not of course remind most readers that the "chester" termination is the *castra*, the first part of the name being apparently a double corruption, first of "Gwent" (ancient British) into "Venta"—"Venta Castra,"

subsequently Germanised as "Vintanceaster," whence the transition to the modern name is obvious. Like most historians of the modern school, Dean Kitchin endeavours to picture the landscape and surroundings of the city as affecting the original choice of the site. The south coast in early times we can easily imagine as all wooded, the chief break in the line of forest being caused by Southampton Water. To explore that was a natural impulse almost; a partial lead up into the country. "Even now, if any one lands at the head of the tidal waters just below Bishopstoke, and looks northwards from a rising ground, he will see well-wooded slopes stretching away to right and left, while at the head, apparently, of the valley just beyond where Winchester lies hidden in the lower ground, he will discern an open breadth of country, which seems to invite him onwards into the heart of England, and this, we may well believe, is just what the Roman saw," and fixed his camp at the British hut village. The Dean traces the line of the present High-street as that of the usual central road across the rectangle of the Roman camp. Of all this there is no historic record beyond what the pick and mattock might supply perhaps still, and what fancy may conjecture. As the author says with a pleasing touch of rhetoric, "with the first breath of Christ's religion, like silent strings touched by the wind, history begins to speak in low mysterious tones," some of which echo down to the present time in a very practical manner, for in the seventh century the first endowment of the church in Wessex was granted to the Winchester monks attached to the Saxon cathedral which was the forerunner of the Norman one, in the shape of a grant of land for some distance round the city, given for the building of the church; "and some of these estates remain to the present day, after a lapse of nigh twelve centuries and a half, in the hands of the Dean and Chapter of Winchester"; a curious example of that slow-changing and conservative state of existence which characterises the cathedral cities of England, in such strange contrast with the quickly changing life of modern cities, and which makes them seem like ancient bridges stretching backward across the stream of time, connecting us with the far-away past of our country.

Perhaps the genuine career of Winchester may be said to date from the great King Alfred, who held his court there as King of

Wessex, who made the first existing chronicle of the English people, the first-known survey, ("Liber de Winton") in the country, and founded the "new minster," which occupied the site that is now the northern or north-eastern portion of the present cathedral precinct, but of which the very memory is now only preserved in some of the names, "Abbey-passage," &c., which still cling around the ancient site. For some centuries, however, there was the spectacle presented of two churches of cathedral type and scale, close beside each other in the same city.

Of course at that time the other cathedral, on the site of the present one, was of a much more simple character than that which we now know so well, though it appears to have been an important and imposing building for its early date. It was the work of Bishop Ethelwold at the end of the tenth century, and is described by the enthusiastic eye-witness of its erection, Wulfstan, as of so many chapels, such intricate passages, such numerous columns, that a man might easily be lost in it; "it was crowned also with a mighty tower, with pinnacles and balls of burnished gold, and a weathercock which caught the morning sun, and filled the traveller coming down the hill into the city with amazement." There is something delightfully characteristic of Saxon times in this; one can fancy the cathedral like a kind of child's toy building on a great scale, or like some of those naive pictures of Medieval architecture, towers with bells swinging out at the windows, drawn in Gustave Doré's illustrations to Rabelais.

All this was to pass away when the strong hand of the Norman conqueror was laid upon the land. William made Winchester his headquarters, "for so long as the king over England was also Duke of Normandy, Winchester lay handiest for Rouen. It was not till this connexion was shaken that the importance of the Southern capital began to wane." William found a congenial spirit in Bishop Walkelin, who in 1079 began to build the new cathedral. The Dean's comment on the architectural influence of the Norman rule is so picturesquely put that we may quote it:—

"The new lords of the land, strong and resolute, seem to have considered the cathedral, abbey, and parish churches built in the native style to be deficient in size and dignity; and therefore many older buildings of note were swept away, and new ministers rose to express in stone the dominant ideas of the new masters. These massive churches were eloquent of the constructive boldness of their builders; they became centres of Roman rather than English worship, and belonged rather to the larger and more general church system attached to the revived Papacy, than to the older national system; garrisoned by friendly monks, each church became a Norman fastness; the bishop, high-seated at the easternmost point of the apse, looked down on the worshippers from behind the altar, and seemed to embody the highest claims of the Medieval Church. In Winchester Cathedral the altar above and the sacred well in the crypt below, the one directly over the other, in the exact centre point of the circular apse, were the significant centres of religious worship. No wonder that the English disliked these characteristic apses, symbols of Norman dominance, and, when they had the power, replaced them by a square east end. The apse of Winchester was soon swept away when Bishop Godfrey Lucy undertook to refashion the church, before the end of the twelfth century, in the new style, which is now called First Pointed or Early English."

The Saxon Cathedral was not demolished till the new choir was completed in 1093, when the monks are related to have taken St. Swithun's shrine from the old church to the new. The Dean suggests that Walkelin perhaps built his eastern apse close to the west door of the old cathedral, and then pulled down the latter and built the new Lady Chapel on the site of it; and thus the very ancient-looking work in the crypt beneath is actually part of the oldest Christian building of these parts. The rude style of the work in parts of the crypt certainly warrants this opinion, which has been often before expressed.

Another curious survival of ancient practice is mentioned in connexion with the chapel

of St. Laurence, the palace chapel of the Conqueror's day, to which to this day each bishop goes before his installation in the Cathedral. Originally this was to pay homage to the king in his palace, which was a necessary ceremony before taking possession of the see; and the practice is still kept up though the real meaning for it has been for centuries in abeyance.

Winchester was omitted from the Domesday Surrey, probably because it was to be treated on a different principle, and the author's summary of the results of the survey of the city made under Henry I. collects in a short space a good deal of curious information. The general impression conveyed, he tells us, is that the houses were few and the population only from six to eight thousand. We may direct the reader's attention also to the chapter on the days of Henry of Blois (1129-1171), whom the Dean calls perhaps the greatest of Winchester bishops, certainly a strong though turbulent and tyrannical character, who on his death bed denounced Henry II., who came to see the dying man, "durissime et dirissime" for his share in Becket's death. It is interesting to note that, like Pope Julius in later days, he combined with violence and wilfulness of temper a great love of art, and was a collector of silver work and jewels and carvings, for which he built a treasure house in the cathedral, which in its peculiarities of style shows some reminiscence probably of his foreign travel. Not long after him came the days of Bishop Lucy, and of the removal of Walkelin's Lady Chapel, and all the excitement of the new building in the new style. He, it is noted, established the first English Church Building Society, "a confraternity for the repair of the church, to last five years." Like many other medieval builders, as well as some modern ones, they did not understand the subject of foundations, and part of their work has settled far out of the perpendicular. The Dean's remarks as to the special object of the new building, as far as plan was concerned, are worth citation; we say advisedly "as far as plan was concerned," for no doubt architectural enthusiasm for the new style was the most urgent influence in the work; people removed and rebuilt things then because they thought they had something better in their mind, and could not help doing it; but the description of the motive for the arrangement of plan is of considerable interest:—

"The object of Bishop Lucy's enlarged church, which lay to the eastward of the ancient building with a new Lady Chapel, is plain; it was intended to provide space for the crowds of pilgrims who flocked to St. Swithun's shrine. That shrine was placed in the centre of this part of the church (between the present chantries of Waynflete and Beaufort); and the monks, though willing enough to receive their offerings, turned their faces away from the persons of the dirty unwholesome crowd, and excluded them carefully from the main church. They made them enter by a Norman doorway in the north transept, which opened into the churchyard, away from the conventual buildings; after they had paid their offerings or fees in that transept, they visited the shrine, and were stopped on the south side by those interesting gates of wrought iron, still preserved in the Cathedral, and which are probably the oldest specimen of English wrought iron-work. And so this part of the building became practically a second church under the same roof, with nave, aisles, and Lady Chapel all its own."

Of the more popularly celebrated Winchester bishop, Wykeham, the Dean speaks with due appreciation but without enthusiasm, as one who "left to us a somewhat dull and monotonous architectural style, capable however of very dignified effects, and a sound type of traditional education. . . . while there is no genius in him or originality, he is the English churchman at his best." To speak of Wykeham as the personal inventor of the Perpendicular style is surely going too far; styles were not personal inventions, even less so then than now; and on the other hand the scheme which he apparently originated and carried out, or at least superintended, for transforming the Norman nave of his Cathedral into the new style of his day, is certainly marked by that kind of boldness in conception

and fearlessness in execution which is a special characteristic of genius.

Among the later historical associations which cluster round Winchester none certainly is more memorable than that first meeting of Philip II. and Mary, after the long ride of the King and his Spanish followers in the wind and rain from Southampton, told with such picturesque force by Froide; but this belongs to the realm of history proper, unconnected with the architectural development of the city, with which we are chiefly concerned. Some account is given in a later chapter of the book as to the comparatively modern transformations of Winchester; the general repair of the Cathedral Close in 1661, and the insanitary state of the city about the same period. Just before the Great Plague year various sanitary regulations of a primitive kind were passed, but even these were not attended to; drainage, as now understood, was unknown, and the houses, many of them built of mud and thatched with straw, were not of a character to make the best of bad sanitation. Accordingly, the plague had its fling at Winchester. Another matter about which we believe very little is known, is the intention of Charles II., who frequented Winchester a good deal, to have a grand approach to the Cathedral made. The Dean tells us that in the Cathedral archives there exist two documents bearing on this project, one signed by Christopher Wren and the other by Rochester, forbidding the Dean and Chapter to lease any of their land to the south of the town until the King's pleasure was known. It would have been highly interesting to see what Wren would have made of this opportunity of laying out an approach to the Cathedral in his own way.

In conclusion we may say that this volume is by far the best, to our thinking, of the "Historic Towns" series. No doubt the author has been exceptionally fortunate in his subject; but his literary ability and picturesqueness of style have enabled him to turn his materials to the best account in producing a short history which is not only full of information, but as interesting reading as a novel.

THE GERMAN NATIONAL MONUMENT QUESTION.



WE have more than once referred to the discussions in Berlin as to the proposed national monument to the Emperor William I., and the form in which it should be embodied; and as the Government seem now about to take the matter in hand, it may be convenient to sum up the position at the present moment in regard to a matter which is of some importance in the art world, and which has been the subject of some very acrimonious criticism in the artistic circles of the German capital.

In accordance with a bill passed in December, 1888, the sum of 5,000L. was placed at the disposal of the Government for the purpose of obtaining a suitable design for a monument to the Emperor William I., by means of competition.

For the purpose of facilitating the choice of a site for the monument, as well as for the purpose of obtaining ideas as to what kind of monument might be deemed suitable, a preliminary competition was opened in March, 1889, and 1,600L. of the 5,000L. offered in prizes.

This competition was decided in October of the same year. Of the 147 designs sent in, the two classed first were by architects, whilst the four classed second bore the names of sculptors. By far the majority of the designs showed extensive schemes to be planned on sites outside the town proper (on the Königsplatz, Siegesallee, &c.); of those still remaining the larger number was destined for the Pariser Platz, just inside the old Brandenburg Gate, whilst the rest were either to find room on the Schlossfreiheit (in front of the Imperial Palace), on the Castle Bridge, or on the finely-situated Opera Place, at the corner of which

the historical window of the deceased monarch's residence is to be found. The jury were, however, unable to come to a unanimous conclusion as to the site to be preferred, and merely noted in their statement that on putting this question to the vote, nine of the members voted for a site outside the gate, and that the votes of the remaining five of their number were divided between the Opera Place and Schlossfreiheit sites inside the town.

Since the date of this statement, which otherwise simply treated of the various designs, in order of merit, without in any way recommending any special idea, nothing definite could be reported for a long time, although it was an open secret that the young Emperor had been keeping the subject before him, and had even gone so far as to consult his favourite sculptor, Reinhold Beggs, together with a court architect of indifferent merit, as to their ideas, at the same time stating his view of the question.

Then came the distinct news that Professor Beggs had been working out a design in accordance with the ideas of his patron; and now during the last month the subject has at last, as it seems, been taken firmly in hand.

During a sitting of the "Kronrath," under the presidency of the Emperor, the subject was discussed; and, some three weeks ago, we were able to state that the "Bundesrath" would be asked to come to certain decisions* very different to what the public at large would be in favour of; and now, after these decisions have really been requested from this body, the "Reichstag" has last week received an official notification that they would be asked to come to similar conclusions.

As before observed, we have every reason to believe that such requests of the Government will be granted, as it is well known that no other idea would have much chance of being approved of by the Emperor, and we do not even believe that the decisions will require debates of noticeable length, now that the Government has at the same time notified their opinion that they consider that the monument should in the first place be a monumental representation of the monarch himself, as a person; and that to go farther than this, and to erect an extensive architectural monument on which also those persons should be memorialised who have played important parts during the foundation of the new German Empire, would be likely to lessen the predominance of the Emperor himself in the design, or, if this was not to be the case, would require that his figure should be treated in a spirit of self-assertion quite at variance with his simple ideas and manners.

Taking their own views into consideration, *é.é.*, that no extensive architectural design would be advisable, and that an equestrian portrait statue only would be the more suitable style of monument to the deceased monarch, the Government has naturally not given those sites outside the Brandenburg Gate any more thought, but has recommended instead, for several reasons (among which that of economy appears to be predominant), the Schlossfreiheit, or rather the new extension thereof, now being acquired by means of a lottery.

In itself the idea of commemorating the old Emperor by a simple equestrian statue is suitable enough; but it is another matter when this is regarded as the national monument, the result of a national subscription, especially as every province and every important town has its own scheme for a monument to the founder of the modern German empire. The city of Berlin might very well itself dedicate an equestrian statue to the memory of the Emperor, as the monument of the capital city, and place it on this very easily acquired site in front of the present Emperor's residence; but a monument which is to stand as the offering of the German nation seems hardly to be adequately represented by a single portrait statue. And it would seem only fitting that a national monu-

ment to the founder of the empire should include some memorial of those who were most prominent and distinguished among his servants, even if it did lead to the introduction in a prominent position of the figures of the Emperor Frederick and of Prince Bismarck who are at present very unpopular in high places.

The objection made to any larger scheme than the single equestrian statue seems, indeed, to be the result either of jealousy, or of a desire to do the thing cheaply, or of both feelings combined. But in this case why was there any competition opened at all, to delude artists with false hopes? It can scarcely be pretended that the ideas now promulgated on the subject arose in any way out of the first competition; and why has the time and labour of artists been so lavishly played with for no purpose? It is to be hoped the German Government will in future be less reckless in opening competitions which are to have no result, and that the present ill-managed affair, and the annoyance and criticism it has raised, will serve as a warning against similar mistakes in the future.

While sympathising with the Berlin architects and artists in their disappointment, and while concurring in their idea that a monument to an Emperor by national subscription should be something on a large scale,—something that may seem an adequate expression of the recognition and loyalty of a great nation, and that a mere portrait statue can hardly be so considered; we must admit that it is rather a difficult matter to decide what the nature of such a monument should be. The result of the competition for the Victor Emmanuel Monument was not encouraging in regard to the idea of built-up monuments, squares or semicircles of architecture surrounding a central statue or group. To justify a work of that kind, it is necessary that every portion of it should possess sculptural or other detail of special interest and significance; a mere piece of built-up ornamental architecture, like that which many of the Victor Emanuel competitors proposed, is apt to impress one with an idea of its uselessness and baldness of expression in comparison with what has been expended on it. The choice seems to lie between a great group of sculpture, such as M. Dalou has executed to commemorate the French Republic, or an architectural erection serving as a framework for sculpture or a *point d'appui* for sculptural groups. The monument to Gambetta at the Tuileries is not a bad type of this latter kind of monument, in which the architectural element is exceedingly simple, and merely serves as a centre point for the sculpture to cluster round and be relieved against. If it be desired to develop the architectural element rather more, it may be said that in general idea the Albert Memorial in this country is a good example, although open to much criticism in regard to points of detail. But something of this kind, an architectural shrine for the principal figure, with bas-reliefs and supporting groups of sculpture in which events and subordinate actors can be represented, so as to compose into a united whole, might be recommended to our German friends as the best type for the solution of the problem, if they are still to have any chance of engaging in it.

THE WORKING OF THE CONCILIATION CLAUSES OF THE RAILWAY AND CANAL TRAFFIC ACT.

A REPORT by the Board of Trade upon the above subject has recently been laid before Parliament, in accordance with the provisions of the Act, in which the cases dealt with are set forth in more or less detail, accompanied by some valuable observations by the Department. It will be remembered that this mode of procedure, which is entirely new to English practice, was introduced into some of the earlier Bills, but was allowed to drop. In 1887 it was abandoned while the measure was in the House of Lords, on the ground that no

new tribunal for dealing with railway questions was necessary; but it was again inserted in the Bill of 1888 (which became law), and the report under consideration gives a good idea as to how far the experiment has proved successful.

The Board remark that the clause "imposes upon the Department the duty of endeavouring to arrange the differences between traders and railway companies, which, in some instances, might be brought before the law courts, but which the Legislature appear to consider might be usefully dealt with by the friendly action of the Department." That the Legislature were justified in anticipating a beneficial result may be considered proved by the fact that out of forty-nine complaints which have been made under the section, twelve have been settled to the satisfaction of the complainants; while in nineteen other cases explanations have been made through the medium of the Board of Trade, and the complainants have taken no further action. It is not unreasonable to assume (as the Report observes) that in some, at least, of these latter cases the explanations obtained have been considered satisfactory.

Of course, the Department had to consider, in the first place, whether they could properly deal with the various matters submitted to them. They were placed in a rather peculiar position, being authorised, "if they think there is reasonable ground for complaint, to call upon the railway company for an explanation, and endeavour to settle amicably the differences between the complainant and the company." Although the Board of Trade have no power to enforce their decisions, there could be no doubt that any expression of opinion on their part would have considerable weight as coming from a State Department; so that it was necessary for them to carefully avoid taking up matters which could only be properly determined by legal action. The Report explains that they took the opinion of the law officers of the Crown as to the extent of their jurisdiction, and that they were advised to act upon a wide interpretation of the section, until experience had shown that interference in any particular class of cases was useless or injurious. This rule the Department seem to have adopted, as they have entertained most of the applications made, while cases occasionally arose which they declined to proceed with. For example, in the case of a complaint of an increased rate charged by the Brecon and Merthyr Railway, the company contended that the increase was due to the discontinuance of a rebate in accordance with another section of the Act, and that its further allowance would be illegal. This case, the Board decided, was one which should be submitted to the Railway Commissioners. Another complaint by the Liverpool Chamber of Commerce and others was based upon the relative severity of the rates from Liverpool to Birmingham and district, compared with those between Cardiff and the Birmingham district. The answers of the different railway companies interested opened up a wide field for inquiry,—such as the effect of water competition and various other circumstances,—and the Board wisely came to the conclusion that the complaint was too wide and complicated a problem for them to deal with.

In other cases their interposition was clearly beneficial, and was much appreciated. In an important colliery case, although no settlement could be arrived at, the Board arranged a meeting at which the question in dispute was discussed; subsequently receiving a letter in which the complainants expressed their indebtedness to the Board of Trade, and stated that it had been arranged to present a friendly case to the Railway Commissioners for their decision. It is not at all improbable that amicable discussions such as these, due to the friendly interposition of a neutral mediator, might not otherwise have been brought about at all. Several complaints of increased charges resulted in the old rates being reinstated, the explanation of the railway company in one of these cases being that the increase was due to a clerical error. An appli-

* See Builder, May 24, 1890.

cation by a Glasgow manufacturer resulted in the reduction of a certain rate from 2*l.* 10*s.* to 1*l.* 10*s.* 10*d.* per ton, "with which," the Board are particular to add, "the complainant is satisfied."

At the same time the Report is not without cases terminating in a way calculated to "satisfy" the railway companies. On investigating one case they found that "there was no just ground for complaining of unreasonable or oppressive treatment on the part of the railway company, as the increased rate, which was reasonable in itself, was the ordinary rate charged in the district under similar circumstances, and was considerably below the company's maximum of charge." We may mention another case in which an interview was arranged, resulting in an offer on the part of the railway company to reduce a rate from 7*s.* 7*d.* to 6*s.* The complainants declined to accept this (because other disputed rates were not altered), upon which the Board stated that they considered the offer made a fair one, and that they could not consent to ask the company to reconsider the matter.

When the scheme was first proposed the railway companies regarded it with disfavour, not considering the Board of Trade competent to deal with the questions which would be submitted to them. A railway journal, under date June 21, 1888, remarked that the only method by which a system of conciliation could be successfully worked would be by the appointment of a number of railway men, thoroughly conversant with goods rates business, as assistants in the Board of Trade Department. It was further declared necessary for this body of assistants to be men who had not only been engaged in the ordinary goods rates departments of the railways, but who had also an all-round knowledge of railway freight business both of this country and also of the Continent and of America and the Colonies! Now it is evident that, although the Board have no doubt found it advisable to strengthen their railway department since the passing of the Act, the writer alluded to entertained a very exaggerated estimate of the duties imposed upon them by this section. This first report affords proof, we think, that as intermediaries,—which was all that the measure designed them to be,—they have been fairly successful; and we may safely assume that they have not found it necessary to call to their aid an array of experts possessing all the qualifications supposed to be so indispensable.

NOTES.

AS will be seen by our report of the meeting of the London County Council this week, the Building Act Committee have at length reported on the referreces made to them many months ago as to the appointment and tenure of office of District Surveyors. The report of the Committee was not reached until too late in the sitting for any consideration to be given to it; but inasmuch as, by its appearance on the *agenda*, it has become a public document, we print it this week for the information of our readers. The Committee do not see their way to the payment of District Surveyors by any other method than by fees, as at present; but by way of counterbalancing this negative conclusion they make the positive recommendation that future District Surveyors be appointed only on condition that they devote their whole time to the duties of their office. The Committee recommend that the Districts be re-arranged as opportunities offer, so that the average of the fees received may in no case amount to less than 500*l.* per annum. It is more than questionable, we think, whether, if these changes be adopted, men of capacity and integrity will be induced to become candidates for District Surveyorships. In the proposed conditions of candidature for such appointments, the Committee, curiously enough, make no mention of the fact that no one can become a candidate unless he

pass the statutory examination and hold a certificate of competency issued by the Royal Institute of British Architects, the examining body for such purpose under the Metropolitan Building Act.

COMMITTEES who are concerned in organising competitions, and who appoint a professional assessor either to adjudicate or to guide them in adjudicating, should bear in mind that in the case of buildings of a special character and for a special technical purpose, it is utterly useless, and worse than useless, to appoint as assessor any architect who has not special knowledge and experience in regard to that particular class of building. We have known of cases (and one was mentioned to us recently) where an assessor has been appointed to adjudicate on plans for a technical building who had never had any experience in planning that type of building at all, his own rather moderate reputation having been made in connexion with works of quite a different class and requiring no special knowledge, and this too in a case where the competing architects were mostly specialists; which makes the matter worse. To choose a competition assessor on such a system, and act on his advice, is casting a slur on the competing architects, and putting them in a most unfair and derogatory position, the probable result being that the plans are selected without any real reference to their technical fitness, and the appointment of an assessor becomes a mere farce.

THE Corporation of Eastbourne are about to adopt a plan which we have long advocated,—viz., the granting of certificates to the proprietors of such lodging-houses as are certified as being in a proper sanitary state. For this purpose the staff of sanitary inspectors is to be enlarged. This plan will have, sooner or later, to be adopted by all watering-places, but none the less is the utmost praise due to the authorities of Eastbourne for appreciating its necessity and for carrying it into execution. But care must be taken that old certificates are not shown to visitors, and that the houses are periodically inspected. It is obvious that if a house gets into bad repair, and the owner possesses an original certificate, it would be easy to get the better of unsuspecting or careless visitors. Of course, the latter should be their own protectors; but none the less should care be taken that the system of inspection is kept continually perfect. One of the great dangers of a sea-side residence will then be removed.

THE jurors appointed to consider the competition designs for the project for a tower to overtop the Eiffel Tower have issued their report to the directors of the "Tower Company." They report that they have given very careful examination to every drawing, and although there were good points about many of them, they confess to being disappointed with the general result, and express regret that "there is no single design which we could recommend as it stands for execution." This we are at all events glad to hear. The design which they recommend for the first premium of 500 guineas, that by Messrs. Stewart, Maclaren, & Dunn, is the one we pointed out in our "Note" of May 3 as the best one in regard to design, with an entrance façade treated in a rather Oriental style; but they state that though many of the designs were at once eliminated as unsuitable, they did not arrive at the final award without repeated and prolonged consideration. The second premium of 250 guineas is awarded to Messrs. Webster & Haigh, of Liverpool. The Jurors are Mr. E. H. Carbutt (Chairman), Sir F. Bramwell, Sir B. Baker, Mr. E. J. Harland, Professor A. W. B. Kennedy, and Messrs. C. Liddell, J. F. Moulton, and Thomas Verity. We cannot help regretting to see the name of Sir Benjamin Baker connected with so foolish a business.

MORE than two years ago we suggested that some of the porous fragments of colossal snake-bodies found to the south of the Parthenon might possibly turn out to belong to Cecrops, the earliest of Athenian legendary kings; but hitherto the majority of the fragments have turned out to belong to the bodies of a Typhon and of Tritons. Our suggestion has, however, now been realised. Dr. Alfred Brückner, who has done so much for the restoration of these porous pediments, publishes in the last issue of the Athenian *Mittheilungen* his reconstruction of the last remaining fragments. The composition consists in the main of a figure of Herakles wrestling with a Triton, the Triton's tail filling the left-hand angle of the pediment; but on the right-hand angle is another snake-tailed figure quietly watching the contest. He, moreover, holds in one hand an unmistakable bird, which can scarcely be other than the eagle of Zeus. In fact, the famous struggle of Herakles is conceived of as taking place not in the Peloponnesus but in Attica itself, under the auspices of the old Athenian king. Very little of the figure remains, but the hand holding the bird is distinctly preserved. Up till now our earliest representation of Cecrops has been the well-known Berlin terra-cotta, where he watches the birth of Erichthonios. The newly-constructed pediment now takes the first place. The eagle in the hand of Cecrops in place of Zeus will raise some interesting questions for mythologists,—questions that cannot be discussed here. Dr. Brückner's long and able paper is devoted chiefly not to these side issues, but to a justification of his ingenious restoration.

IN reference to the Leipsic "Rathhaus" question mentioned on page 149 *ante*, we now hear that the municipal authorities have decided against their City Architect's design, in which was shown a clever solution of the problem of saving the old Town-hall, and the former Booksellers' Exchange close by, and the connection of these two archaeological relics, with a well-planned extension, in which the committee-rooms and offices required were to be placed. The authorities, contrary to the advice and expectation of most competent judges, have come to the conclusion that a renovation of the old buildings, combined with an extension, would be inadvisable; that an entirely new building, containing the administrative offices, in combination with a new Town-hall, presentation rooms, &c., would be preferable, and that for the fulfilment of this idea a special committee should be elected for the purpose of working out a clear programme of requirements in such a building and framing a set of conditions for a competition for designs open to all architects residing in Germany. Whilst the official *Centralblatt der Bauverwaltung* expresses a hope that architects of repute will not send in designs for this competition, another architectural paper sarcastically remarks that many a long year will still elapse before the Leipsic citizen will see his new town hall. From our point of view, we hope that the number of designs sent in at the proposed competition may be 0, and that, as the City Architect has expressed his intention of not troubling himself about the matter any more, the authorities may some day find out that advice from competent persons should not be overlooked.

AT Hamburg there is a good deal of interest aroused at present in regard to the new scheme for extensive harbour works for Cuxhaven, to be situated on and off that piece of ground at the mouth of the Elbe which belongs to the old free Hanse Town farther up the river. The scheme, which has just been formally laid before the governing authorities of the town, and which has every chance of being soon approved of, shows that 380,000*l.* is the figure at the foot of the estimate, and that full three years' time will be necessary to do the work in. These new harbour works, when complete, besides being of great service as a place for

landing the passengers and mails of transatlantic steamers, unable to pass up the river at low water, will also be of considerable value as a harbour of refuge to such ships when waiting to pass through the North Sea-Baltic Canal, now in construction, and will have the great advantage of being "free," hence permitting the unloading and reloading of cargoes, and the temporary warehousing of them, without duty dues.

IN the *Semaine des Constructeurs* for June 14 there are published a series of small sections and plans illustrating the proposed extension of the Sceaux railway inward into Paris, by means of what is practically an underground railway with a terminus near the Luxembourg Museum. Those who have experienced the difficulty and loss of time in being conveyed to the present terminus of the Sceaux railway, which forms a kind of *ultima Thule* on the outskirts of Paris, will appreciate the gain to the public from this proposed construction.

WE have had an opportunity of seeing a model of what is claimed to be an "improved system" of road-paving, invented and patented by Mr. Frederick G. Helmore, and which forms the subject of Specification No. 12,011 of 1889. Briefly described, the method proposed by the patentee consists in the provision of what he calls "sectional casements," or shallow trays, as we may call them, measuring at their maximum (say) 20 ft. or 25 ft. long by 10 ft. broad; or they could be made of any other smaller size, so that one, two, or more of them would cover the width of the roadway of a street. These "sectional casements" the patentee proposes to make of malleable iron, steel, or other material (including wood). They are provided with flanges at the edges, which enable the sections to be bolted together, and which also serve, in conjunction with a central raised rib, to enable the wood or other paving-blocks to be keyed together. The paving-blocks rest directly on the iron or other surface which forms the bottom of the "sectional casement," which surface it is proposed to groove or furrow, so as to carry off into side-channels any liquid passing down through the joints of the wood blocks. In the case of a street only 20 ft. or 25 ft. wide as to its roadway, one of these "sectional casements" would cover the whole roadway. Each section is cambered, so as to give the roadway a proper amount of fall from its crown to the sides. The advantages claimed by the patentee are (1) that these "sectional casements" could be made at the factory, and filled in with wood blocks or other paving material before being brought to the street where they are wanted; (2) that they would require no bed of concrete under them, only bearing or foundation slips at each side (and at an intermediate point or points where more than one "sectional casement" is required to cover the road); and (3) that roads could be repaved very expeditiously with this system, drains, gas-pipes, &c., being readily got at by lifting up one or two of the "sectional casements" at a time. The inventor claims that his system would be nearly as economical in cost as the present systems, the cost saved in concrete going towards the cost of the iron-work. We confess that even if the cost of the inventor's system would compare with those of the present systems, which we very much doubt, there seem to us to be other practical difficulties which it would not be easy to overcome. In the first place, it would be very difficult to adjust the proposed "sectional casements" to the ever-varying and irregular widths of London streets. Secondly, the comparatively thin iron trays (for such, practically, are the so-called "sectional casements") would hardly, we should imagine, sustain heavy traffic without fracture, unless carefully and tightly packed underneath with earth between the bearing-points on the concrete. It is very easy for a plate-layer to pack a sleeper; but how is the space under an object 10 ft. in width to be effectually packed? While we are glad to

find inventors working at the problem of improved street paving, in view of cleanliness, convenience, and safety, we cannot think that the invention under notice solves the problem. There is, however, something to be said for the idea of the inventor's patent, No. 20,945 (1889), for providing a ready means of quickly flushing the surfaces of roads from the crown. But this last-named patent is applicable to any kind of road, and the adoption of some such method would not only abolish the water-cart, but would prevent an incalculable amount of suffering to horses on wood and asphalt roadways at certain times.

MR. SPEARS' report to the Local Government Board on an outbreak of enteric fever in the Pemberton Urban Sanitary district, Lancashire, turns in part on causes belonging to purely medical administration; but, as usual in such cases, there are defective conditions of sanitation favourable to the development of disease. Of the Pemberton and Orrell division it is observed:—

"The privy midden is in universal use in both districts. The structures, speaking generally, are large and deep, admitting of much accumulation of refuse, and, no doubt, of soakage of foul matters into the soil. They are often in very close proximity to dwellings, and when emptied, the refuse has first to be thrown on to the unimproved surface of the yards. This work of removal is provided for in the Pemberton district by the Authority; in Orrell it is left to owners and tenants, who are dependent upon the goodwill of neighbouring farmers. At New Town, Pemberton, nuisance has been caused by the deposit of the collected midden refuse on vacant land in close proximity to rows of houses."

Further conditions which require the attention of the sanitary authority are noted as follows:—

"The house accommodation of the district requires much attention. There are houses at Lamborn-green that from dilapidation, dampness, want of proper ventilation, and from the sewage-soaked state of the surrounding surface are unfit for habitation. At New Town, a damp, low-lying locality, there is a great want of proper surface drainage and paving; the houses are largely of the "jerry" class, and often dilapidated and dirty; middens containing foul accumulations of refuse stand close by the kitchen doors and windows, and at one spot, close by a row of houses, a quantity of midden refuse was last summer deposited by the contractors in the employ of the authority. Speaking again of the sewer system, it is evident that much unpurified sewage finds its way into the Douglas. There is only one tank for the deposition of sludge before the sewage is applied to the land, and whenever the tank requires cleaning the sewage is passed by the overflow direct to the river."

WE understand that a deputation from the London United Building Trades' Committee is to wait upon the Royal Institute of British Architects on Monday next, at 4 p.m., to ask that body to place clauses in all contracts to prevent sub-letting, sub-contracting, and "sweating" in the building trades.

A PORTION of a lecture on "Electrical Phenomena in Nature," by Mr. Shelford Bidwell, published in *Nature* for June 12, contains an important suggestion in regard to the circumstances in which lightning-conductors are or are not efficient. The real value of a lightning-conductor, according to Mr. Bidwell's view, is that it establishes a silent and harmless discharge of electricity as fast as it is generated, in the case where a cloud charged with electricity is hovering over a building. According to this view it would seem that we are to consider that a kind of safe and easy path for electrical discharge is formed. But Mr. Bidwell maintains (and he illustrated the theory by experiments at the original lecture) that if a harmless uncharged cloud received suddenly an overflowing charge of electricity from a distant cloud, there is no certainty that the overflow discharge from it, instantaneously made and without a previous electrical condition of the air, would seek out the lightning-conductor. The electrical path would not have been formed in

that case, and it is hopeless, we are told, to make the lightning-conductor so much the easiest path that all others are protected. This does not in our opinion alter the statistical fact that in the immense majority of cases lightning-conductors are an efficient protection, but it points out a certain state of things in which they will not be, and perhaps accounts for some of the injuries by lightning done to buildings supposed, according to the generally-received theory, to be fully protected.

IN the course of this week were sold by auction, on the premises, all the furniture, fittings, and effects, including the wings, scenery, &c., of the theatre, appertaining to Evans's Club, King-street, Covent-garden. The once favourite resort known as "Evans's" formed part of a hotel, at the north-western corner of the Market-square, of which W. C. Evans, of Covent Garden Theatre, was at one time lessee. He was succeeded here, in 1844, by John, or "Paddy," Green, who carried on the business for nearly thirty years. The large music-room, familiar, doubtless, to some of our older readers, was built in 1856, after the designs of Mr. Finch Hill, on ground which had been the garden of Orford House. It has since been converted into a theatre, with an end and side galleries. We believe it is still a moot point whether "Evans's" or the "Cyper Cellars" is the original of that "Cave of Harmony" wherein, on one memorable evening, Colonel Newcome sang "Wapping Old Stairs" as he had learnt it from Inledon. The lease of the whole premises, held for an unexpired term of five years, at a ground rent of 200*l.* per annum, with an estimated rental value of 2,000*l.* a year, was withdrawn from the sale, as the reserved price was not reached.

ORFORD HOUSE is depicted in Hogarth's (reversed) plate of "Morning," and in Canaletto's large painting of Covent Garden Market, circa 1750. It was built about 1716 for Edward, grandson of Francis, fourth Earl of Bedford, who for his victory over the French fleet under De Tourville off Cape La Hogue, 1692, was created Earl of Orford on May 7, 1697. Its lofty Dutch facade, since altered, was intended to resemble the stern of a man-of-war; and a large quantity of ships' timber was used in the building. The house, constructed of red brick, contains a fine main-staircase and a spacious suite of rooms upon the first-floor. The billiard-room, on the top-floor, is fitted up after the style of "Old London." Lord Orford died, *æt.* 72; his house passed to Lord Archer, and then to James West, P.R.S., the bibliographer. Two years after West's death, in 1772, it was opened as a private family hotel,—the first of its kind in the town,—by David Lowe. Of late years it has been occupied, in succession, by the Savage, Vauxhall, Falstaff, and other clubs. The site of this house alone has many interesting associations. For Lord Orford's mansion took the place of one that had been occupied in turn by such celebrities as Sir William Alexander of Menstrie, the Scots poet and statesman, friend of Henry, Prince of Wales; Tom Killigrew; Denzell, Lord Hollis; Sir Harry Vane, the younger; Sir Kenelm Digby, who, according to Aubrey, had his laboratory there; and Nathaniel, Lord Crewe, Bishop of Durham, at whose door they were wont to lay the parish foundlings.

WE hear that the once-celebrated Tinted Venus, executed at Rome by Gibson, in 1852, for Mr. R. B. Preston, is to be put up to auction at Christie's on the 28th. It was the first piece of sculpture upon which the experiment of colouring has been tried in our time, and was one of the central attractions in the great Exhibition of 1862. The gold decoration was done by Castellani. It is a

* *Travels* Mr. E. Walford, in his "Old and New London."
† Vide a "Note" in the *Builder*, July 7, 1888; sold at Christie's for 210*l.*, on June 30 of that year; from the Wimpole Collection.

beautiful work of its kind, with that superficial beauty of form and modelling which characterised the work of Gibson, who did not however succeed, in this and other examples, in proving the aesthetic superiority or fitness of tinted sculpture. The flesh tones are not, of course, realistic, only a slight warm tint suggestive of flesh tones is put over the nude portions of the figure. Gibson's reputation, in spite of his real ability, is one that has hardly stood the test of time; he was content to be little more than an echo of Greek sculpture, and his works, as far as the ideas and feeling embodied in them are concerned, are out of touch with the spirit of modern art. It will be curious to see what will be the result of the practical test of the auction-room, as to the appreciation in which Gibson's work is now held.

ARCHITECTURE AT THE ROYAL ACADEMY.—VII.

1,868. "Music": Mr. Percy E. H. Bacon. This is a rather large coloured drawing meant as a decorative design, but it looks too much like a modern lady on a drawing-room sofa with a harp, who has fixed a gold nimbus behind her head; the nimbus makes a rather irritating bright spot in the composition. The face is expressive and the whole well executed, but it has none of the idealism which the subject and the nature of the work demand.

1,869. "Northington Church, Hants, interior." Mr. T. G. Jackson. A view of the exterior of this church (also in the Academy collection,) is published in this number; the interior is a small pen-drawing the main object of which is to show the organ-case and the stalls. The former shows a screen with traceried panels below, there is a coved cornice to this, on part of which stands the upper part of the organ front, consisting of three square "towers" of pipes, finished with a group of pinnacles; the towers and the recesses between are decorated with rich tracery work partly concealing the pipes. The effect is very refined and artistic, but there are two practical mistakes here; the front part of the organ alone stands out from the arch, the bulk of it is closeted up far too much; and of the towers the largest is in the centre and the smaller ones at the sides, which is a contradiction of the real internal construction of an organ, in which the larger pipes are placed at each side and the smaller ones in the middle. We have often called attention to this, which is habitually overlooked in organ-case designs.

1,871. "South Chapel, Catholic Apostolic Church, Camberwell": Mr. John Belcher. Remarkable chiefly for the harmonious colour, which however does not easily lend itself to description; but there is some nice detail in the treatment of the mouldings and caps of the arcade.

1,875. "Campanile, Holy Trinity Church, Gosport": Sir A. W. Blomfield. Apparently a brick campanile, very simply treated, with a battered basement story and four stages, the upper one filled with a triplet of round-beaded lights. Some individuality is given to it by the solid circular brick (?) spire which forms the finis.

1,876. "Crozier, silver-gilt, enamelled, and jewelled": Messrs. Saul & North. The colour effect must be taken on credit, as the drawing is only an outline one, but it indicates a true taste in the treatment of metal work. A kind of glory is formed round the outer curve of the staff (a form, by the way, to which some ecclesiastical authorities deny the title of "crozier" at all) by light open work scrolls and leaves of metal, with a novel and rich effect.

1,878. "Cavendish College, Cambridge": Messrs. Giles, Gough, and Trollope. A small drawing of a Gothic building, apparently chapel or hall, with some effective treatment in the window design at the end, but too big to be properly seen.

1,880. "Zenobia, Design for a Mural Painting": Mr. P. H. Newman. There is some very clever work in this, in the separate figures, but the colour effect is too confused and multitudinous for good decorative effect. Zenobia and her children look like a modern lady and her family taking part in a tableau.

1,881. "Adelphi Bank, Castle-street, Liverpool": Mr. W. D. Caröe. Two coloured elevations and a small plan. Apparently a terracotta-faced building, Elizabethan in general

feeling but very freely treated, and with a good deal of richness of detail. The upper windows are mullioned, the ground-story ones left plain to give light to the bank. This is a very good specimen of rich and picturesque street architecture, treated nevertheless in a style not out of keeping with a business building, and an appropriate protest against the prevalent treatment of bank buildings with cold and threadbare Classical details. The bulbous angle spirelet sits rather awkwardly on the roof, though this would not be seen from below in most situations.

1,882. "All Saints' Church, West Dulwich; view of north-east end": G. H. Fellowes Prynne. This is a picturesque building in general design and grouping, but rather hard and bald-looking in detail. A two-storied gallery runs round the east end (the main feature of which is a polygonal apse), an open arcade below, with passage way through the buttresses; a closed gallery with small windows above. A tall square turret, placed obliquely on plan, rises from the junction of nave and chancel on the north side, balanced or contrasted by a tall flèche on the ridge. Below, on the north side of the aisle, a circular stair turret with a conical roof is placed with good effect. The upper windows of the main apse are traceried, as also those of one of the two smaller apses at the east end of the aisle, which is further accentuated with external sculpture. The rest of the windows are plain pointed lights. The building is certainly an unusual and should be rather a striking one; but it very much needs a plan to explain its construction and the reason of the various parts.

1,884. "Harrow School; New Music School": Mr. E. S. Prior. This is an original and very well-executed coloured drawing, but it is vexatious to find so clever an architect as Mr. Prior is, giving his mind to the production of such a very ugly building. Good honest brick-work, no doubt, (as Cobbett is made to say of Drury Lane Theatre in "Rejected Addresses"), but where does the architecture come in? The open arches in the basement, just down on the ground level, produce the effect of the building having been partially covered by accumulations on the site, and requiring excavation. It is not commonplace, but its originality seems to consist in its extreme ugliness, combined no doubt with the artistic execution of the drawing. From the plan we see that the building consists of a central hall with an orchestra, surrounded by side blocks (on the other side of the corridors) containing small practising-rooms. These have corners canted off and circular lines introduced in the blocks thus left between—looking as if they were to carry off superfluous sound, but in reality we presume for warming.

1,885. "New Organ Case, Paignton Parish Church": Mr. A. Mardon Mowbray. Unless the scale is deceptive, this seems to be a large example of the Parish Church organ; we presume the large metal pipes to right and left belong to a 16 ft. metal pedal diapason; the two largest are marked out for a little special decoration—a new idea. The architect has here rightly treated the design with the larger pipes at the side; the pipes introduced in the front are very multitudinous; if all speaking pipes, rather too much so for the benefit of the instrument, musically speaking; it is not well to displace so many pipes from their proper position on the sound board. The design, treated with a good deal of carved woodwork, has a rich effect, though the eye does not feel quite satisfied with the stepped skyline (so to speak) of the facade.

1,892. "Hotel, Scheveningen": Mr. T. W. Aldwinckle. This is a praiseworthy attempt to give something of picturesque and architectural effect to a hotel, without losing hotel character, or what is supposed to be so. The upper portion of the gabled front is treated with that kind of profusion of colonnettes and pilasters so common in Dutch Renaissance buildings, and there is a large octagonal campanile, with open stages at the top, the ground floor of which forms the entrance-hall apparently; but there is no plan. The series of verandah hanging roofs on various stories, no doubt necessary to the comfort of a hotel in hot weather, form a feature which unfortunately militates very much against architectural character, and would give to the best building a kind of Chinese pagoda character.

1,894. "Reid's New Hotel, Madeira": Mr. Somers Clarke. This is a large and effective sepia drawing, showing the hotel white and bright in the sunlight, on a rocky cliff, with gardens in front and a range of hills behind.

The hotel consists of two main blocks placed at right angles, forming two sides of a square, each block terminated by an oblong tower with a lower range of buildings between butting against the sides of the tower. The adjacent towers of the two blocks are connected by a lower building forming part of an octagon on plan, the upper story of which is an open one, with the roof carried on posts. There is little pretence of architectural treatment in a decorative sense, but the whole is picturesquely grouped and looks like what it is, a hotel for a warm climate.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The final meeting of this Institute for the present session took place on Monday evening last, Mr. Alfred Waterhouse, R.A., President, in the chair.

Mr. W. H. White (Secretary) announced a long list of donations to the library, and votes of thanks were passed to the several givers.

Election of New Members.

A ballot was then taken, when the following gentlemen were elected as *Fellows* of the Institute, viz., Messrs. Frederick William Tarring, New Southgate; Edward William Monning (Associate), London; Stockdale Harrison (Associate), Leicester; Christopher Harston, London; Nathan Solomon Joseph, London; John Salmon Quillor (Associate), London; William Henry Spaul, Gwestry; Philip Henry Tree (Associate), St. Leonards-on-Sea; Edward Henry Bruton (Associate), Cardiff; James Neale, F.S.A. (Associate), London; Walter Augustus Hills, London; William Henry Thorp (Associate), Leeds; Leslie Over, Dundee; William Douglas Caröe, M.A., Gantab, London; Leonard Aloysius Scott Stokes (Associate), London; Robert William Collier (Associate), London; Frederick Atkinson Powell (Associate), London; and Stephen Shaw, Kendal.

The following gentlemen were next elected as *Associates* upon a show of hands, viz., Messrs. Herbert William Doe, London; Frederick Moore Simpson, London; Samuel Edward Wall, London; Herbert Stone Wood, Beckenham; Bastick William Nunn, Brighton; Thomas Edgar Eccles, Liverpool; William John Mettam, Leeds; William Eaton, Leicester; Eustace Corrie Frere, London; Richard Thomas Beckett, Hartford, Cheshire; Robert Stodart Lorimer, Edinburgh; Henry Harold Hughes, Ealing; James Sivewright Gibson, London; George Harvey, London; Samuel Bridgman Russell, London; Alfred Eustace Habershon, St. Leonards-on-Sea; William Braine Goodwin, London; Henry Leonard Hill, London; Alfred Henry Hart, London; Arthur Edward Ascombe, Harpenden; Edward Carter, Sarpton; Arthur Harry Heron, Usbridge; and Harold Arthur Woodington, London.

The following were elected as *Honorary Associates*,—viz., Mr. Alexander Stuart Murray, LL.D., F.S.A., Keeper of the Greek and Roman Antiquities, British Museum; and the Right Hon. Lord Savile, G.C.B. *As Hon. Corr. Member*, Professor Johannes Otzen, Berlin.

Alliance with a Provincial Society.

The President: I have great pleasure in announcing that the Council have at their meeting to-day resolved to recommend to the general body that the Leeds and Yorkshire Architectural Society be admitted to alliance with the Royal Institute, under the provisions of by-laws 77 and 81.

Presentation of the Royal Gold Medal.

The President: Gentlemen and colleagues, before proceeding to the most pleasing duty which falls to the lot of your President in the course of his year of office, that of presenting, in the Queen's name, her most gracious Majesty's annual gift to some architect, or man of science of any country, who has produced a work tending to promote the knowledge of architecture, it may be interesting to this meeting if I remind you that, of the forty-two gold medals already awarded, twenty have been given to fellow-countrymen whose greatest claim to distinction was their success as practising architects, while seven other medals were awarded to Englishmen whose claims were rather that as authors or archaeologists they had done something noteworthy for the advancement of our art. Of the fifteen foreigners

who have received this honour, more than half the number have been so distinguished by us for their achievements as architects,—for their buildings rather than for their books. Now, I trust that the choice of the Institute having fallen in twenty-eight cases out of forty-two, or on two-thirds of the total number, on practising architects, may be looked upon as a matter for congratulation, and as a sign of architectural vitality during Her Majesty's reign. When the medal was first instituted there were giants in the land. Cockrell and Sir Charles Barry were the first two English recipients. Such men seem now hardly of ourselves, their achievements were so splendid, so numerous, so varied. Still, we must not forget that it is easier to see the excellences of those who have passed from us, than of those who are with us still. There are now a greater number than ever before of men of capacity, merit, and sterling character, who are doing their best, by their lives and practice, to uphold the status of the profession, and make it appreciated by the world, though their opportunities for distinction may not be so great as those of their predecessors half a century ago, and though there may be many more to share such opportunities as present themselves. Now, I think prominently among those stands the colleague whom we have chosen to honour, by recommending him to Her Majesty as the recipient of her gold medal this year. Mr. John Gibson entered the office of Sir Charles Barry, then in Foley-place, as his articled pupil, in the year 1835. In the following year, when the first premium in the great competition for the New Palace of Westminster was awarded to his master, he had the enviable distinction of being his only pupil. He was soon joined, however, by a host of others,—George Villiam, W. H. Brakspear, James Murray, and George Somers Clarke amongst the number. After serving a three years' term of pupillage, he remained his master's assistant for six years, and must have been more or less engaged on such works at Tretham Hall, University College, Oxford, Harewood House, Duncombe Park, the Board of Trade, Whitehall, and above all the Houses of Parliament, which were then occupying the attention of Sir Charles Barry, at 32, Great George-street, whither he removed to be near his great work, on the details of which, I believe, Mr. Gibson was largely employed. Sir Charles had a high appreciation of his pupil's talent and character, and in course of time they became dear friends, and friendship which Mr. Gibson highly prized, and which continued to the last. Commencing practice therefore in 1844, after so excellent a training, Mr. Gibson appears to have entered at once on his most successful career. Among his earlier works I may enumerate the National Bank of Scotland, Glasgow, the Imperial Fire and Life Office, Threadneedle-street, and the well-known and characteristic twin-spired Romanesque chapel in Bloomsbury, erected in 1847. He appears to have carried out many works in Warwickshire about this time—Compton Verney for Lord Willoughby de Broke, Wroxton Abbey for Colonel North, Charlotte Park for Mrs. Lucy, Guy's Cliffe, and several churches. He built his ecclesiastical *chef d'œuvre*, Bodelwyddan Church, for Lady Willoughby de Broke. Plas Power, near Deubigh (1858), is a clever re-clothing of a once commonplace-looking house. The Todmorden Fielden family have availed themselves largely of Mr. Gibson's skill—Mr. Joshua Fielden at Nutfeld Priory; Mr. John Fielden at Dobroyd Castle; Mr. Samuel Fielden, at Central Hall, both near Todmorden, where also he built the Town Hall and Unitarian Church, both for the same family. But by far to me the most remarkable of Mr. Gibson's professional connections is that with the National Provincial Bank of England. This great company apparently employed nobody but Mr. Gibson as its architect as long as he remained in practice. He built for them, not only the very striking and original head office in Threadneedle-street, and the branch banks in Piccadilly, but upwards of forty branches, some of them, as at Birmingham, of great merit and importance. It is worth while to note again in London Childs' Bank, and the house of the Society for the Propagation of Christian Knowledge, the first building erected in Northumberland-avenue, where its fine proportions are now seen to a disadvantage from the height to which its neighbours have risen. Time will not allow of my giving you

at greater length a catalogue of Mr. Gibson's achievements. In fact, so modest is he, in speaking of his works, that I have had some difficulty in getting to know what they have been. I shall ask the Editor of our *Journal of Proceedings* to give us correct a list of them as possible.* When you come to look over that list you will, I think, deduce from it the inference that Mr. Gibson's clients were all very fond of him. When they had once discovered him, they found him a treasure. They stuck to him and never dreamt of looking about to see if any one else could be found to take his place. One who knew him most intimately says of him—"He was on the most excellent terms with all his clients, and was always held in the highest esteem, not only by them, but by the whole of his staff, and by those employed in executing his work." Gentlemen, what can any of us wish to have said of ourselves more than those words convey in Mr. Gibson's case?

Addressing Mr. Gibson, and handing him the medal, the President said:—Mr. Gibson, I have now the greatest possible pleasure in handing you this, the highest distinction which it is in the power of the Institute to confer, and which is presented to you with her Most Gracious Majesty's expressed approval.

Mr. Charles Barry said that, as the representative of his late father, he might perhaps be permitted to congratulate Mr. Gibson on the receipt of the honour which had just been conferred upon him. Mr. Gibson had several old friends in the room, but he ventured to doubt if he had any older friend than himself (Mr. Barry), as their friendship dated back more than fifty years, from the time when he (the speaker) was a schoolboy. In the quiet and unostentatious life which Mr. Gibson had led, he had been an ardent and zealous worker, imbued with the most genuine artistic feeling, as well as with great powers, constructively and otherwise. All his works were distinguished by a plain solidity and a refinement of feeling, combining excellent proportions and purity of detail, without straining after those ruinous fantasies which nowadays seemed to be so attractive to the public. Any one who had passed a long life of practice in that way was of peculiar use, as a protest against the opinion that anything but careful study and attention to proportion, purity, and simplicity of style, represented the goal to which an architect should press, and by which he would be most creditably known in all future time. The President had really expended the subject in the anxious care which he had taken to ascertain the various credentials of Mr. Gibson's architectural work for the honour which had been conferred upon him. He would, therefore, conclude by congratulating the Institute on having made such a choice. He could only have wished that it had been conferred upon Mr. Gibson years ago, for he deserved it then as much as he did now.

Mr. Jobu Gibson, in replying, said:—Mr. President and gentlemen, there is no position more difficult to me than that of replying to a compliment, especially when that compliment has been paid and conveyed in such eloquent and eulogistic words. I therefore, from late severe illness and present emotion, must make a very short speech in thanking you for the honour you have done me in making me the recipient of the only gift, I may say, of great eminence, which it is in the power of the Institute to bestow. I beg you will kindly excuse the shortness of my reply, and accept my grateful thanks for the honour which you have conferred on me, an honour which I never expected, and one which, coming from her Most Gracious Majesty the Queen, at your voluntary recommendation, I shall ever look upon as one of my most precious treasures. I thank you collectively and individually for your kindness.

* The following is a list of Mr. Gibson's works which have been published in the *Builder*:—Bloomsbury Baptist Chapel, volume for 1848, page 186; Imperial Insurance Office, Threadneedle-street, volume for same year, p. 238; Bodelwyddan Church, near St. Asaph, volume for 1860, p. 637; National Provincial Bank of England, Threadneedle-street, 1865, pp. 885, 908; Dobroyd Castle, Todmorden, 1869, 947; National Provincial Bank of England, Newcastle, 1873, p. 966; Nutfeld Priory, Surrey, 1874, p. 53; National Provincial Bank of England, Middleborough, 1874, p. 155; Todmorden Town Hall, 1875, pp. 306, 324; Saloon and Staircase, Dobroyd Castle, Todmorden, 1875, p. 953; National Provincial Bank of England, London-lease, 1877, p. 61; Chisney Piece, Nutfeld Priory, 1878, p. 1146; Building for the Society for Promoting Christian Knowledge, Northumberland-avenue, 1879, p. 1153; National Provincial Bank of England, Sunderland, 1879, p. 1379; and Childs' Banking House, Fleet-street, Nov. 27, 1880, p. 646.

Professor Aitchison said he had had the honour of knowing Mr. Gibson for a great many years, and could reiterate all that had been said as to his amiability and kindness. As Mr. Barry had already mentioned, what struck him about Mr. Gibson's works was their extremely noble proportions, which, he was sorry to say, were not so commonly met with in the present day as one would wish. They might all therefore consider that her Majesty had been well advised in giving encouragement to those grand proportions which distinguished architecture so greatly. Mr. Gibson had handed down those proportions, which, coming from the Greeks and the Romans, were transmitted through Palladio and the great masters to the father of Mr. Barry.

The President: I am particularly pleased that my remarks have been supplemented by the words of Mr. Barry and Professor Aitchison. I most thoroughly agree with every word they have uttered as to the beauties of refinement and proportion which have distinguished our present Gold Medalist's work, and the valuable lessons they inculcate to us. We may now bid each other affectionately farewell at the close of this session. I cannot allow it to close without thanking you, from the chair, for the assiduous way in which very many of you have attended the meetings of the session, and I hope next session we shall have even a better attendance than we have had this.

The proceedings then terminated.

THE ARCHITECTURAL ASSOCIATION.

THE last ordinary meeting of the Association, adjourned from May 16, was resumed on Friday last, June 13, when the alterations of the rules drawn up by the Committee in order to carry out the instructions given them by the special business meeting of May 30, to carry into effect the various resolutions dealing with the report of the Special Education Committee, were proposed; in addition, a further alteration of Rule 43 was proposed in writing by several members: "After show of hands,"

"But no question touching any alteration of the rules or constitution of the Architectural Association shall be decided upon at any meeting without first submitting such proposed alterations to the whole of the members, and furnishing each member with a printed voting paper; the decision of the majority so voting shall be considered final."

Rule 43 will then read as follows:—

"All voting shall be taken by show of hands, but no question touching any alteration of the Rules or Constitution of the Architectural Association shall be decided upon at any meeting without first submitting such proposed alterations to the whole of the members, and furnishing each member with a printed voting paper; the decision of the majority so voting shall be considered final."

The ordinary meeting was then terminated, and the special business meeting called for that evening commenced, when the minutes of the last special business meeting were read and confirmed. Mr. J. Douglass Mathews then proposed that the alteration of Rule 43 should be considered prior to the alterations proposed by the Committee. This was seconded by Mr. Stannus, and a long discussion ensued, in which Messrs. H. Sirr, A. W. Earle, A. Needham Wilson, W. J. Leverton, A. Beresford Pite, Frederic R. Farrow, Owen Fleming, H. O. Crosswell, Percy Hunter, and F. H. Collins, took part.

The proposition being put was carried by 28 votes to 26. Mr. Collard then proposed that the special business meeting be adjourned for a fortnight. This was seconded by Mr. Earle. Mr. Stannus proposed as an amendment that the alteration of Rule 43 be considered that day week, and the remainder of the proposed alterations adjourned till next session. Mr. Max Clarke proposed a further amendment that the special business meeting be adjourned for one week. After some discussion, Mr. Collard's proposition was withdrawn, and Mr. Stannus's amendment was put and lost by 43 votes to 30. Mr. Max Clarke's proposition was then put and carried by a large majority, and the President accordingly declared the meeting adjourned until Friday, June 20, at 7 p.m. It is to be hoped that there will be at the adjourned meeting a larger attendance than was present last Friday; many members evidently considered that the business of last Friday would be merely formal, but it is evident that there is a small but active opposition who are determined to leave no means untried to upset the proposed extension of the educational methods of the Association, and it is therefore incumbent

upon all who wish to see the new scheme carried into effect to attend and support the Committee, and especially to notice the alteration of the hour to the earlier time of 7 p.m.

SURREY ARCHEOLOGICAL SOCIETY.

A VERY successful afternoon meeting of this Society was held at Wimbledon on Saturday afternoon last.

Meeting at the parish church (St. Mary's) at three o'clock, an interesting paper on the fabric and its history was read by one of the Hon. Secs., Mr. Mill Stephenson. The greater part of the church is modern, it having been rebuilt in 1843 (in succession to a curious "Classical" structure built at the end of last century) by the late Sir Gilbert Scott, then a partner in the firm of Scott & Moffatt.

The visitors then walked across Wimbledon Common to inspect what remains of the remarkable circular earthwork, long (and still) erroneously called "Caesar's Camp" or "the Roman Camp." Here Mr. Ralph Nevill read a paper, in which he said he gave in short compass the little that was known and had been said about the place, together with such considerations as had suggested themselves to him. All that had been previously written about the Camp was well brought together by Mr. Tregellas, in a paper published in 1866 in the *Archeological Journal*. The Battle of Wimbledon, the first fight between Saxon and Saxon, had been very ably treated in an article on the "West Saxon Conquest of Surrey," by Mr. Henry Elliot Malden, published in the *English Historical Review* for 1886. Although later Roman camps were of more various formation than was sometimes imagined, it might be taken for certain that this was not Roman, since at the only time that a Roman camp could have been required in that district, viz., at the time of one of the two first invasions, the form would certainly have been the orthodox rectangular. There was nothing in the contents found in the barrows that once existed, and that were examined by Douglas in 1786, to determine the date of their formation. Mr. Nevill thought that it might safely be concluded from its regular shape (almost a true circle) that the place was made as a war-camp, and was not one of those entrenched towns that were with certainty referred to a British date. He was strongly inclined to think that it was of Saxon or Danish date.

Sir James Ramsay, in some remarks which followed, said that the remains were unquestionably British. In this he was supported by Mr. George Lambert, F.S.A. After a vote of thanks had been given to Mr. Nevill, on the motion of the President, Viscount Middleton (who deplored the havoc that had been made with the remains during the last twenty years), the visitors walked back over the Common and proceeded to—

Eagle House, now the residence of Mr. T. G. Jackson, the eminent architect. Mr. Jackson received the visitors in his library, the largest room in the house, and read to them an interesting and pleasantly-written paper. The interest attaching to the house, independently of such architectural character as it still retains, arises from the fact that it is a well-preserved example of the private residence of a London merchant of the reign of James I. The house was built early in that reign by one Robert Bell, citizen and Girdler, and subsequently deputy-alderman of the Ward of Lime-street, where he carried on business as a merchant. His father and his grandfather, both Robert Bells, had lived at Wimbledon before him, as appears by the Herald's Visitation of 1633-34, where his arms are recorded—*azure an eagle displayed argent below three fleurs de lys or*. Mr. Jackson has not been able to discover the exact date of the building of the present house. The first mention of it occurs, according to Manning and Bray's "History of Surrey," in the Survey of the Manor in the year 1607. It is there spoken of as "a fair new house." But by the kindness of Mr. Plaskett, the present Steward of the Manor, Mr. Jackson has been able to see this survey, and finds that the date is not 1607, but 1617. All, therefore, that can be said with certainty of the date of the house is that it was standing in 1617. From other evidence Mr. Jackson believes that it was built before 1613. The description given by Manning and Bray of the heraldry still holds good. The arms mentioned by them are still

on the ceiling of the large room on the first floor, now used as a library, one of the coats being that of Robert Bell. The initials which Manning and Bray saw on the front of the house in several places disappeared under the coat of stucco with which a subsequent owner covered the handsome red brick and ashlar of the outside walls; but when the back of the house was partly restored in 1887, the stucco was removed from the two lower stories and exposed some little square stones, spaced at regular intervals, in the frieze of the entablature that marks the second-floor level; and on two of these may still be seen, though much defaced by the plasterers (who hacked the stone to obtain key for their stucco work), the ciphers of Robert Bell and Alice his wife. The excellence of Robert Bell's building is testified by its perfect condition at the present day. The walls are of solid brickwork, those outside varying from 2 ft. 3 in. thick in the basement, to 18 in. in the attics, while the two party-walls that divide it from front to back, and contain the flues and chimney-stacks, average 3 ft. in thickness. There are three gables to the front, the middle one slightly in advance, with an oriel window over the entrance, and in the two side spaces each a bay-window from the ground to the second floor. The back is similar, except that the middle bay-window runs up from the ground instead of being cut short as an oriel, and that the middle space recedes instead of projecting. The sides of the house have each two gables, making in all ten gables, of the picturesquely-broken profile characteristic of Jacobean architecture. The quoins and the lower windows are of Caen stone, but all the mullions, window-frames, and transoms of the upper stories are of oak, inserted in brick reveals, with a simple moulding worked in the brickwork round the opening. The allowance of windows was so liberal that it is no wonder that many of them have been closed with lath and plaster, and however much one may have wished to re-open them as part of the original design, it would have been very difficult, had one done so, to find places for the furniture. The architect was not less liberal in the matter of height from floor to floor, for instead of the usual low-pitched rooms of Jacobean houses, he has provided rooms of 12 ft. and 13 ft. high. The house was evidently handsomely finished within; as late as 1763 it appeared by an old inventory that the principal rooms were wainscotted, and had high chimney-pieces up to the ceiling. Although this has all but disappeared, we have left four rather remarkable plaster ceilings, which date from the building of the house, and are still perfectly preserved. They are unusually good specimens of this kind of work, both as regards design and execution. The finest is that in the large room, now used as a library, which measures nearly 31 ft. by 20 ft. The plan of the original house was extremely simple. On each of the three lower floors there was one large room in the middle from front to back, with light at each end, and rooms and a staircase on both sides of it. The back or secondary staircase is still the original one, constructed with framing of great oak beams in post and pan work, like the staircases in an Oxford college, and with treads of elm. The best staircase, on the other side, has, unfortunately, disappeared, and been replaced by an inferior one of deal, dating from the last century, when the block of building containing the present dining-room was added, and one of the bay-windows had to be removed and the staircase altered to make way for it. In concluding his paper, Mr. Jackson very pleasantly described the history of the house since the time of Robert Bell. In 1787 we find the Right Hon. William Grenville, the relative and colleague of Pitt, living here. Grenville probably left the house in 1789, on his election to the Speakership. From his time until the house came into the possession of Mr. Jackson, about four years ago, the house was used as a school. At one time it was called "Nelson House School," from the fact that Nelson and Lady Hamilton once visited it and heard the boys recite their pieces. The school was afterwards kept by a Mr. Stoughton, then by Messrs. Stoughton & Mayer, Messrs. Mayer & Brackenbury, and finally by Dr. Huntingford. It is to Dr. Huntingford that it owes its present name; he had previously had a school at Eagle House, Hammersmith, and when he brought it to Wimbledon, he brought with it not only the name but the eagle which now surmounts the middle gable of the front.

A vote of thanks was accorded to Mr. Jackson for his interesting paper.

THE FRENCH ARCHEOLOGICAL SOCIETY.

THE annual meeting of the Société Française d'Archéologie commenced on the 17th inst., under the presidency of Count de Marsy, Director of the Society. It is held this year at Brive, a small town in the Department of Corrèze, about two-thirds of the distance from Paris to Toulouse. On Monday next the Archaeologists will move their headquarters to the neighbouring little town of Tulle.

At 1.30 p.m. on the opening day the President and members were received by the Maire of Brive, and by the President of the Société Scientifique et Archéologique de la Corrèze, at the Hôtel de Ville, and after the usual expressions of welcome from the Maire had been duly responded to, the Count de Marsy, as President, read his usual address. This consisted almost entirely of a review of the archaeological work done in France during the past year, chiefly by members of the society, and of a comparison of the state of the science in the present day and at the time of the foundation of the Société Archéologique by the late M. de Caumont.

This was followed by a paper on the authorities for the history and archaeology of the district, after which the members and their friends inspected the church and other antiquities of the town, under the guidance of the Presidents of the two societies. Among the archaeologists present besides the Count de Marsy, were the Count A. de Dion, Baron de Loë, of Brussels; M. M. E. Travers, of Caen; Cathailac, of Toulouse; L. Germain, Francart; the Rev. S. S. Lewis, of Cambridge, and many others.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday afternoon at Spring-gardens, Lord Rosbery in the chair.

New Standing Orders as to Tenders.—The Standing Committee reported as follows:—"The Council on the 3rd inst. had before it a report by the Parks Commission, stating that, in consequence of the long interval between the date of a certain tender and its final acceptance by the Council, the person who had sent in the tender was not prepared to adhere to it, and had asked for an additional payment. This has led the Deputy-Chairman to suggest for consideration an amendment of the standing orders relating to tenders so as to obviate unnecessary delays. The proposed alterations appear to us desirable, and we recommend—

"That the Standing Orders of the Council in relation to tenders be as follows:—

All tenders where the estimated expenditure exceeds 500*l.* shall be opened in the Council by the Chairman, and be immediately referred without discussion to the Committee which they concern. In such cases the Solicitor shall at once, and without waiting for the meeting of the Committee to which the tenders are referred, make such inquiries (if any) as he may consider necessary as to the competence of the lowest tenderer, and, if the information obtained do not appear satisfactory, then into the competence of the next lowest, and so on until a satisfactory result shall have been obtained, reporting the result to the Committee as early as possible.

Where the estimated expenditure is below 500*l.*, tenders may be opened by a Committee, and shall then be reported to the Council. The Committee shall, however, as soon as the tenders are opened, instruct the Solicitor to make such inquiries as the Committee may consider necessary.

When a contract has been executed by the contractor, it shall be submitted for sealing at the next meeting of the Council, without being again brought before the Committee."

These recommendations were agreed to *non. dis.*

City Improvements.—The Improvements Committee brought up an adjourned report stating that the Committee had had under consideration an application from the City Commissioners of Sewers for a contribution towards the cost of improvements in the following thoroughfares, viz.:—(1) Threadneedle-street; (2) Upper Thames-street; (3) Pauls-chain and Godman-street; (4) Houndsditch and Abchurch-lane; (5) Warwick-lane; (6) New Broad-street; (7) Minories. The Committee recommended that the Council should contribute 3,547*l.* (one-third of the total estimated cost) towards No. 1; 2,500*l.* (one-third of the cost) towards No. 3; and 1,837*l.* 6*s.* 8*d.* (one-third of the cost) towards No. 6. With regard to improvements Nos. 2, 4, 5, and 7, the Committee recommended that the Commis-

sioners be informed that the Council is not prepared to contribute towards their cost, and these recommendations were agreed to at once. On recommendations 1, 3, and 6, however, which were taken separately, long discussions arose. Eventually No. 1 was rejected on a division by 51 votes against to 36 for; No. 3 was negatived without a division; and No. 6 was rejected on a division by 48 votes against to 42 votes for.

District Surveyors and their Tenure of Office.—The first portion of the report of the Building Act Committee was as follows:—

"Your Committee present a report upon the following references:—

'A. As to a reform of the system hitherto followed in the appointment of District Surveyors in the Metropolitan, with the view of arranging that the duties hitherto discharged by the District Surveyors shall be performed by a department of this Council, and that all fees received in connexion with such duties shall be paid direct to the Council.

B. Whether all District Surveyors to be appointed by the Council should not be appointed at a fixed salary instead of by fees and on condition that they shall devote their whole time to the office, and not engage in private practice, also whether all fees payable in respect of their office should not be paid into the County Council Account.

Speaking generally, very grave and extended dissatisfaction exists in the public mind as to the present system. An impression prevails that the office as now constituted is frequently sought, not only for the emoluments belonging to it, but for the advantageous position in which it places an architect to secure other professional work, and it would, in the opinion of your Committee, be desirable to bring the District Surveyors into closer touch with the Council.

The conditions of appointment in force since June, 1886, the Council is doubtless aware, prohibit a District Surveyor from practising in his own district, but it is competent for him to nominate another architect for such work, and thus this restriction may be rendered, to a certain extent, a fiction.

Before considering the references A and B, we sought the opinion of the District Surveyors' Association, the Royal Institute of British Architects, the Architectural Association, the Surveyors' Institute, and the Institute of Builders, upon the changes contemplated by these references. With the exception of the Architectural Association, which was unwilling to express a definite opinion as to debarring District Surveyors from private practice, all unite in the desire that no change should be made in the present system, but numerous alterations of the law in other directions are suggested.

In considering reference A, your Committee was at a very early stage of its investigation, impressed with the opinion that putting on one side the delay consequent upon any attempt at an alteration of the law, the duties devolving upon District Surveyors are not likely to be efficiently carried out by a 'Department of the Council.' London is, in fact, too large to administer this detail work from one centre. In practice, a great many cases would, in our opinion, remain unreported under such a plan. Not only would this cause considerable decrease in the fees received, but what is more important, the system would fail to secure, in the public interest, more efficient administration of the Building Acts.

In considering reference B, a joint report was presented by the Solicitor and the Superintendent Architect, upon the power of the Council with regard to paying District Surveyors by salary instead of by fees. In their report, sections 65 and 66 of the Act of 1855 are quoted, by which the Council is enabled to pay a salary to any District Surveyor, instead of fees, provided the amount of such salary be not less than the amount of the average fees for the previous three years, and in such case the fees would be payable by the District Surveyor to the Superintendent Architect, who would account for and pay them to the Council, and your Committee is advised that those conditions apply to old as well as new appointments.

If the plan were adopted of paying District Surveyors a fixed salary based upon the average fees for the previous three years (and this, it appears from the Act, must be the basis for such payment), we think that injustice might be done to a District Surveyor in whose district building operations were increasing, because, although extra work would devolve upon him, the Council would be receiving the increased fees. The system would be equally unsatisfactory in the case of a District where the

fees might fall either from diminished building operations, or from a cause which may be suggested, viz., that a salaried District Surveyor might not be so anxious to recover the fees as at present.

We have carefully considered this matter, and are of opinion that the Council should continue the payment of District Surveyors by fees as at present, but, having in view the public advantage likely to result from a more systematic and personal inspection of buildings by District Surveyors than it is evident exists generally at the present time, recommend that they be appointed on the condition that they devote their whole time to the duties of their office.

Since the references to the Committee upon this subject, two vacancies have occurred: one in South St. Marylebone, caused by the death of Mr. J. Jennings, and one in East Islington, by the death of Mr. John Turner, so that the Council has now two vacancies to fill.

Your Committee submit the following recommendations to the Council:—

1. That no person shall be accepted as a candidate for the appointment of District Surveyor unless he shall have attained twenty-eight years of age, and be under fifty years of age, and that every such candidate shall deliver with his application satisfactory evidence of his age.

2. That every candidate shall be required to sign a declaration and deliver it with his application that he becomes a candidate, and will accept the appointment if he should be appointed on the following understanding:—(a) That he will personally discharge the duties of his office subject to section 35 of the Metropolitan Building Act, 1855. (b) That he will give his whole time to the duties of his office. (c) That he will not during his continuance in office (except in the discharge of the duties thereof) carry on business as an architect, surveyor, or builder, or directly or indirectly as a partner or otherwise be interested in such business. (d) That he will furnish the Council with information of those cases in his district in which the orders of the Council or the requirements of the Metropolitan Local Management Acts with regard to the width of streets, or to any building, structure, or erection, or projection therein beyond the general line of buildings are not complied with. (e) That he will make no claim for compensation in case a diminution of his income shall at any time hereafter arise. (f) That he will keep his District Office open from Monday to Friday (both inclusive) between the hours of 9.30 a.m. and 5 p.m., and on Saturday from 9.30 a.m. until 2 p.m., and give his personal attendance there daily from 9.30 a.m. to 11 a.m., and (except Saturday) from 4 to 5 p.m. (g) That he will retire if required to do so on attaining the age of sixty-five, or at any date subsequent to his attaining that age.

3. That the aforesaid declaration of the appointed candidate shall on his appointment be entered on the Council's minutes.

4. That the fees to be re-arranged by the Building Act Committee as opportunities may occur, so that the average of the fees received may in no case amount to less than 500s. per annum.

The Council reserves to itself the exercise of its powers of dismissal, if the District Surveyor so appointed should not act consistently with the understanding above set forth in any of the matters referred to therein, or for other sufficient reason."

Owing to the lateness of the hour when this report was reached, its consideration was postponed, and the Council, after transacting other business, adjourned.

THE ROYAL MILITARY EXHIBITION.

This Exhibition, now being held in temporary buildings erected on the grounds of Chelsea Hospital and Gordon House, in aid of the funds of Church of England Soldiers' Institutes, is one of some magnitude. It is, for the most part, housed in corrugated iron buildings, forming an irregular quadrangle enclosing the gardens of Gordon House, several annexes having been built partially around the open space known as the "Arena," which forms part of the grounds of Chelsea Hospital, and is used for various displays of a military or semi-military character. The main entrance is from the Chelsea Embankment. The Tite-street entrance is described in the catalogue as a reproduction on a small scale of the well-known double gateway at Malta. The grounds of the Exhibition buildings cover 7½ acres, 3½ acres being the garden of Gordon House (which has been laid out by Mr. Dick Radclyffe), and 4 acres forming part of the park of Chelsea Hospital, so that there is abundant space for *al fresco* delights. The grounds are illuminated at night by electric light and by coloured lamps. The roofs of the Exhibition buildings cover a space of 120,000 superficial feet.

The Exhibition is divided into three main sections, "Military Industrial," "Commercial," and "Loan." The first-named section is a very comprehensive one, and includes numerous exhibits of interest by the War Office from Woolwich Arsenal, the Ordnance Office, Dublin, the Tower of London, and the Ordnance

Factory. The Honourable Artillery Company, the Brigade of Guards, the Royal Artillery, the Royal Engineers the Life Guards, and many of the "territorial regiments" of the British Army, send collections of exhibits, varying from patchwork quilts to portraits in oils. Of course military clothing and accoutrements, past and present, and weapons old and new, are very largely represented in this section.

One of the objects of the Exhibition has evidently been to encourage our soldiers to devote some of their spare time to industrial pursuits. The results of their spare hours of labour are, it must be confessed, very unequal in quality. The best things are of course produced by the men who have been brought up to some trade, and who are wise enough to content themselves with sticking each man to his own *métier*. The industrial products of the soldier's leisure, when he is without the knowledge of a trade, or when he seeks to go outside of his own trade, are often just as unsatisfactory as those of his civilian brother who labours under the same conditions. Nevertheless, there is a great deal of very creditable work by soldiers in the Exhibition, the best display, on the whole, being, as might be expected, that made by the Royal Engineers, every man in that corps having a knowledge of some trade or other. In addition to their industrial exhibits, properly so-called, the Royal Engineers exhibit models of many temporary structures which they are called upon to build in time of war, such as bridges. Many of these are simple and rough-and-ready in construction, though quite adequate for their purpose. From some of these models many a carpenter and scaffolder in the building trade might derive useful hints.

We can only notice a few of the exhibits in detail. Colour-Sergeant-Major Armitage, R.E., No. 2,515 in the catalogue, exhibits an improved metallic lashing for spar bridges (equally applicable to scaffolding for building purposes), and a very ingenious shifting spanner, which consists of two parts, a shank or handle, and a head. The handle is forked to receive the head, which works on a pivot, allowing it to revolve through half a circle. The head can be adjusted by means of a pawl which engages in slots provided in the back part of the head. The head can be removed, and heads of different sizes put in, by taking out a screw-pin. The advantages of this form of spanner are very considerable, for it can be used in cramped places, is portable, and has great strength in the jaws. Colonel Fraser, C.M.G., 2,552 in the catalogue, shows some improvised glass drinking-vessels, &c., made from common glass bottles. The bottles are cut down evenly and smoothly by the following expedient:—A piece of string is passed rapidly to and fro round the bottle for a minute or two; the friction caused by the string makes the glass of the bottle warm on the line where the cut is wanted, and by immediately dipping the bottle into cold water far enough to cover this line the desired cleavage is cleanly effected, and the sharp edges of the improvised drinking-vessels are ground down by rubbing them on stone. No. 2,670 in the catalogue refers to an exhibit in the shape of a wrought-iron gate made by the "blacksmith boys" of the Royal Engineers, under the instruction of Sergeant H. Romain. Although it is a rather crude piece of work, it gives promise of better things. Various other specimens of workmanship, including plumbing, are shown by the members of this corps. The mention of plumbing work reminds us we may say that the Exhibition includes a great deal bearing upon the hygiene of the soldier, both in barracks and under canvas. But we must take exception to the name bestowed upon one exhibit, which is described as "a model hospital ward." It is true that in size it is a model, but it is by no means a model for imitation. The exhibitor, Mr. H. Mark, if his model as we saw it correctly represents his ideas, offends against some of the cardinal rules now insisted upon in all good hospital-ward plans. In the model referred to, the beds are crowded together, some immediately under the windows, and others half-way under the windows, and others on one side. While speaking of hospitals, we may mention the "Ambulance Gallery," facing the Arena, where, amidst painted scenery and realistic mounting by Mr. Rowland Ward, we may gain some idea of the horrors of war from the full-sized models of wounded men being

tended by surgeons and members of the Army Hospital Corps.

There is a large "historic loan collection," consisting of arms, armour, accoutrements, trophies of battle, and pictures, including portraits of military celebrities by Kneller, Reynolds, Romney, Sir Thos. Lawrence, and other masters. Some of these portraits, we see, are lent by the Trustees of the National Portrait Gallery. There is also a "Music Loan Collection" and an "Art Loan Collection." To complete the whole, there is a "Trade Section" which includes a great variety of miscellaneous exhibits, from Messrs. Doulton & Co.'s artistic and sanitary pottery to Messrs. Thurston & Co.'s hilliard-tables and Mr. Gawthorp's memorial brasses.

As will be gathered from this brief sketch of the Exhibition, there is a great deal worth seeing in it. The main exhibition buildings were erected by Mr. Charteris, contractor, of Page-street, from plans by Mr. J. Wilson Dennison, surveyor, Mr. C. Miller being the clerk of works. Messrs. North & Son, of London-road, South wark, have erected a number of the corrugated iron buildings facing the Arena, including farriers' shop, ambulance buildings, Press-room, fire and police stations, &c.

COMPETITIONS.

The Sheffield Municipal Buildings.—Thursday's Sheffield papers announce that notices have been issued calling a special meeting of the Town Council for Monday next to "receive the report of Mr. Waterhouse, R.A., and of the Improvement Committee on the six final competitive designs for the new municipal buildings, and as to the set of designs to be adopted, to consider the same, and to pass such a resolution or resolutions thereon as may be deemed expedient."

The Drainage of Guildford.—A limited competition for the drainage of the county town of Surrey has recently taken place, four engineering firms having submitted plans in response to the invitation of the Guildford authorities. The competitors were:—Mr. W. H. Radford, Assoc.-M.Inst. C.E., of Nottingham; Mr. F. Deesley, M.Inst. C.E.; Mr. F. Wentworth Shields, M.Inst. C.E.; Messrs. Stone & Ault; and Mr. C. N. Lailley, Assoc.-M.Inst. C.E., of Westminster. Pumping will have to be resorted to in order to raise a small portion of the sewage to a suitable elevation for purification. Four of the engineers advocate the purification of the sewage by what is known as the "International" process, which consists of adding a precipitant called "Ferozone," or ferrous carbon to the sewage, and allowing subsidence to take place in suitable tanks, the sewage being then passed through filter-beds composed of sand, gravel, and "Polartie" (a rustless magnetic oxide of iron in a highly porous condition), whereby a perfectly innocuous effluent can be obtained. Mr. Wentworth Shield's recommendation embraced treating the sewage upon land. The plans prepared by Mr. C. N. Lailley have been selected by the Committee appointed by the Guildford Corporation as the best suited for the town, and in these plans the "International process" will be carried out. Mr. Lailley designed the sewage works at Acton, at which place the International process was first put into operation more than three years ago. The total cost of the works included in Mr. Lailley's scheme is 22,408*l.*, and this design has received the approval of Sir Joseph Bazalgette.

The English Iron Trade.—On the whole, there is a slight improvement perceptible in the English iron market. Prices seem to be getting steadier, generally speaking, and the inquiry is somewhat better. The demand for pig iron is reviving, the low rates now ruling probably tempting buyers. The Glasgow warrant market has been firmer this week, and Scotch makers' iron is rather more readily taken up, some brands being quoted 1*s.* lower. In the North of England prices ruling last week have been maintained, and this, to some extent, is true of the value of pig iron in other districts. The hematite iron market of the north-west has also recovered, mixed numbers of Bessemer iron being quoted 1*s.* a ton higher. There is rather more inquiry for finished iron, but prices are not getting stronger; on the contrary, common Staffordshire bars can be bought 5*s.* and black sheets 10*s.* a ton cheaper. Steel is still quiet, and cheaper. The condition of the shipbuilding trade is not improving. Engineers keep fairly busy.—*Iron.*

Illustrations.

CHURCHES ON THE LOWER RHINE :

THE ABBEY OF ALTENBERG.

THE beautiful and interesting Abbey-church of Altenberg is without doubt one of the finest examples of "Geometric Decorated" work in Germany. It is, however, in such a very out-of-the-way spot, and so difficult to get at, that it is far less frequently visited than it deserves to be; so much so that when the writer, with two of his friends, was at Cologne last July, he could not come across a single person there who had seen the place, though it is only some fourteen miles distant. After, however, making the expedition, the wonder ceased, for the roads about Altenberg are the very worst in Europe, and the way, as the innkeeper at Schneebuck, the nearest town, informed us, is impossible to find without a guide. The railway goes to within a few miles of Schneebuck, through a desolate and hideous country. Then there is a disagreeable drive by omnibus from the station to Schneebuck itself, an uninteresting place. Altenberg is eight miles off, and a carriage has to be hired for the journey there and back. The first two or three miles are simply a continuation of the ugly-scenery which surrounds Cologne, but after a while we came in sight of a range of hills of considerable altitude, though looking rather bare; but when we arrived at the top the view was most interesting,—the whole valley of the Rhine was visible, with the great city of Cologne in the midst of a vast plain. The spires of its cathedral and churches, although some nine miles off, told out distinctly against a background of blue hills. Looking in the opposite direction, we saw another range of hills, higher than the one we were upon, separated from us by a valley, with a clear and rapid river. Down we went into the valley, and here we at once saw the truth of our driver's assertion, that a guide would be necessary to point out the way, for off we turned to the right down a lane, then to the left down another, then we zig-zagged up a hill, then we zig-zagged down on the opposite side, then we plunged into a river, then up the opposite bank past a pretty little village nestling amongst oak trees. More narrow lanes, when a huge hill, covered with a beech-forest, seemed to block our way and shut off all further progress; but no, the plucky old German horse,—he was certainly a true Prussian,—laboured bravely on up one zig-zag lane to the right, then sharply to the left, the beech-trees meeting over our head and sweeping the sides of the carriage. At last, with a pull and a struggle, we were on the very top of the hill, but surrounded on every side by other beech-clad hills, the counterpart of the one we had ascended. The driver passed, and, pointing down to the ground beneath the horse's feet, exclaimed:—"Dort ist kloster Altenberg." Where, in Heaven's name!—under the ground? No. Looking down through an opening in the trees we saw, 200 ft. below, a rapid river with an ancient Gothic bridge, and on the opposite bank a picturesque gateway with a vast, cathedral-like church rising over it. The effect was so strange, so unexpected, that one could scarcely believe it to be real. But how on earth were we to reach it? To jump down plump on to the roof of the church seemed to be the quickest plan, but then it might be attended with disagreeable consequences. However, the mystery was soon solved. Zig-zags again, but this time all down hill, with the turns so sharp that every moment I expected we should enter the church, carriage and all, through the roof. However, at last we got down to the bank of the lovely river, and crossing the bridge, we entered the courtyard of the monastery, and the great lofty west front of the church, with its magnificent eight-light window and double doorway, was before us.

The order of monks who erected this magnificent church are no longer here—they were driven out of their monastery in 1802. The Prussian Government turned the place into a manufactory of "Prussian blue," and in 1833 the whole of the buildings, with the exception of the two churches, were burnt to the ground. The cloisters, chapter-house, and refectory were magnificent twelfth-century work, as some of the capitals and bits of mouldings kicking about in the inn-yard opposite the great church still testify. The church was much injured by

the fire, its outer timber roof was destroyed, but, fortunately, the fourteenth-century glass with which all the windows are filled escaped. The Government of the day restored the church, and hence the ugly slate roof which we now see. The church belonged to the Cistercian order, and is consequently very plain and has no towers. It is, however, a noble structure, some 360 ft. long, with deep transepts, and choir terminating in an apse and chévet with seven radiating chapels. The height to the vaulting is at least 100 ft.

Upon entering the building, its proportions and vast size at once impress one; but it is bare and cold to a painful degree, whitewashed all over! The only colour being in the windows, which are beautiful examples of grisaille work, dating from the close of the thirteenth and commencement of the fourteenth centuries. There is a little old furniture. A remarkably beautiful tabernacle (sacraments-hauslein) attached to one of the columns of the apse, a pretty sixteenth-century iron screen half-way down the nave, a great bronze pascal-candlestick, and a wrought-iron crane for lifting the font cover. The old altars all exist. They are simple square masses of stone, with slightly-moulded "mense." Between the columns of the choir is a series of magnificent monuments of abbots of the church and counts of Berg. They are, however, terribly mutilated, mere ruins in fact. In the north transept is an immense Flemish brass. The chapel immediately behind the high altar is full of magnificent fragments of sculpture, which may possibly have belonged to a great reared or a roof-screen.

This church is often called "The parent of Cologne," and has been supposed to have had the same architect, Gerhard von Rile. It was, however, commenced in 1253, and Cologne in 1248, so that it cannot be regarded as an earlier work. Whether Altenberg is by Gerhard von Rile, or the architect of Cologne, whoever he may have been, is a difficult question; I am inclined to think that they are not the work of the same man, and I venture to think that the architect of Altenberg was the greater man of the two. The proportions of Altenberg are far less exaggerated than those of Cologne, and there is a much greater air of repose about the interior. The principal points of variation in the two designs are the following:—Cologne has eight bays to the nave, Altenberg has nine; Cologne has four bays to each transept, Altenberg has only three; Cologne has four bays to the choir, Altenberg three; Cologne has four aisles to the nave, Altenberg only two; Cologne has clustered columns throughout, Altenberg cylindrical columns everywhere, with carved caps in the choir and moulded ones in the nave. The triforium at Cologne is glazed throughout the whole church, at Altenberg it is nowhere pierced through the outer walls. At Cologne the flying buttresses are double (in height), and at Altenberg single. Of course, I have not alluded to those variations which would necessarily follow from one being an abbey church and the other a cathedral, but simply to those which seem to display a different school of thought. It seems to me that Cologne shows the influence of the South-German School of Gothic working upon a French plan, whereas Altenberg, especially in the use of cylindrical columns, and the treatment of the flying buttresses, is more like northern work, with a strongly-marked Flemish feeling about it. The only features in the two churches which strike me as being very similar, are the treatment of the chévet. In both cases the treatment is purely French, undoubtedly copied from Amiens. This is remarkable in the case of Altenberg, because the Cistercian order very rarely built apsidal ends to their churches, though even in England we find one example, that of Croxden Abbey. It must, however, be conceded that the similarity of planning noticeable between the apses of Altenberg and Cologne is very remarkable. I can, however, scarcely think it a sufficient proof that the two churches were the work of the same architect—probably both men had seen Amiens, and copied its arrangement. A very curious feature at Altenberg is the row of blank square panels over the triforium arcade. In any other church than one belonging to the Cistercian order one would say that they were intended for pictures, but the Cistercians at this early date did not have pictures in their churches, and we see that even in the glass, immediately above, figures are excluded from the design.

The west front is considerably later than the

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THE BUILDER, JUNE 21, 1890.



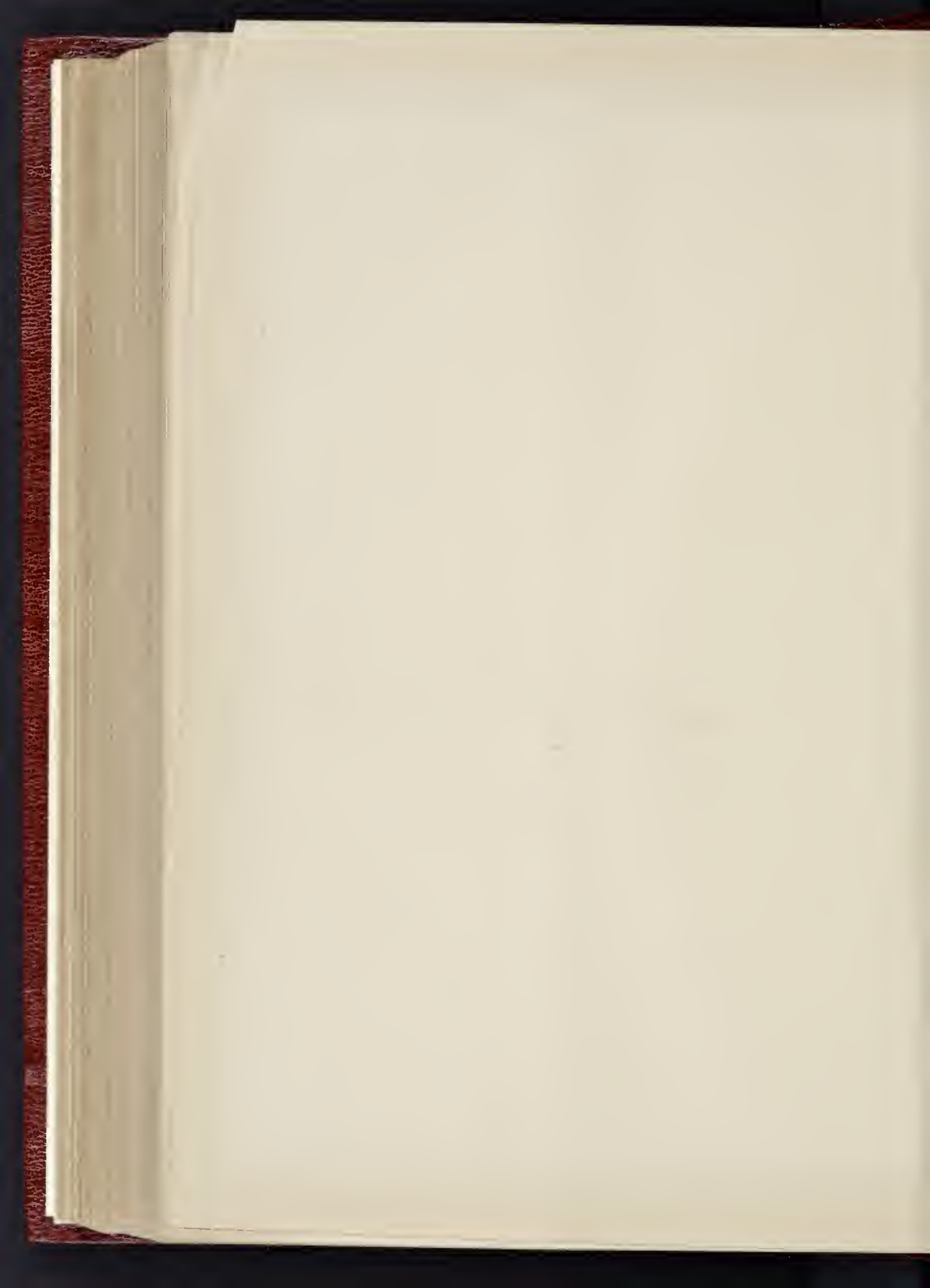


T.G. Jackson 1890

THE PHOTO-DUPLICATION SERVICE, 22 MARTIN LANE, LONDON, E.C. 4, ENGLAND.

NORTHINGTON CHURCH, HANTS.—MR T. G. JACKSON, ARCHITECT

No. 1760 Royal Academy Exhibition, 1890.





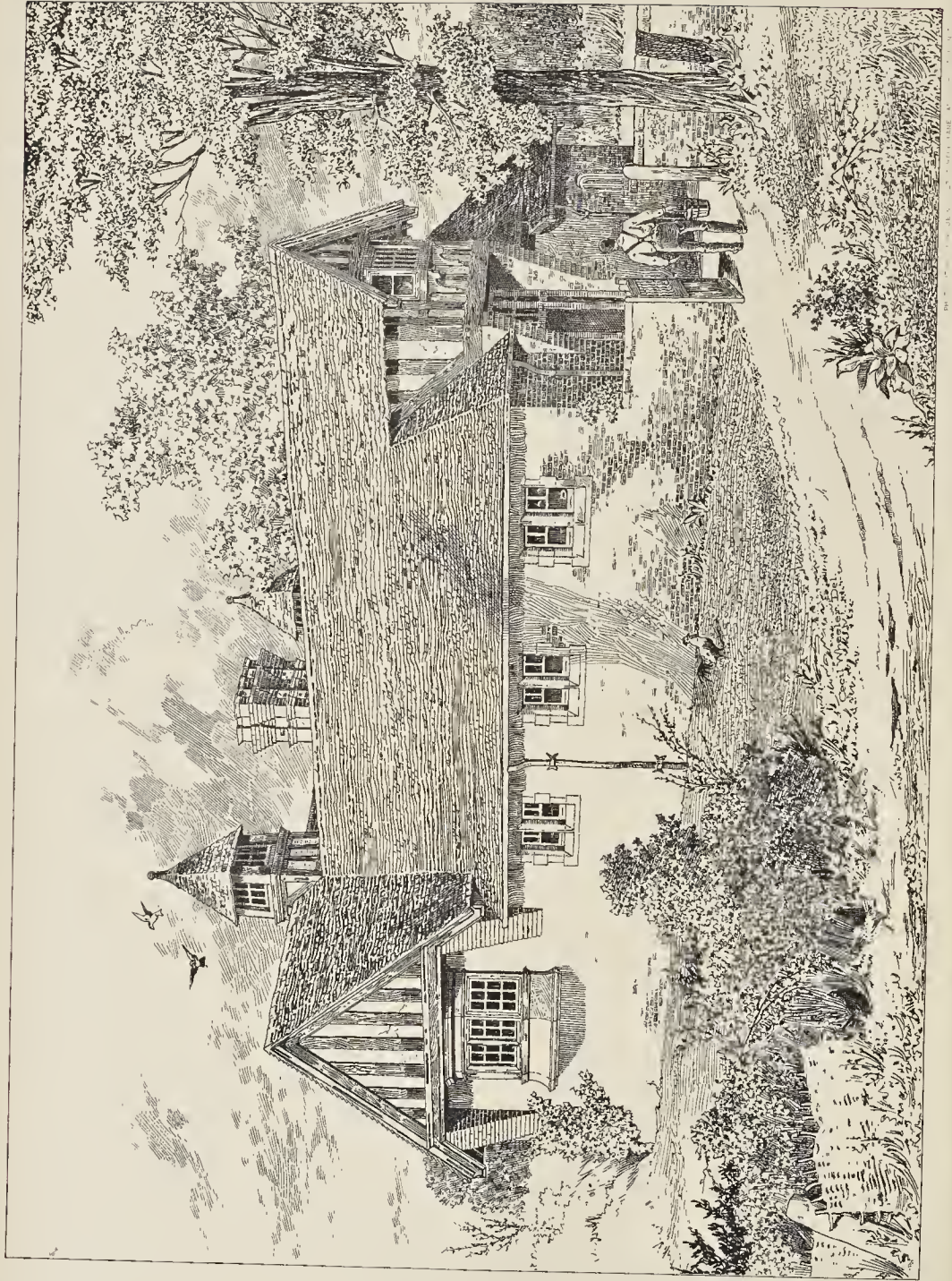
THE PHOTO. BRAGUE & CO. 22, MARTIN LANE, LONDON, E.C.

MUSIC.—MR. E. ONSLOW FORD, A.R.A., SCULPTOR.

No. 2118 Royal Academy Exhibition, 1890.

1871

THE BUILDER, JUNE 21, 1890.



LAUNDRY, ASHAM HALL, YORK.—MESSRS. CHORLEY & CONNOR, ARCHITECTS.



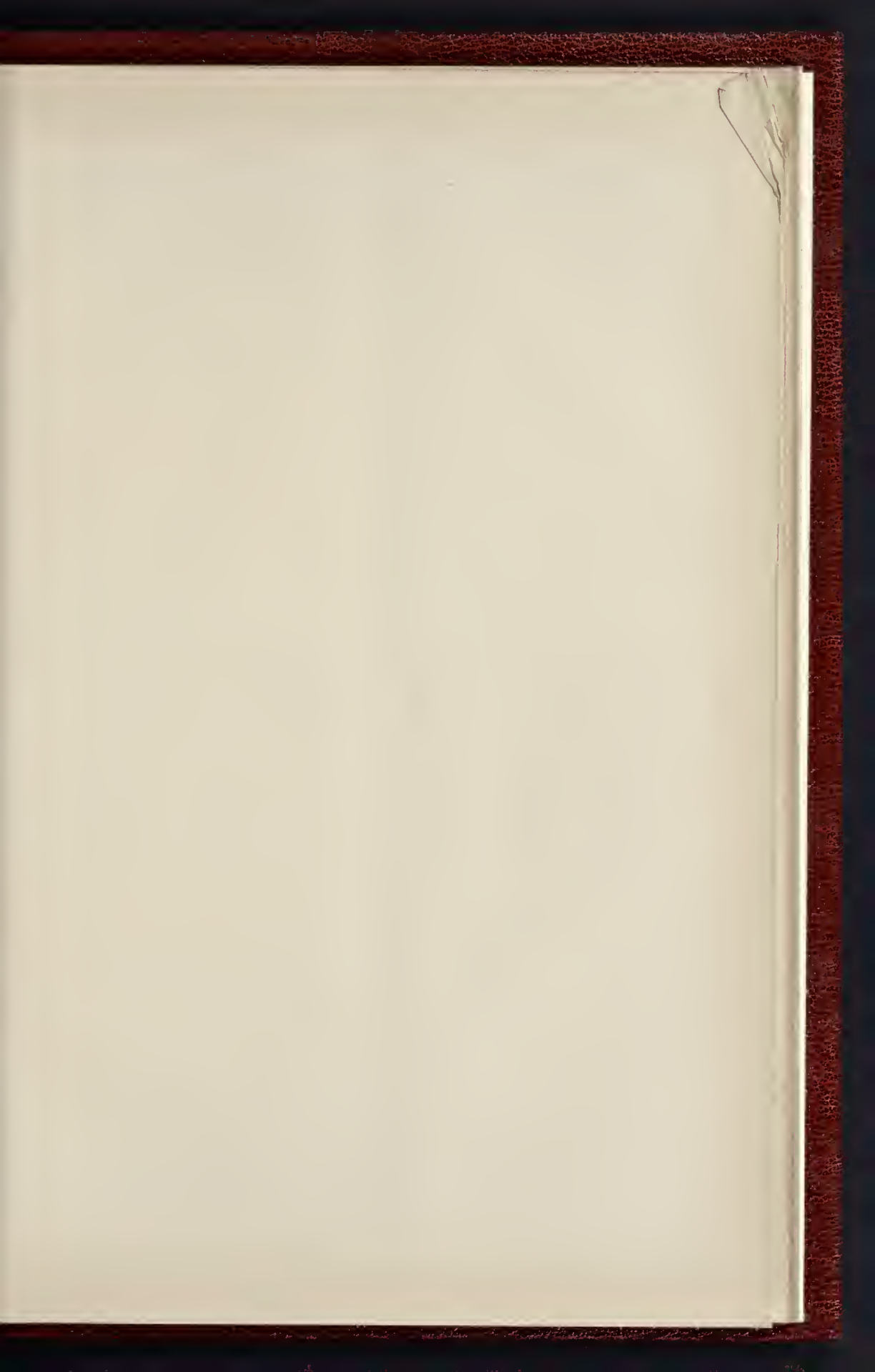
STABLES, ASKHAM HALL, YORK.—MESSRS. CHORLEY & CONNOR, ARCHITECTS.



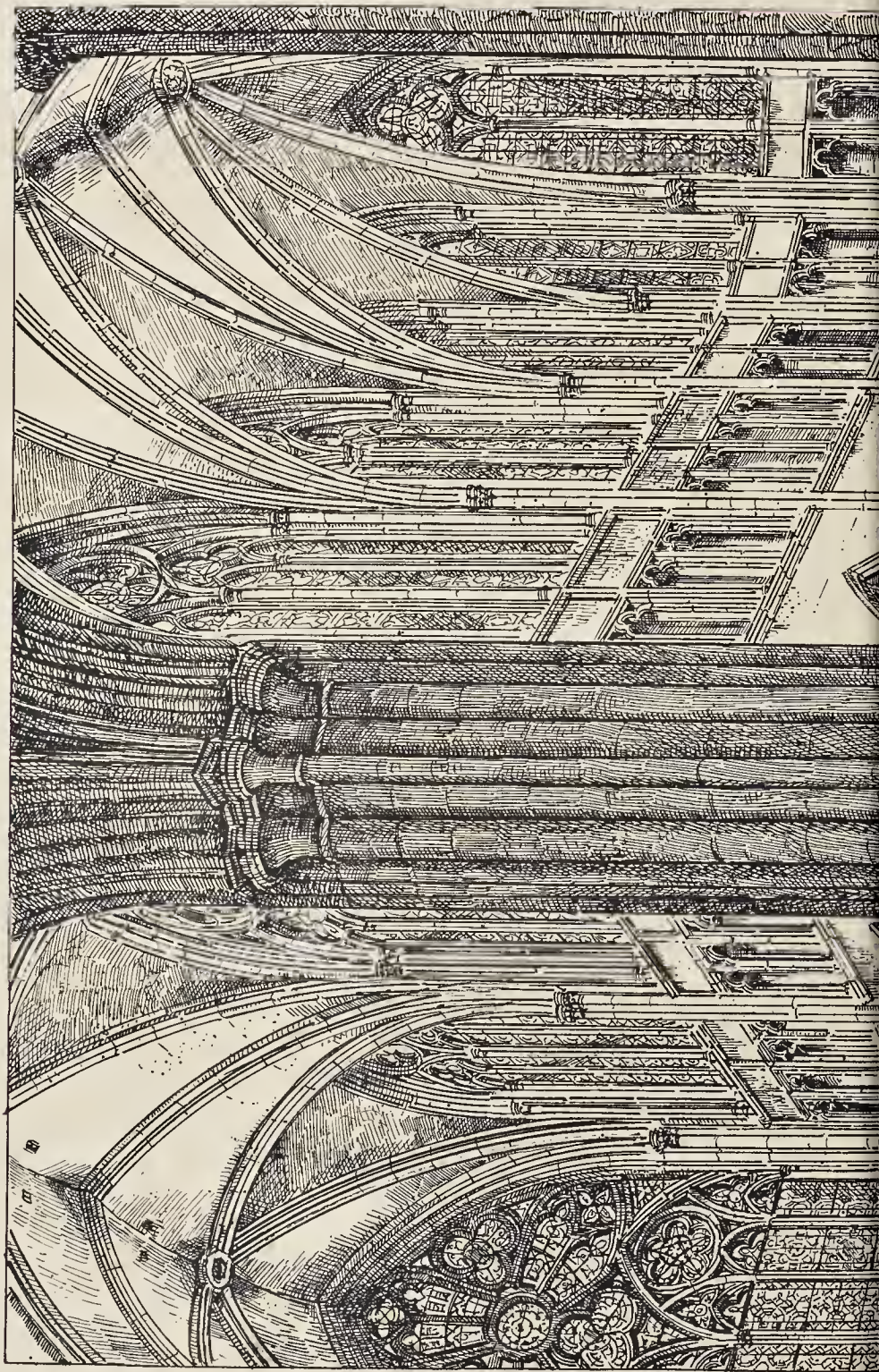
THE PHOTO ENGRAVED BY G. MARTIN LANE, LONDON, FOR THE BUILDER.

DANCING.—MR. E. ONSLOW FORD, A.R.A., SCULPTOR.

Exhibited at the New Gallery.



THE BUILDER, JUNE 21, 1890.



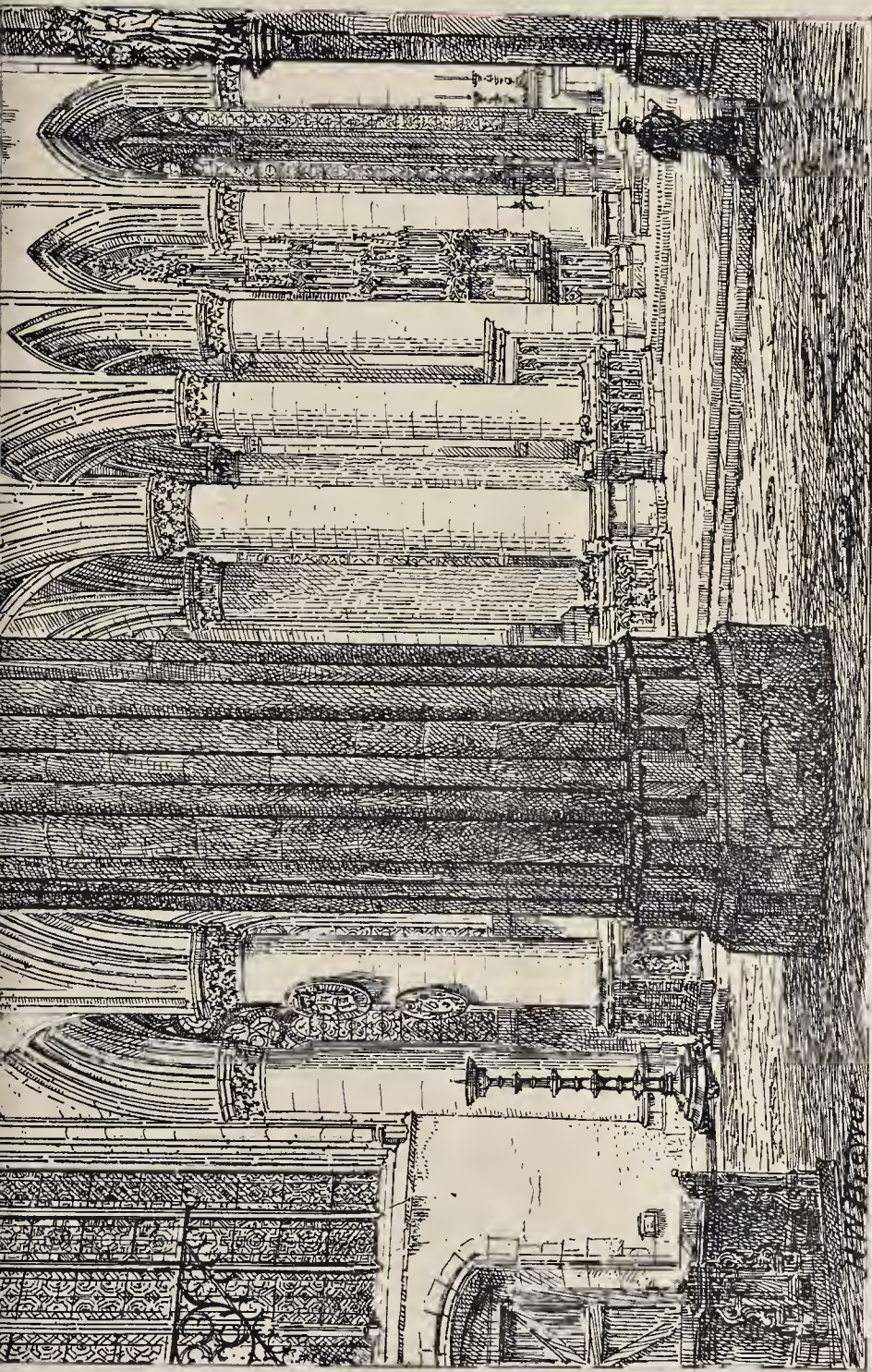


PHOTO LITHO. BRASSER & CO. MARTIN LANE, LONDON, E.

THE ABBEY CHURCH, ALTENBERG, NEAR COLOGNE.



rest of the church, and was not completed until 1379. It contains a fine eight-light window, a double door, and is adorned with some good sculpture. The Cistercian order had by this time relaxed the severity of their rule, and thus we find statues attached to the doorway and figures in the stained glass. If the latter is in its original condition, the order had not gained much by this relaxation, for the glass of this window is the most inharmonious old glass painting we have ever seen, and very inferior in general effect to the beautiful grissaille of the other window.

The smaller abbey-church, or chapel, is a pretty twelfth-century building, well vaulted with a good western doorway; it is, however, no longer used for religious purposes. About half a mile from the Abbey is a very fine old grange, which formerly belonged to the abbots.
H. W. B.

NORTHINGTON CHURCH, HANTS.

The church at Northington, near Arlesford, in Hants, of which the last remains are now being pulled down, was a modern structure of no particular architectural interest, though it was improved to some extent a few years ago by Mr. Butterfield.

The new church which will shortly be completed is designed by Mr. T. G. Jackson, and stands a few yards from the site of its predecessor.

It was begun by the late Lord Ashburton, who took the greatest interest in the work, but unhappily has not lived to see it completed, and it is now being finished by his executors. The walls are built with cement concrete constructed without the usual planking and bolts by building up an inner and outer lining between which the concrete was filled in. The inner lining where exposed is of thin Caen stone ashlar, elsewhere of concrete bricks, the outer is of flintwork with dressings of Oldham stone from the Wardour bed. This work has been carried out without a contractor by the workmen of the estate under Mr. Potter, his lordship's clerk of works, who is well-known as an authority on concrete building.

The exterior flintwork is inlaid in various panels, finished flush with flat tracery of stonework, in the manner common in the Eastern counties, where the richest examples of flintwork are found.

The church, which seats 260, consists of a chancel, nave, and north aisle, with an organ-chamber eastward of the aisle and on the north of the chancel.

The rapid fall of the ground allows of a vestry below the chancel, which takes the form of an octagonal chamber, with a central pillar, from which vaulting of stone ribs, with panels of rubbed red brick and stone in hands, spring to the side walls.

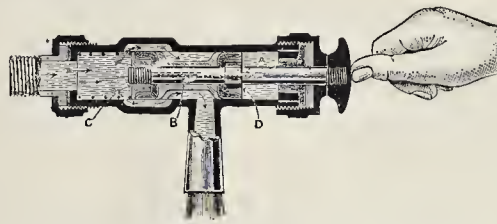
The six windows of the chancel and apse are filled with stained glass executed by Messrs. Powell from cartoons by Mr. H. E. Woodbridge. Each of the twelve lights contains the figure of an Apostle, one of them being a portrait of the late Lord Dighy, father-in-law to the late Lord Ashburton.

The seating throughout the church is of black American walnut; the nave seats have traceried ends, with a carved panel containing heraldic and other devices, and the chancel-stalls have high backs and canopies and carved standard ends, in which are introduced figures of the four Evangelists and their emblems. The organ-case is of the same material, and overhangs the stalls on the north side.

The reredos is of alabaster, with a panel representing the Last Supper, under canopy work with carved and pierced cresting.

The following have been employed to carry out Mr. Jackson's designs:—Messrs. Farmer & Brindley for the carving, the marble pavement, reredos, and font; Messrs. Watts & Co. for the embroidered altar-cloth; Messrs. Hart, Son, Peard, & Co. for the wrought-iron altar-rail, an unusually elaborate piece of smith's work, and for the bronze lectern and eagle, the bird itself being modelled by Mr. George, of Messrs. Farmer & Brindley's. The organ is built by Mr. Martin, of Oxford; and the church is heated by Messrs. Haden & Son, of Trowbridge, under the direction of their London manager, Mr. Blake. The bells are being rung, and two of them recast, by Messrs. Taylor, of Loughborough.

The illustration is from a drawing in the Royal Academy this year, where is also hung a view of the interior of the chancel.



Rigg's Automatic Self-closing Tap. (See description below.)

LAUNDRY AND ELECTRIC LIGHT BUILDINGS, ASKHAM HALL, YORK.

THE block of buildings shown in the illustration published this week is for the accommodation of the engines, dynamos, and accumulators required for the purpose of lighting the hall; and for the washhouse, laundry, drying-closets, &c., requisite in connection with the same. The architects for the buildings are Messrs. Chorley & Connon, of Leeds, who have designed them to correspond with the hall, recently completed from their darwings.

STABLES, &c., ASKHAM HALL, YORK.

THESE buildings, like the laundry ones, are built to correspond with the recently-erected hall. Of their kind they are very complete, providing accommodation for sixteen horses, with large coachhouses, coachman's houses, groom's rooms, hospital, machine and engine rooms, &c. The architects are Messrs. Chorley & Connon, of Leeds.

The drawing is exhibited in the Royal Academy of this year.

SCULPTURE: "MUSIC" AND "DANCING."

THESE two works in bronze, one of which is at present exhibited at the Royal Academy and the other at the New Gallery, are both the work of Mr. Onslow Ford, A.R.A., and though exhibited separately, are, as might be gathered from the identical design of the pedestals, companion works, and are executed for the Maharajah of Durhuhang, Bengal.

They are certainly two of the most successful works in sculpture of the year, both in regard to ideal fancy and to sculpturesque style. In regard to the birds placed on the heads of the figures, which have puzzled some people, Mr. Ford tells us that the cockatoo was used for the dancing figure because it is a dancing bird: "The owl on the head of the other figure was intended to express solemnity, 'nocturne,' or anything else the reverse of gay." The wings drooping on either hand at all events add very much to the poetic and fanciful effect of the figure.

Mr. Ford suggests that a bird headdress may have been worn by some remote people, from which the metal bird headdress worn by Egyptian ladies may have had its origin.

RIGG'S AUTOMATIC SELF-CLOSING TAP.

This is a tap contrived to close automatically and without jar by utilising the water-pressure from the supply-pipe, a cushion of water being formed against which the valve has to close. The section shows the tap open and water passing, the "Cataract Chamber" A being filled automatically by water admitted along the central passage B in the spindle, which is always in communication with the supply-pipe. On releasing the finger the pressure on the greater area C overcomes that on the lesser D, causing the pipe to close automatically without concussion. A spring is provided in case of the pipe being empty or the pressure low; but the special advantage of it is that it depends on a power which in the normal state of the water-supply is always the same, and does not weaken by usage, as a spring must inevitably do. The agents are the Automatic Pipe Syndicate Company.

The Printing-machine Managers' Superannuation Fund.—The annual excursion in aid of this deserving institution will this year be run to Ramsgate, Margate, and Canterbury on Saturday, July 5.

INCLINED GAS-RETORTS.

THE automatic system of charging and discharging gas-retorts by gravitation attracted last week a large party of visitors to the Brentford Gas Works. That it should remain to be demonstrated at this day that there is great advantage and economy in setting the retorts for distilling the coal at an angle, so that the charges may slide down into them,—and that such an arrangement is a novelty,—does not seem to indicate any remarkable amount of inventive, or even engineering, genius in several generations of gas engineers and managers. Clay is said to have tried it in 1803, but no one seems to have accomplished it before Coze, the Frenchman, at Rheims, in 1885,—some five years ago. Everybody knew that masses of material once set in motion have a tendency to come to rest at some particular angle which varies with the form, weight, and other characteristics. But no one during ninety years of gas industry has substituted this simple means for the old horizontal setting in the loading of the retorts by long scoops, containing about a hundredweight of coal borne on men's shoulders and launched thence into them with much scorching labour and fatigue. Instead of a special angle being needful for each kind and dimension of material, it is found that in practice an angle of 80 degrees will serve for all kinds of coals and sizes. This simplification is important, and bases the rest of the processes upon a tangible foundation. Last year further improvements, in the setting of the retorts, by which the cost of erection is much reduced and also in the mechanical means of charging and discharging, were effected by Messrs. Morris & Van Vestrant. These improvements are embodied in the portion of the Brentford Works which have been fitted up on the new principle.

The ordinary horizontal retorts there are 20 ft. long, and are charged at both ends simultaneously, six men being engaged in the operation,—some minutes being frequently taken to perform it. These men must be of strong physique, and trained to work skilfully together. A deficiency on the part of one man may tend to the injury of another, and the training required for the filling of the retorts by the shoots, evenly and properly from end to end, is not attainable without experience. Thus it is difficult always, and sometimes in emergencies impracticable, to fill the places of men falling out through illness or disagreements. For the higher reasons of civilisation the new system deserves encouragement, in that it obviates the need for arduous toil.

The new system is worked in the following way at Brentford:—The coals are elevated to a platform at a convenient height above the retorts; and the charge of 7 cwt. is put in a truck which moves along a line of rails. Under this platform also are movable vertical tubes or shoots, telescopically adjustable to the different levels of the mouths of the upper ends of the retorts. The charge of coals is injected into the shoot from the truck by the withdrawal of a slide. In their descent the coals acquire sufficient velocity to overcome the tendency to rest on the slope of the retort, and, consequently, they travel downwards along its floor until arrested by a stop-piece, which is inserted in the lower end of the retort before closing the lid. The front portion of the charge being thus arrested, the remainder is gradually brought to a stand in succession, the whole charge being so regularly distributed that the retort will contain one-seventh more than the ordinary quantity. The charges can be shot in far quicker than they can be put in by the old hand proceedings—from five to seven seconds sufficing. When charged the retort lid is closed, and the carbonising goes on in the usual manner, but in

superior degree. When the distillation is effected the lid at the lower end of the retort is opened and the stop removed. The coke within is now seen in radiant red heat, slightly expanded against the sides, sufficiently to hold it up. A light rake or sicc is inserted under the coke, which then slips forward rapidly with but the slightest labour, and falls down in a continuous flow into the quenching-vault below, whence it is carried out of the retort-house and stored or put into trucks as required. The wear and cost of tools is much diminished. A most important practical result of the system is the greater control it affords over the illuminating properties of the gas produced,—in this, that no gang work being needed, the time of carbonising can be shortened optionally to any extent in lieu of the ordinary six hours' work. Thus, a more highly carbonised gas can be secured by sacrificing the weak carbonic oxide and marsh gases given off towards the end of the six hours' charge. In foggy weather, also, by thus shortening the time of distillation, one quarter more gas can be made in the same retorts, provided the heating is kept up; which, where gaseous fuel is used, as it is at Brentford, is very easily accomplished.

CASE UNDER THE METROPOLITAN BUILDING ACT.

NEGLECT TO GIVE NOTICE TO DISTRICT SURVEYOR.

THE case of the District Surveyor for East Hackney North v. Anthony & Co., Limited, was heard in the North London Police-court on the 12th inst., before Mr. Montagu Williams.

The defendants were summoned for neglect to give notice. They had recently erected on the front of the Old Town Hall, Hackney, two wooden advertisement framings, each measuring about 15 ft. by 12 ft., supported on wood brackets driven into the wall and fixed with iron holdfasts, some with and some without screws.

The District Surveyor relied on sections 9 and 14 and section 25, rule 1.

The defendants, by counsel, contended that the Building Act was only intended to apply to what was a permanent part of a building, and not to such temporary things as advertisement-boards and hrowers' signs.

The defendants were ordered to pay a penalty of 10s. and 12s. 6d. costs, the Magistrate refusing to grant a case.

THE PRESENT POSITION AT THE ARCHITECTURAL ASSOCIATION.

SIR,—I wish to ask for the opportunity of urging that further and calmer discussion should be given by the members of the Association to the proposals of the now lapsed Committee on Education. A unusual amount of controversial heat has been engendered at the last few meetings on the subject, and almost angry looks have been exchanged between nearly equally-matched bodies of supporters. The Session, according to the rules, lapsed with May, and in the season of evening tennis and boating and, let us hope, of sketching, it will be difficult to fairly obtain the opinion of the great body of members. Surely the present constitution of the Association is good enough to last until the cooler days and longer evenings of autumn, for we should not be forced to suppose that more time and thought must be prejudicial to the new scheme.

The rules must be carefully readjusted and the constitution re-drawn before the alterations can become operative, and unless the new army of lecturers at "21s. 6d. per lecture" are already engaged in preparing their syllabuses, nothing can be done before the next brown-hook goes to press in August.

Two things have to be done if the Education report is to become the new constitution of the Association—each independent of the other, but strangely linked in the amateurish report of the committee. The first is to substitute an architectural paid "dominie" for a real architect in practice as a voluntary teacher, and to publicly (and I urge the importance of full consideration by the profession of this point) disown and discard the pupillage system, which, after all that can be said against it, has produced the Architectural Association and a National School of Architecture that for extraordinary vigour and freshness is unrivalled in the records of the century.

The second point is that the Association is to have a purge of a drastic character. After diving in a course of undeterred progress advanced to a membership of over 1,000 members, the subscription is to be doubled, and the hands of the clock put back into darkness, as far as progress in membership is concerned. Do the members who have built up the Association realise this? The reason given is that the work of the Association is so great that more money must be paid for secretarial

assistance, &c. No doubt this is true, and I admit it, with hearty thanks to the honorary labourers who, in accordance with the old motto of the Architectural Association, have worked hard and lovingly for no pay. But it should be remembered that last year the Association spent *one quarter* of its income on the contrasalone and soiree, and that if the expenditure on these heads was limited to 50l., the 150l. requisite would be found for further clerical help without raising the subscription and "the wind."

There has seldom been wanting, either in the Institute Council or among the Presidents of the Association, the expressed desire to bind the junior body to the senior one in some satisfactory manner that shall be a source of strength to both. May I suggest that as the Royal Institute are enlarging their premises, and have an efficient official staff, that the office and gallery, rent and clerical expenses of an honorary and mutual body like the Association might be eased by some paternal help? It is idle and—like other ideas floating in the minds of some "A. A." orators—childish to expect the Institute to become the body to teach architecture, or to make grants for paying masters for the young in the art, but the nature of official and clerical help is very different, and could with dignity be asked for and with grace given; and as guineas and their halves are considerations to young architects, the Royal Institute of British Architects will be likely to gain more recruits for the Associateship at 2gs. with the "A. A." subscription at 10s. 6d., than if the latter is doubled.

I hope that those senior members who expressed the hope that an adjournment of the battle might be made till next session will be supported at Friday's meeting, and that their request may prevail.

June 17, 1890.

A. BELSFORD PITE.

THE OLD NAVE, ST. SAVIOUR'S, SOUTHWARK.

SIR,—In reference to a letter on this subject by Mr. Garbett, which appeared in your issue of May 24, July 29, 1839, is the date on which, according to the article on "St. Saviour's, Southwark," in the current *Quarterly Review*, the first stone of the new nave was laid by Bishop Sturges, of Winchester. It is hardly likely that there is an error as to this date in an article so carefully written, and evidently with access to original parochial memoranda. The same article states that in 1838 "the old nave was levelled to the ground." If we interpret this as meaning that the work of destruction was begun in that year, the building could hardly be described as "untouched" in July, 1839, the month in which the rebuilding commenced.

The first stone would certainly not be laid until the ground had been cleared for the builders' operations. Is it possible that Mr. Garbett, writing after the lapse of half a century, has made a very natural slip in the date of his first visit to St. Saviour's? He is certainly in error as to the south porch, the existence of which he questions. That there was one, attached to the second bay from the west on the south side, is absolutely certain. I saw it hundreds of times before its demolition, which I witnessed with bitter grief. It is exactly reproduced in Sir Arthur Blomfield's design for the rebuilding of the nave. Mr. Garbett is quite correct as to the western entrance, which was a very beautiful example of Perpendicular work, with richly carved oaken doors (can any one say what has become of them?), as depicted in Pugin's "Specimens," vol. ii., plate xvii., K*. Mr. Garbett's reference is accurate, but he has been misled by the asterisk. The note referring to "Briton's Architectural Antiquities," vol. v., belongs to the preceding paragraph describing Illey Church, of which "a ground-plan and five plates," as stated, will be found in that work. The explanation of the misleading asterisk is this:—Each plate has two signatures, one in Roman numerals at the upper right-hand corner; one in Roman capitals at the lower. The plates being more than fifty in number, one alphabet would not suffice, and a second was used, distinguished from the first by an asterisk—A*, B*, K*. EDMUND VENABLES.

A PLEA FOR THE IMPROVEMENT OF SIX- AND EIGHT-ROOMED HOUSES.

SIR,—Pray, Goody, moderate the rancour of your tongue. Why flash those sparks of angry fire from thine eyes?—they quite obscure thy vision. Corridors in my proposed houses need not be dark; glass in upper parts of partitions and over-doors would obviate that, and are usual expedients. Corridors in large city buildings and in hotels, say the Grand Hotel, Paris, nearly as long as streets, are dimly lighted only, and many approve; evidently a delusion. However, Knightley can't do it. Pite can, and (very good of him) shows his model, which he modestly calls a "casual." Eighth scale gives 18 ft. frontage (very usual width), back parlour well lighted, kitchen 9 ft. by 8 ft., dear little place; rather tropical, large jambs for kitchener; dresser, table, two chairs, three persons seated in kitchen, two on chairs, one on fire or table. Scullery,

7 ft. 6 in. by 4 ft. 6 in., no copper (useful article, though, but then at times makes steam, so leave it out); back w.c. in direct line of passage, gross and palatable to visitors, who might say, "How very convenient." First floor, two bed-rooms 8 ft. wide; don't see where to put bed; front room very good, but one bed-room short allowance; dressing-room dispensed with; pity this; fellow likes to keep brush, comb, and towel to himself; water-closet instead (this over hall—thought it a sunk porch); music of machinery to amuse callers whilst waiting. In case of w.c. overflowing, pretty good benefit for heads of folks in hall (alias sunk porch). First-floor plans in time for next week, and then from me nothing more. T. E. KNIGHTLEY.

SIR,—I quite agree with Mr. William A. Pite [p. 437, ante], that the casual suggestion he has lightly thrown off and published in your last number goes far to show that the "everlasting plan" of the six and eight-roomed houses with which we are so familiar, should not be hurriedly condemned, for it is evident from Mr. Pite's plan that the jerry builder has been merciful and spared us in many things.

He does not, for instance, place the drawing room door immediately facing the fire-place, so that anyone sitting in front of it would be seriously inconvenienced by it, nor does he increase the evil caused by the dining-room window being forced into the corner to a greater extent than necessary, by putting the widest room in the rear. He has contrived for us a narrow stair, but a well-lighted one, delivering towards the front door and public rooms. We can see by Mr. Pite's sketch how the staircase might descend into inner darkness, and the kitchen lobby, while securing sometimes with a little more light a pleasing vista through the kitchen and scullery to w.c. in rear; how the kitchen which everyone says is too small at present might be made still smaller, being half the size of the "dining-room;" how the cost of the house, and, therefore, its rent, could be increased by adding another 4 ft. to the depth for a cross-passage, lady's store, and glass pantry, which would certainly be ample for the occupant's requirements in that way. It also shows how the w.c., which present sentiment consigns to a back place, could surmount the position usually allotted to the good-man's dressing-room, and could be made quite a feature in the front elevation; how the door in the adjacent bedroom could be put in the wrong wall and hung in the wrong way; how to make one of the back bedrooms still more uncomfortable by a novel arrangement of door, window, fireplace, and cupboard. It also exhibits clearly how our builder, if he forgot scale and dimensions, could produce still more wonderful effects in tight places; see the ladder and the scullery, where a copper might be easily omitted.

Sir, if we look for improvement it must not be from casual suggestion. I am well aware of the difficulty of improving upon a plan which is really the result of a long evolution; but Mr. Knightley's plan (though open to criticism in some respects) yet makes an advance which should be considered. I am sure he deserves our thanks for placing his ideas at our service. W. D.

JUNCTION OF SOIL-PIPE WITH DRAIN.

SIR,—On p. 437 of the *Builder* for June 14, Mr. Frank Caws begins his letter on this subject by saying:—"I desire to draw attention to a danger and evil which have seemed to have reared their heads among sanitarians"; and he goes on to explain that the discharges falling down inside high vertical soil-pipes, and striking the fire-clay head at the bottom, by-and-by disturb the bend and cause leakage of its joints, on account of this bend not being properly supported or bedded.

Now, sanitarians and practical plumbers did not allow this to escape their notice, for, as far back as twenty years ago or so, I published that when of iron this bend at the bottom of the soil-pipe should have a strong iron stud or heel below it, which heel was to be made to rest on a solidly-laid stone, so that it could not be moved. When of lead this bend was to be otherwise firmly fixed.

I do not approve of the bend at the bottom of the soil-pipe being either fire-clay or stone-ware, or of "earthenware," as Mr. Caws terms it. This bend should be part of the soil-pipe, and not part of the drain.

I do not believe a properly set and properly cement-jointed fire-clay head, bedded on clay, would give way as Mr. Caws says. I support his idea of bedding the socket and of the drain-pipe in cement or concrete. This is an old practice with me. W. P. BUCHAN.

IRON BUILDINGS AND LIGHTNING.

SIR,—In answer to your correspondent "J. Arthur Wallington," who inquires [p. 421, ante] as to the effect of lightning on iron roofs, and whether a corrugated iron house is liable to suffer from lightning, or whether it would act as a conductor, I beg to refer him to the "Report of the Lightning Rod Conference" (London: E. & F. N. Spon, * There are two doors between it and the visitors, however.—Ed.

CHURCH BUILDING NEWS.

1882). That Conference consisted of delegates from the Meteorological Society, the Royal Institute of British Architects, the Society of Telegraph Engineers and Electricians, and the Physical Society, besides two oopted members, Prof. W. E. Ayrton, F.R.S., and Prof. D. E. Hughes, F.R.S. On p. 70 of that Report there will be found an abstract by Prof. T. Haylor Lewis of "Instructions" issued with the "Army Circulars" of May 1, 1876, "as to the application of lightning-conductors for protection of powder magazines, &c." In his abstract of these instructions, Prof. Lewis says:

"The principles adopted by Sir W. S. Harris, as shown in Appendices A and B to this paper, are still held to be sound. . . ."

"Iron verandahs and railings are good conductors when with good earth connections. Iron buildings are good conductors. But if covered with asphalt, concrete, &c., rods or points must be provided, projecting above asphalt, &c., and with good earth connections."

In the Appendix A, just referred to, the late Sir W. Snow Harris, F.R.S., says:—

"Electricity when confined to substances resisting its progress, as air, glass, dry wood, stones, &c., exerts a terribly explosive power."

"Resistance is connected to bodies, such as metals, offering small resistance, its violent expansion or disruptive action is greatly reduced, or avoided altogether, and becomes a continuous current comparatively quiescent. But if a body be small, as wire, it may be heated or fused. Resistance is so small that a shock has traversed copper wire at the rate of 576,000 miles a second; resistance increases with length and diminishes with area of section of conductor."

"So a building metallic in all its parts, or a man in armour, is safe. . . . It follows that if metal would be safer than if built in the usual way."

These dicta of Sir W. Snow Harris would seem to be confirmed by the following paragraph from the current number of your contemporary *Iron*:—

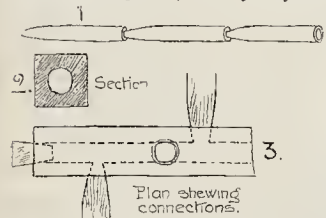
"THE EIFFEL TOWER IN A THUNDERSTORM.—From recent experience during thunderstorms, the Eiffel Tower at Paris seems to be proof against lightning. On one occasion it was subjected to a remarkable bombardment from aerial electricity, being struck by lightning no less than six times in eleven minutes. Three of the flashes are said to have reached the top of the conductor simultaneously, resulting in a remarkable display and considerable vibration on the part of the big iron frame. A rattling of the metal was heard, but no apparent damage was done."

The "Report of the Lightning Rod Conference" is not as well known as it should be to architects and builders. It is well worth their attention, the conclusions of experts on a matter of great importance to the protection of life and property being very clearly and succinctly laid down in it.

London, June 18. Δ
* In reference to the quotation from *Iron*, it must not be forgotten that the Eiffel Tower, though of iron, is fully furnished with special lightning-conductors.—Ed.

THE WOODEN WATER-PIPES FOUND AT BELFAST.

SIR,—The wooden water-pipes found in the Fountain at Belfast [see pp. 431, 420, 438 ante] were in lengths of about 12 ft. each. We took up three lengths; they were 9 in. in diameter, and the timber is quite sound. There is a waterway 3 in. in diameter through them, and they are jointed



(fig. 1) by simply opening one end a little wider and cutting away the other to fit in (but with no iron rings). The one end of this stretch of pipe was connected into a junction 8 ft. long, 12 in. by 12 in., with a 3 in. diameter waterway through same (fig. 2). This square pipe had several connections, one at right-angles each way (fig. 3), and one for up-stand, which was likely used for supplying some of the old fountains. It was closed up at one end and open at the other. This seemed only to be a junction for connecting the pipes.

Belfast. W. MACDONALD & SON.

SYMBOLISM OF THE PASTORAL STAFF.

SIR,—With reference to Mr. Littlehale's letter [p. 438, ante], my own impression is that the examples mentioned are only exceptions to the rule. The carelessness of sculptors may be answerable for those deviations. It has just been my lot to behold at Farleigh Castle (Wilts), a seventeenth-century effigy represented in armour of the fifteenth.

J. BAGNALL.

Burnham Thorp.—An influential committee has been formed, with the Prince of Wales as chairman, and comprising some distinguished naval officers, for rebuilding the parish church of St. Peter's, at Burnham Thorp, Norfolk, after the designs of Sir Arthur Blomfield. This church, which was repaired and beautified fifty years ago, consists of chancel, nave, north aisle, and western tower, mostly in the Perpendicular style. It contains some memorials of Lord Nelson's family, including a tablet to his father, who was rector here; and a brass, representing Sir William Calthorpe in a complete suit of chain armour, with inscription and date, "1420."

Denton.—The Church at Denton, in the diocese of Durham, which was only built in 1830, on the site of an ancient church, is now being demolished, and a new and more substantial fabric erected in its place in the Early English style. It is to consist of nave, chancel, south porch, vestry at west-end, and organ-chamber on south side of chancel. The walls are to be faced with random blockers from Houghton Bank, lined with buff-pressed bricks from Normanby, the internal panels and arches being of stone. The pulpit, choir-fittings, reredos, and chancel screen are all to be of Anstrian oak, the rest of the woodwork being of pitch-pine. The gangways and chancel are to be paved with mosaic tiles, the rest of the floors being laid with wood blocks. The windows are to be glazed with cathedral-tinted glass, having coloured roundels and margins. The warming is to be by hot water, and the lighting by corona. The architect is Mr. J. P. Pritchett, of Darlington.

London.—The new Church of the Holy Trinity, Sloane-square, Chelsea, was consecrated on the 13th ult. It replaces an old and smaller structure, and has been erected at the cost of Earl Cadogan, the congregation and parishioners providing the amount required for the fittings. It is stated by the *Guardian* that up to the present time 22,000, has been spent, but before the church is completed the total sum will probably reach 35,000. Internally the church is 150 ft. long by 40 ft. 9 in. wide, and 60 ft. high. In plan the church is a parallelogram, with narrow but lofty aisles, and on the north side are the morning-chapel and organ-chamber. Within the wall arches are the clearstory windows, and below the springing of the arcade a deep frieze, which is carried throughout the length of the church, and which is intended to be decorated with a series of subjects illustrating our Saviour's life, for which sketches have been prepared by Mr. Burne Jones. The spandrels of the nave arches are filled with tracery panelling, with large medallions intended to contain figures of the Prophets, which are to be executed by Mr. Armstead, and upon the face of the piers are to be figures of the twelve Apostles, for which sketches have been prepared by Mr. Hamo Thornycroft. The chancel, which is of the same width as the nave, is separated from it by a low screen of green marble. A flight of white marble steps leads from the nave level to the chancel floor, which is paved with black and white marble. On the right and left of the entrance are two pillars of green marble, on which are seated bronze angels bearing scrolls. The chancel gates and side wings are only partially executed. The chancel stalls are of novel design, and show the unusual admixture of beaten and cast brass panels with oak stained a dark colour. In the panels are a series of angels holding inscribed scrolls. There are also large panels representing David and St. John the Divine. The figures, both upon the screen and the stalls, are the work of Mr. F. W. Pomeroy. The altar, which is 12 ft. long, is internally of oak, and has a marble front, in which occurs a carved panel showing the entombment, by Mr. Harry Bates, of which the model is to be seen in this year's Royal Academy Exhibition. The pulpit is formed of white marble with coloured panels, supported on columns of alabaster and red marble. The panels are to be enriched with metal reliefs by Mr. Alfred Gilbert. At the west end of the morning chapel is the font, the bowl and shaft of which are made of Mexican onyx, supported on steps of golden veined marble. On the shaft of the font is a band of cherubs holding scrolls, the work of Mr. F. Boucber, under the direction of Mr. Onslow Ford. At the east end of this chapel is a marble reredos, above which hangs a piece of tapestry work executed by Morris &

Co. The front of the altar in the Morning Chapel, which is being painted by Mr. Reynolds Stephens, represents the homage of the nineteenth century to the Saviour. The design shows a figure of the infant Saviour and His mother, before which kneel the figures of typical men of the time, such as Gordon as a soldier, Damien as a martyr, Selwyn as Bishop, Browning as poet, Lowder as priest, &c. The church is lighted with electric light, the fittings having been made from the architect's design by Messrs. Longden & Co. The lights are enclosed in wrought iron lanterns, which are surrounded by filigree work of wrought iron gilded. The wiring and other details have been carried out by the Brush Electric Supply Corporation. The architect is Mr. J. D. Sedding, and the works have been carried out under his superintendence, assisted by Mr. E. H. Sedding. Messrs. Higgs & Hill were the general contractors, their foreman being Mr. Swain. The following illustrations of the church have appeared in the *Builder*, viz.: A large view of the interior and a perspective view of exterior, on October 6, 1888; one bay of nave arcade, October 12, 1889; sketch of chancel, January 4, 1890.

PROVINCIAL NEWS.

Northampton.—A good deal of new building has been done here recently, partly for some of the London shoemakers, who, finding that ground can be purchased at about one shilling per square foot, have run up a number of new factories, although, perhaps, not quite so substantially as this description of buildings would be erected in London, Manchester, or Leicester. The architects are, for the most part, beginners in practice, among them Messrs. Brown & Fisher, of Wellington, the following being some of their works:—Messrs. Stimson's factory, Abington-street, just commenced; Messrs. Crockett & Jones's shoe factory, Mages-street; builder, Mr. Wingrove. Heating and ventilating by Mr. B. F. Startovant, of London. The building is built of red bricks and Bath stone. About ten other factories have been designed by the same firm, also a bank in Mercer's-row. Messrs. Holding & Jeffrey are making extensive additions to the Town-hall. The "Dolpin Hotel" is being rebuilt by the Northampton Brewery Company, from the designs of Messrs. Brown & Fisher. Mr. Hull has added an extensive wing to the Convent School, Abington-street. Messrs. Ingram & Shaw have nearly completed the new Masonic Hall, Albert-street; also a very handsome building as a shoe factory close by. Within the last four years several extensive estates by the race-course have been covered with about 800 or 900 houses and shops. Several new villas have been erected round the racecourse, but owing to the utter disregard one architect or builder has for the designs of his neighbours, the grouping is anything but agreeable.

Prescot (near Liverpool).—A new gymnasium, club-house, and coffee tavern are being erected at Prescot from the designs of Mr. Thomas W. Cubbon, architect, Birkenhead, for Miss Ruth Evans, of Rainhill and Rhyll. The buildings will include a public gymnasium, 51 ft. by 24 ft., having dressing-room and all necessary conveniences attached; billiard and reading-rooms, with lavatories and cloak-rooms, &c.; coffee tavern, consisting of large refreshment-room fitted with serving-bar, seats and tables, bicycle-shed, verandah, &c. The buildings, which will be Gothic in character, will be of two stories high, and faced externally with red sandstone from local quarries. All internal woodwork will be of pitch-pine varnished. The whole of the buildings are being erected by Messrs. Hughes & Stirling, contractors, of Bootle-cum-Linacre and under the supervision of the architect.—A new public swimming-bath, designed by the same architect, is now in course of erection at Prescot, for Miss Ruth Evans. It consists of swimming-bath room 50 ft. by 23 ft., having eleven dressing-boxes, all being fitted-up in the best style, and with all modern conveniences and fittings. The design is Gothic, all the external walls being faced with local red sandstone, the internal walls faced with selected bricks, the sides of bath lined with white glazed bricks, and the bottom laid on concrete bed with heavy white tiles, all set in cement. The internal woodwork is of pitch-pine, varnished; roof lights glazed with Hartley's rolled plate, and slated with Vellenhelli slates. Movable Louvred ventilators, which may be opened and closed at will, are provided in the roof. The

contract is being carried out by Messrs. Hughes & Stirling, under the architect's superintendence.

Ripon.—Messrs. W. Lewis & Son, architects, have just completed considerable improvements to Grantley Hall, and other work on the Grantley estate, near Ripon, for the Right Hon. Lord Grantley. Other work is in progress and contemplation to generally improve the estate, from the plans and designs of Messrs. Lewis & Son.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—XXV.

METERS.

IN some districts it is the custom to charge for electricity supply at so much per lamp, or other piece of apparatus, per annum; but a far more satisfactory way is to meter the B.T.U.'s which are used in a building, by placing some form of electric meter where the street mains are tapped for the local supply current. The following properties of the electric current can be used for the purpose of metering (i) the decomposition of a compound conducting liquid, (ii) the rise in temperature of a conductor, (iii) the field of force produced. A meter may measure either coulombs or joules. If a building is supplied under constant E.M.F. the coulombs alone need be recorded, for if their number be multiplied by the E.M.F. the joules are at once obtained; again if the current be constant but the E.M.F. be varied the meter is placed as a shunt across the house mains, and so arranged that the current which flows through it shall be proportional to the E.M.F. between the terminals; in this case also the coulombs registered, multiplied by some number, will give the joules used.

Meters, based on the fact that if a continuous current be passed between, say, two plates of metallic copper immersed in a solution of sulphate of copper, a definite weight of copper will dissolve from the positive plate and deposit on the negative, for every coulomb that passes, irrespective of the current, have long been employed. Among early meters of this kind may be mentioned those of Edison and of Wright. An ingenious modification was introduced for use with an alternating current by Lowrie and Hall. If an alternating current be passed through an ordinary depositing cell, there would, as a whole, be no change in weight of either plate because as many coulombs would pass in one direction as the other. The inventors therefore put a charged secondary cell in series with the depositing cell; as a result, the current is helped in one direction but opposed in the other by the E.M.F. of the cell, and the excess of coulombs in the direction of this E.M.F. is recorded, its proportion to the whole number of coulombs passed being easily calculated. A practical defect in all meters of this kind is that the plates have to be periodically removed and weighed; a consumer cannot see on a dial the number of B.T.U.'s he has used at any time, in the same way that the number of cubic feet of gas passed through a gas meter can be determined by mere inspection.

A meter introduced by Professor George Forbes is equally efficient for either continuous or alternating currents, as its action depends upon the heating of conductors by an electric current. A number of wires connect together two horizontal concentric rings, and the heated air which rises from this arrangement, fig. 67, impinges on little mica plates set at an angle of 45 deg. round a horizontal mica disc. This disc and its vanes revolve like a windmill, the number of revolutions made being recorded. The whole is placed under a glass shade to prevent disturbance from external currents of air.

Dr. Aron's meter, which is very largely used, consists of two pendulum clocks timed to go at exactly the same rate, and geared to a dial so that one clock train undoes the record of the other. One pendulum has its rate of vibration changed by a field produced by the current or currents passing through coils, and it is this change of movement which the dial records.

Other meters, too numerous to mention by name, are simply little motors whose rate of revolution is made to vary directly as the



Fig. 67.

current, and the work they do is to turn round the index on the recording dial. When these motor-meters are used for the alternating current, the alternating current in the field coils induces currents in a short-circuited armature, so that nothing of the nature of a commutator is required.

SWITCHES.

It is absolutely necessary to be able to stop at any moment the current in any main or branch, and for this purpose the continuity of the conductor carrying the current is broken. A switch is an arrangement by which a removable part is introduced into any circuit, and when a large current is flowing under a high E.M.F. there is danger of an arc forming at the break across the gap made, for the reasons already explained in connexion with fuses.

The means adopted for getting over the danger of arcing in a switch are to introduce breaks simultaneously in two places, and to make the separation so rapidly that sufficient heated vapour cannot be produced to form the arcs. Fig. 68 represents an exceedingly simple, but very effective, main switch. The current is



Fig. 68.

led across a bar of brass or other metal, B, bent over at the ends and gripped by two split rings, S, S, which can be tightened to any desired degree by means of nuts, and the separated ends of the main cable are connected to these rings, through the terminals T, and T. Some little force is required to release the bar from contact with the rings, and when they do let go it comes away with a jerk, so that the circuit is broken in two places with great rapidity. A switch must be constructed so as to make it impossible to leave it "partly on," that is making loose contacts, which, while allowing the current to pass, introduce a high resistance, and cause heating to a dangerous degree. A spring therefore, always acts, to pull the bar out of contact, so that, unless it is tightly gripped, it will not stay in a position to let the current pass.

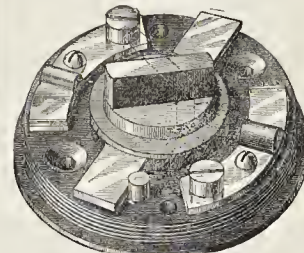


Fig. 69.*

A similar kind of switch is shown in fig. 69, suitable for single lamps or small groups of lamps. The bar is kept away from the clips by a spring, unless held tightly by them. The handle, which is held in place by the cover (not shown in the figure), is not in any way attached to the bar, and is cut away underneath, so that on turning it through a fairly large angle it will touch the bar on one side or the other; the handle turns the bar until the clips loosen their hold, and are unable to resist the spring, when it flies out rapidly and slides away independently of the handle. As an arc does not form when contact is made, in neither form of switch need contact be made with such rapidity. Any switch in which the current passes on to the arm through the pin about which it turns should be avoided, and the material on which the working parts are mounted should be unflammable.

Surveyorship, Banbury.—Mr. S. E. Burgess, Assoc. M. Inst. C.E., Assistant Borough Surveyor of Stockton-on-Tees, was last week appointed to the position of Borough Surveyor of Banbury, Oxon. There were ninety-three applicants for the post.

* The block for this figure has been kindly lent by Mr. P. G. Hart, of Westminster.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

10,237, Syphon Flushing-cisterns. T. Deeley.

This invention has for its object the production of a perfect water-waste preventer, combined with a noiseless flusher. It is an improvement on a previous patent, and consists of a long and short leg syphon arrangement, with the short leg or inlet passage pierced near its upper end, over which is fitted a flexible sleeve-valve carried by a sliding tube, the tube being raised by a float connected at its lower end. The outlet or long-leg of the syphon has an open-topped branch which is closed by a self-closing valve, operated by the cistern-pull. By the rising of the valve water for the creation of the vacuum is allowed to pass into the long-leg and down pipe of the cistern.

10,386, Brick Facings. R. Kerr.

According to this invention, the bricks which are exposed to the surface and form the face of the wall, &c., are fluted or rippled, rounded, or indented for the purpose of distributing the light by reflection. The surface is also sometimes composed of special materials, pottery, glass, &c.; or the outside surface of the bricks are highly glazed in order that light may be reflected from them.

10,463, Cupboard-turn or Door-fastener. W. Donslin.

In place of the ordinary latch with a square socket-hole, and held upon the spindle of a cupboard-turn by means of a nut,—which frequently works loose,—according to this invention a latch is mounted upon a spindle of nearly square section, upon the corners of which spindle a screw-thread is formed and this spindle is fitted into a knob. A set-screw passing through a slot in the spindle enables the latch to be screwed up to the side of the door.

10,900, Liquid Glue. W. G. Richardson.

This invention refers to a liquid waterproof glue, prepared by dissolving gum-shellac in spirits of wine, naphtha, &c. This glue is not soluble by either water or heat.

3,776, Sash Fastener. W. J. Ingram.

The fastener which is the subject of this patent is a sliding-bolt attached to a spiral spring, which, when locked, throws the bolt back, enabling a projection to enter a groove towards the front. To unlock it the bolt must be pushed in so as to disengage it from the groove, then turned half round, when the spring will throw the bolt back. This bolt is made to pass between two lips on the bottom sash, and through a tongue on the top sash, the tongue passing between the two lips. This tongue is screwed on the edge of the meeting-rail in addition to the surface, which renders it impossible to cut the bolt or open the sash without breaking the glass.

NEW APPLICATIONS FOR PATENTS.

June 2.—3,488, J. Andrews, Screws, Screw Nails, &c.—8,498, J. & O. Macfarlane, Sewer Gas and Sewage.—8,512, B. Leslie, Stair Treads.—8,513, C. Prinz, Manufacture and Treatment of Cement.—8,521, J. Wallace, Kitchen Ranges.

June 3.—8,542, H. Farmer, Self-closing Hinge for Doors and Gates.—8,555, T. Garlick, Check or Stop for Sash Windows.—8,558, W. Coulson, Metallic Frames and Supports for Glass and other materials of Greenhouses, Roofs, &c.—8,563, B. White and J. Boyd, Brick-making Machines.—8,586, F. Egleton, Ranges and Stoves.—8,604, C. Shepherd, Valves for Soil or Sewer Pipes of Dwellings.—8,606, S. Byran, Treatment of Slag for the Manufacture of Building Blocks, &c.

June 4.—8,644, W. Cockburn, Securing Door Knobs to their Spindles.—8,664, C. Patchett, Window Fasteners.—8,668, B. Piffard, Varnishes.—June 5.—8,892, G. Calvert, Chimney Pot.—8,705, C. Bischoff, Binding Plate for Brick and other Walls.—8,723, G. Ollier, Fire-resisting Cements.

June 6.—8,732, H. Hearn, Spring Window Sash-fastener.

June 7.—8,801, J. Carr, Composition for Covering Walls, &c.—8,817, K. Kadler, Hinges.—8,818, J. Manley, Construction of Bath Ovens.—8,825, A. Cover, Ventilating Tile.—8,839, J. Birde, Window-fastening.

PROVISIONAL SPECIFICATIONS ACCEPTED.

5,977, C. Wright and J. Mackinlay, Stove Grates, &c.—6,196, W. May, Glazed Bricks and Tiles.—6,225, E. Street, Flushing Drains and Sewers.—6,265, C. Orr, Door-closing Apparatus.—6,429, J. Vicars and Others, Baker's Ovens.—6,805, W. Thompson, Paints, &c.—6,969, W. Lancaster, Bevels.—7,306, J. Boustead, Paint and other Brushes.—7,401, M. Webb, Floral Decoration Silvered Plate Glass.—7,657, W. Gale, Ferule or Collar for Painters' Brushes.—7,745, W. Lambert, Nails.—8,008, J. Cowley, Nails.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

9,486, S. Wilson, Dies for Bricks.—4,083, G. Lawrence and A. Ranyard, Closet-seats.—6,855, G. Higham, Manufacture of Portland Cement.—7,025, J. Jones, Safety Appliances for Windows, &c.

RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

JUNE 9.—By G. A. WILKINSON & SON.

Covent Garden—4, New-st., l., 400 p.a. £1,670

Stratford—40, Forest-lane, l. 350

By C. & F. BUTLEY.

Snarebrook—8, Westfield-villas, l., r. 450 p.a. 685

Sylvan-rl.—A plot of land 230

By VERNON, BULL, & COOPER.

Bloomersbury—The lease and goodwill of 1 and 3, Silver-st., ut. 22 yrs., r. £130 250

By W. H. KERR.

Regent-pk.—53, Upper Gloucester-pl., ut. 31 yrs., no gr., r. £50 740

Notting Hill—90, Lansdowne-rl., ut. 60 yrs., gr. £17, 2s., r. £07, 2s. 540

By W. HOLOMBE.

Maida Vale—Portsmouth-rl., lgr. of £50, ut. 53 yrs., gr. £2 945

Oxford-st.—129, Great Titchfield-rl., ut. 20 yrs., gr. £30, r. £75 725

Hampstead-rl.—2, Everholt-st., ut. 53 yrs., gr. £6, 6s., r. £70 400

St. John's Wood—13, Clifton-hill, ut. 47 yrs., gr. £10, 10s., r. £60 400

By IRELAND & BARBER.

Streatham—73, Burton-rl., ut. 83 yrs., gr. £9, 9s., r. £45 470

By FAREBROTHER, ELLIS, & CO.

Hayes, near—"Yeading Green Farm," and 65, 66, 7p, l., r. £150 3,620

Marlowe—4, West India-rl., l., r. £30 p.a. 760

67, Bell-st., l., r. £45 p.a. 750

JUNE 10.—By THED. WADE & CO.

Notting-hill—53, St. Charles-rl., l., r. £90 1,200

By WAGSTAFF & WARMAN.

Stratford—45 & 47, Rosher-rl., ut. 56 yrs., gr. 250

Fleet-st.—10, Rose-st., ut. 60 yrs., gr. 900

By FURBER, PRICE, & FURBER.

Dalston—1, Stoke Newington-rl., ut. 40 yrs., gr. £10, r. £90 1,000

Hyde-pk.—The lease of 34 Hyde-pk.-pl., ut. 19 yrs. 225

Hampstead-rl.—2, Everholt-rl., ut. 53 yrs., gr. £6, 6s., r. £70 p.a. 570

73, Adelaide-road, ut. 55 yrs., gr. £5 800

By B. BROWN.

Poplar—211, East India-rl., l., r. £50 p.a. 700

253 and 255, East India-rl., l., r. £30 p.a. 1,100

By ELLIS & SON.

Cubitt Town—"The Newcastle Arms," ut. 61 yrs., gr. £10 2,350

Manchester-rl.—Lgr. of 47, lvs., ut. 60 yrs. 110

By DEBENHAM, TEWSON, & CO.

St. Alban's Hillside-rl.—"The residence "Ranelagh" Lambeth—Fgr. of £40 p.a., with reversion in 60 yrs. 900

Hammersmith—Fgr. of £20 p.a., with reversion in 55 yrs. 1,500

Fgr. of £42 p.a., with reversion in 55 yrs. 1,050

Fgr. of £63 p.a., with reversion in 55 yrs. 1,720

Albion-gardens—Fgr. of £17 p.a., ut. 55 yrs. 880

17, King-street, r. £20 p.a. 1,450

Shepherd's Bush—165, Goltshawk-rl., ut. 53 yrs., gr. £5, r. £62, 10s. 650

Kensington—Hansard Wood-rl., l., r. £24, with reversion in 71 yrs. 1,050

Fgr. of £44, with reversion in 71 yrs. 1,000

Russell Mews—Fgr. of £30, with reversion in 71 yrs. 630

Acton, King-street—Fgr. of £25, with reversion in 62 yrs. 440

Surliton-hill—"Lambeth House," l. 5,000

JUNE 11.—By M. HUBBARD.

Regent-pk.—8, St. John's-rl., ut. 35 yrs., gr. £13, 10s., r. £67 015

Camden Town—25, Rochester-rl., ut. 53 yrs., gr. £5, r. £52, 10s. p.a. 450

2, Wilnot-pl., ut. 37 yrs., gr. £2, 2s. r. £50 340

By A. S. ARVILL & SON.

Gray's-inn-road—1 to 9, Southurst, ut. 32 yrs., gr. £45, r. £405 3,200

Dorking, South-st.—"Mount House," l. 580

By W. H. COLLEBRAN.

Cranleigh, Surrey—"Oaklands," and 9a, 2r. 30p, l., r. £10 p.a. 3,350

By FAREBROTHER, ELLIS, & CO.

Strand—No. 32, Essex-st., l., area 1,740 ft. 4,000

13, Broomfield-villas, l., r. £36 p.a. 450

The house of "Shirley Villa," r. £25, 10s. p.a. 300

13 to 21, Oak-cottages, l., r. £140 p.a. 300

JUNE 12.—By G. HEAD & CO.

St. John's Wood—77 to 83 (odd), Carlton-hill, ut. 40 yrs., gr. £4, 4s., r. £280 2,570

By GLASIER & SON.

Crowborough—"The Firs," and 5a, 2r. 30p, copyhold—123, 124, and 125, Weston-pl., ut. 24 yrs., gr. £1, 17s., r. £42 360

Brixton—70, Barrington-rl., ut. 33 yrs., gr. £1, 17s., r. £42 360

By E. STIMSON.

Southwick—9, Merrick-rl., ut. 35 yrs., gr. £5, 5s., r. £40 360

Walworth—51, Gurnsey-st., ut. 53 yrs., gr. £5, 5s., r. £35 p.a. 320

Barnsbury—123, 124, and 125, Weston-pl., ut. 24 yrs., gr. £1, 17s., r. £42 360

24, r. £97, 10s. 100

Stockwell—63 and 125, Hubert-grove, ut. 30 yrs., gr. £13, r. £64 670

Hackney—31, St. John's Church-rl., ut. 30 yrs., gr. £6, r. £30 320

By C. & H. WHITE.

Kennington—61, Colindale-rl., ut. 30 yrs., gr. £4, r. £30 260

Lewisham—72, Algernon-rl., ut. 30 yrs., gr. £4, r. £30 270

By NEWBON & HARDING.

Clapton—40, Burton-rl., l., r. £30 p.a. 235

Haggerston—155, Haggerston-rl., l., r. £24, 14s. 230

111, Haggerston-rl., ut. 23 yrs., gr. £3, r. £24 230

Risland—88, St. John's-rl., ut. 23 yrs., gr. £4, r. £24 230

Dalston—27, Holly-st., ut. 31 yrs., gr. £4, r. £38 265

De Beauvoir Town—130, Tottenham-rl., ut. 32 Hall End, Beda, F. detached cottage, and la. Or. r. £4, r. £53, 18s. 310

Clapton—7 and 9, Millington-st., ut. 9 yrs., gr. £1, 10s., r. £20 50

King's Cross—192, York-rl., ut. 19 yrs., gr. £1, 10s., r. £20 70

21 to 29, Hovefield-rl., ut. 60 yrs., gr. £24, r. £4, r. £20 300

22p, r. £10 300

Leystone—10, Barnett-ter., ut. 78 yrs., gr. £4, r. £20 300

Holloway—14, St. Peter-rl., ut. 55 yrs., gr. £3, 8s. 325

By C. C. & T. MOORE.

Bethnal Green—125, and 107, Green-st., and 17, 18, and 19, North-st., l., r. £14, 14s. 1,450

Stepney Green—24 to 30, Hannibal-rl., ut. 23 yrs., gr. £25, 8s. 470

1 to 6, and 13 to 16, Hannibal-rl., ut. 23 yrs., gr. £45, 12s. 1,020

Linthouse—45, Rhoadswell-rl., ut. 65 yrs., gr. 1,310

132, Rhoadswell-rl., ut. 22 yrs., gr. £20 350

1 to 5, Brookes-ter., ut. 60 yrs., gr. £16 1,000

Row—13, St. Leonard-ter., ut. 63 yrs., gr. £2, 10s. 415

By WARNEY & SONS.

Twoyford, near—A residence called "Woodlands," c. 280

Enclosures of near 100 a. of 21p, c and l. 1,100

Enclosures of meadow lands, 24 a. in sp. 1,100

Cranleigh, near—"Waterbridge Farm," and 40a Or. 22p, l. 640

The residence known as "Albion," and 50a Or. 22p, l. 1,300

The residence known as "White's," and 22a Or. 19p, l. 6,000

Several farms of meadow lands, containing 517a, 2r. 7p, l. 800

The "Peppermint Wood Estate" of 63a Or. 15p, l. Enclosures of meadow and wood land and beer-house, 10 a. 1,110

Horsley, Surrey—"The Wray's Estate," 100a Or. 20p. 6,100

By PRICE & VENABLE.

High Barnet—120, 122, and 124, High-st., l., r. £10 3,000

Enfield—Enclosures of land, 48a Or. 22p, l. 1,450

Palmer's Green—Fgr. of £10, reversion in 51 yrs. 500

Highgate—44, High-st., l., r. £40 500

Islington—162, Barnsbury-rl., l., r. £45 500

Islington—137, Clonsdale-rl., l., r. £30 520

Drury-lane—2, Clare-st., ut. 70 yrs., gr. £10 530

City of London—16 and 18, Great St. Martin-rl., r. £280 7,100

JUNE 13.—By RICE BROS.

Wandsworth, Melrose-rl.—Fgr. of £16, with reversion in 43 yrs. 400

Wimbledon—20p, l.—Fgr. of £20, with reversion in 71 yrs. 550

By BAKER & SONS.

Upper Norwood—53 and 55, Central Hill, l., r. £22 p.a. 900

Highgate—20p, l., and 21, and 22, Woodlands-rl., ut. 70 yrs., gr. £20 900

By GRAVES & SON.

Notting Hill—5, Lower Church-rl., ut. 70 yrs., gr. £5, 10s., r. £30 250

By R. REID.

Bayswater, Queen's-rl., &c.—Fgr. of £66, ut. 53 yrs., ut. gr. £3 1,300

Hoxton, Foxcote-rl., l., r. £20, ut. 40 yrs., at a peppercorn rent. 1,015

Holborn—10, Featherstone-buildings, l., r. £80 p.a. 405

Hampstead-rl.—No. 213, freehold 795

By DREW & SON.

Westminster—45, Wood-st., l., r. £52 10s. p.a. 420

Harlesden—54, High-st., ut. 30 yrs., gr. £5, r. £60 p.a. 930

By DEBENHAM, TEWSON, & CO.

New Bond-st., No. 4.—Profit rental of £200, ut. 12 yrs. 1,250

St. John's Wood—29, Bechem-rl., ut. 47 yrs., gr. £10 p.a. 730

Forest Hill—No. 2, The Glen, ut. 70 yrs., gr. £10, r. £55 p.a. 390

By PRUKEFF & VENABLE.

Camden-rl.—No. 255, ut. 55 yrs., gr. £7, 10s. 2,300

No. 265, Camden-rl., ut. 55 yrs., gr. £7, 10s., r. £120 1,600

Barnet—"The House," and a. Or. 24p, ut. 70 yrs., gr. £10 800

City of London—18, Hansell-st., and 22, Well-st., ut. 40 yrs., gr. £115, r. £420 3,200

Dulwich, Albany-rl., ut. 60 yrs., gr. £18, 6s., r. £10 1,150

"Carlton Lodge" and "Tudor Lodge," ut. 60 yrs., gr. £20, 12s. 6d. 380

1 to 5, Abbey-st., ut. 60 yrs., gr. £18, 6s., r. £24 1,730

Euston-rl., Melton-st., &c.—Fgr. of £300, 16s., ut. 20 yrs., gr. £70 2,440

By ROGERS, CHAPMAN, & THOMAS.

Finliss—23 and 25, Tachbrook-st., ut. 34 yrs., gr. £14 1,100

Vauxhall Bridge-rl.—No. 179 and 181, ut. 34 yrs., gr. £10, r. £20 700

Battersea—44, Warriner-gardens, ut. 60 yrs., gr. £6, r. £34 330

[Contractions used in these lists.—Fgr. for freehold ground-rent; lgr. for leasehold ground-rent; lgr. for improved ground-rent; gr. for ground-rent; r. for rent; fr. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; ut. for unexpired term; p.a. for per annum; y. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; crea. for crease; yd. for yard, &c.]

MEETINGS.

SATURDAY, JUNE 21.

St. Paul's Ecclesiastical Society—Visit to Waltham Abbey. Train leaves Liverpool-street at 2.50 p.m.

Liverpool Engineering Society—Visit to the Thirlmere Aqueduct.

MONDAY, JUNE 23.

Victoria Institute.—Mr. HORNUM Rassam on "The Sites in the East earliest mentioned in Holy Writ." 8 p.m.

Junior Engineering Society—Visit to Messrs. Allen Scott & Co.'s Printing Works, Bouvier-street, E.C. 5. 5.30 p.m.

WEDNESDAY, JUNE 25.

Artists' Benevolent Fund.—Annual Dinner, Freemasons' Hall, Sir Richard Temple presiding. 7 p.m.

THURSDAY, JUNE 26.

Association of Municipal and Sanitary Engineers and Surveyors.—Annual meeting to be held at Liverpool. Address by the President (Mr. H. P. Bothnis, City Engineer of Liverpool); and papers on "The London Sewage Question," by Mr. Crawford Barlow; "The Mersey," by Mr. W. Spinks; "The Maintenance of Main Roads," by Mr. E. P. Hooley; and "Traction Engines and their Effect upon Roads and Buildings," by Mr. J. H. Burton.

FRIDAY, JUNE 27.

Association of Municipal and Sanitary Engineers and Surveyors.—Annual Meeting (continued). Visit to the Docks, Abattoirs at Birkenhead, and the Tunnel, &c.

SATURDAY, JUNE 28.

Association of Municipal and Sanitary Engineers and Surveyors.—Annual Meeting (continued). Visits to Salt Water Baths, Pierhead; Electric Lighting Station, Highfield-street; Liverpool Hydraulic Power Company's Athol-street Pumping Station; St. George's Hall; New Royal Infirmary (work in progress); and "Walker Engineering Laboratories."

Miscellaneous.

Enforcement of Building By-Laws at Hornsey.—Some of the evening papers last week described an "extraordinary scene at Hornsey" but inasmuch as the evening journalist is nothing if not sensational we were not disposed to refer to the matter in our own columns. The facts were, however, substantially as stated, as will be seen by the following extract from the Local Board's Plans Committee's Report, sent to us by Mr. De Courcy Mordaunt, the Surveyor to the Board:—

"Your Surveyor reports that the builder . . . on receipt of the Board's decision on Monday, June 2, to remove the portions of two houses in . . . road, instead of availing himself of the opportunity of removing the small portions of the buildings which had been erected at the time they were condemned, continued with the erection of the buildings with more than ordinary despatch. Your Surveyor, therefore, acting on the advice of counsel proceeded to remove the buildings on Monday, the 9th inst. The police authorities were communicated with, and sent some constables to ensure there being no breach of the peace between the builder's men and those employed by the Board for the removal of the buildings. The pulling-down was executed in a business-like and orderly manner, and was completed on the following day, viz. the 10th inst. The Surveyor reports further, that the adjoining houses, erected by the same builder, are in contravention of By-law 24, and states that he has this day served him with the necessary notice to remove the defective work."

The By-laws under which this action has been taken are, as may be imagined, somewhat severe in their terms, but they are deemed by the authorities to be none too stringent to meet the cases of jerry-building which at times come under their notice.

The Association of Municipal and Sanitary Engineers and Surveyors will hold their annual meeting at Liverpool, on Thursday, Friday, and Saturday next, June 26, 27, and 28.

After the adoption of the annual report, the presentation of general business, the President, Mr. H. P. Bothnis, City Engineer of Liverpool, will deliver his address. This will be followed by papers on "The London Sewage Question," by Mr. Crawford Barlow, B.A., M.Inst.C.E.; "The Mersey," by Mr. W. Spinks, Assoc.-M.Inst.C.E.; "The County Management and Maintenance of Main Roads," by E. P. Hooley, Assoc.-M.Inst.C.E.; and "Traction Engines and their Effect on Roads and Buildings," by J. H. Burton. The annual dinner will take place at Eberle's Restaurant, Eberle-street, in the evening. On the second day, Friday, June 27, there will be visits to the Docks, to the abattoirs at Birkenhead, and to the Mersey Tunnel; arrangements having been kindly made by Sir Douglas Fox, the Engineer, for an inspection of this work. On Saturday, June 28, the members will visit the Salt Water Baths, Pierhead; the Electric Lighting Station, Highfield-street; the Liverpool Hydraulic Power Company's Athol-street Pumping-station, passing Artisans' and Labourers' Dwellings, Cancaus-terrace, and Juvenal-street; St. George's Hall; passing the Walker Art Gallery, the Free Library and Museum; the New Royal Infirmary (work in progress); and the "Walker Engineering Laboratories; and, if time permits, will drive round Sefton Park.

Civil and Mechanical Engineers' Society.—The members of this Society, under the guidance of the President, Mr. Henry Adams, visited the Broad-street Goods Station of the London and North-Western Railway Company on the 12th inst. They were received by Mr. David Stevenson, and shown round by Mr. Hignett, of the Locomotive Department, and Mr. Carston, of the Goods Department. This station, being arranged in the heart of the City of London, was constructed under some difficulty. It extends beneath the whole of the Broad-street, Passenger Station, and some distance beyond. On this side the goods are received for transmission by rail; they are sorted out and loaded into trucks, which are then raised to the upper level and made up into trains. There is a large open yard, and on one side a warehouse of several floors, where the goods arriving by rail are received for distribution. A few of the trucks run over a viaduct into the warehouse upon one level, but the majority have to be brought from and returned to the upper level by means of 14-ton hydraulic wagon hoists working at the rate of fifty lifts per hour. These hoists, made by Sir William Armstrong & Co., are ingeniously arranged with a constant pressure cylinder alongside the vertical lifting cylinder, but with a smaller diameter, in order to nearly counterbalance the heavy platform upon which the trucks are carried, so that no water is expended in lifting the dead-weight, being simply forced back into the accumulator when the lift descends. There are five pumping-engines of 50 effective horse-power, each supplying the water pressure of 730 lb. per square inch, these being until recently the standard pattern adopted over the whole of the London and North-Western Railway system, so that all parts might be interchangeable. They are automatically regulated by the rise and fall of the accumulators, the supply of power being thus exactly equal to the demand, and determined by it. The capstans, cranes, jiggers, and lifts were all seen in work, and the various details of the mechanism were fully explained to the visitors. Before leaving, a hearty vote of thanks was passed to the officials of the Company, not forgetting the veteran Biggs, under whose charge the machinery has been from its first inception, twenty-two years ago.

Sanitary Congress at Brighton.—The following arrangements have been made by the Sanitary Institute for the Congress and Exhibition at Brighton, which commences August 25.—President, Sir Thomas Crawford, K.C.B., M.D.; Hon. Treasurer, the Mayor of Brighton; Hon. Secretary, A. Newsholme, M.D., D.P.H.; President, Section I, "Sanitary Science and Preventive Medicine," George Vivian Poore, M.D., F.R.C.P.; President, Section II, "Engineering and Architecture," Professor Roger Smith, F.R.I.B.A.; President, Section III, "Chemistry, Meteorology, and Geology," Mr. Wm. Topley, F.R.S., F.G.S.; Conference of Medical Officers of Health, President, A. Newsholme, M.D., D.Ph., M.O.H.; Conference of Inspectors of Nuisances, A. Carpenter, M.D., M.R.C.P. (President). The arrangements also include a *conversazione* in the Pavilion Building, a lecture to the Congress by W. H. Preece, F.R.S., and excursions, and an address to the working-classes by B. W. Richardson, M.D., LL.D., F.R.S. The meetings of the Congress and Exhibition will be held in the Pavilion Buildings.

The Claybury Asylum, near Woodford. On the 12th inst., Lord Rosebery, Chairman of the London County Council, laid the foundation-stone of the new pauper lunatic asylum for London. We published a view, plan, and description of this extensive building in our issue for November 23 last year. Mr. G. T. Hine is the architect, and Messrs. Gahbutt & Co., of Liverpool, are the contractors, the amount of their contract being 337,945*l.* Accommodation is to be provided for 2,000 inmates. Lord Rosebery incidentally mentioned that pauper lunatics in London were now increasing at the rate of 400 a year. If that rate were maintained they would require to erect another such "palace of desolation" every five years!

New Central Telegraph Factory, Coldhath-fields.—We understand that the tender of Messrs. Treasure & Son, of Shrewsbury and London, has been accepted for the Government Telegraph Factories and Water Tower, on part of the site of Coldhath-fields Prison. The architect is Mr. Henry Tanner, of H.M. Office of Works.

A Discussion on a Certificate.—At a recent meeting of the Chelmsford Town Council, a certificate was presented from the Borough Surveyor (Mr. C. Fertwe) for the payment of 800*l.* to Messrs. Longley, the contractors for the new water tower, but it was decided to defer payment until the receipt of further particulars from the Surveyor as to the amount still due to the contractors. At a subsequent meeting of the Town Council, the Surveyor wrote:—"With regard to my certificate for 800*l.* to be paid to Messrs. Longley & Co., on account of their contract, while I am willing to afford any explanation to the Council and the contractors, my position is such under the contract that I decline to receive dictation with regard to my action from either party. The works are practically completed, but unfortunately I was unable personally to examine and report before leaving home. The payments as set forth in the contract amount to 3,818*l.* 5*s.* during the progress of the works, and 763*l.* 13*s.* within three months of completion, making in all 4,581*l.* 18*s.*, of which some 3,500*l.* has been already certified for, leaving 1,081*l.* 13*s.* now due, from which I have deducted 281*l.* 13*s.*, and this, together with 509*l.* 2*s.*, payable six months hence, will, in my judgment, amply secure the interests of the Council and meet all contingencies and penalties arising out of the contract, or which could be recovered from the contractors." Alderman Dutton proposed that the certificate be at once honoured, and after some discussion it was decided by 7 votes against 4 to pay the 800*l.*

Classes and Examinations for Plumbers.—The steady progress made by the plumbing classes is one of the most satisfactory features of the movement for the registration and training of plumbers. Among the latest and most successful classes is that established last Session at Greenock in connexion with the District Council for Glasgow and the West of Scotland. This class, which commenced in October last, and has just terminated for the Session, was held at the Mearns-street Public School. A report which the teacher of the class has furnished to the District Council shows that out of the total number of thirty-six students the average attendance was thirty. The happiest results have been visible in the greater intelligence manifested by the rising generation of plumbers in executing their work. During the preceding Session many of the students in the Greenock class were given elementary instruction in the plumbing class connected with the Glasgow Technical College, and they have, therefore, received advanced instruction in the Greenock class during last Session. The result of the examinations held at the close of the Session was eminently satisfactory, the students taking the second and fifth prizes, out of five prizes with medals offered to plumbing students in the United Kingdom.

Sanitary Appliances and Builders' Ironmongery.—From Messrs. Young & Marten, of the Caledonian Works, Stratford, we have recently received an illustrated catalogue and price-list of baths, lavatories, water-closets, urinals, sinks, and countless other appliances and fittings, including plumbers' brass-work, ventilators, &c. Accompanying this catalogue was Messrs. Young & Marten's illustrated "Tariff No. 13," illustrated with selections of stock articles in the shape of stoves, gas-fittings, chimney pieces, and builders' ironmongery, of which the wholesale trade prices are quoted. The two catalogues are very conveniently arranged, and will be found to include fittings to suit all tastes and requirements. We may specially call attention to the "steamless and noiseless" baths and lavatories which are figured in the first-named catalogue, and which are excellent in every respect. The two catalogues taken together form a comprehensive whole, and may be advantageously studied by architects and builders, and those who, being "about to build," desire to count the cost.

Nineteenth Century Art Society.—We are asked to mention that the One Hundred Pound Prize of the Art Union of London has been selected from the Nineteenth Century Art Society's Exhibition in Conduit-street. The work is by Mr. Hamilton Marr.

New Baths for St. George's, Hanover-square.—In our account of this new building last week (see p. 432), we inadvertently omitted to say that the clerk of the works was Mr. John Herbert, C.W.A.

Tectolith.—In mentioning this new material in a "Note" in our last issue (page 428) we observed that while high results were said to have been obtained from it at Mr. Kirkaldy's testing works, the results of these tests had not been forwarded to us. We have since received the papers of the tests referred to, and we give the following extracts from them:—

Pieces cut out of plates $\frac{3}{4}$ in. thick and 1 metre square.

Test number.	Mean thickness. in.	Span. inches.	Breaking load. lbs.
2,811	.85	12	437
2,812	.76	do.	379
2,813	.73	do.	371

Pieces cut out of plates $\frac{3}{4}$ in. thick, 1 metre square.

Test number.	Mean thickness. in.	Span. inches.	Breaking load. lbs.
2,835	.51	12	213
2,836	.52	do.	200
2,837	.55	do.	249

PRICES CURRENT OF MATERIALS.

TIMBER.		£. s. d.	£. s. d.
Greenheart, B.G.	ton	6 10 0	7 10 0
Teak, E.I.	load	11 0 0	14 0 0
Sapele, U.S.	foot cut	0 2 0	0 3 0
Ash, Canada	load	3 0 0	3 10 0
Birch	do.	3 0 0	5 0 0
Elm	do.	3 10 0	4 15 0
Fir, Dantsic, &c.	do.	2 0 0	3 0 0
Oak	do.	2 10 0	3 10 0
Canada	do.	5 10 0	6 10 0
Pine, Canada red	do.	2 10 0	3 10 0
" yellow	do.	2 10 0	3 10 0
Lath, Dantsic	do. 1000 ft. 1000 ft.	5 0 0	6 0 0
St. Petersburg	do.	5 0 0	7 0 0
Wainscot, Riga, &c.	log	0 0 0	0 0 0
Deals, Finland, 2nd and 1st. std.	do.	7 15 0	8 0 0
" 4th and 3rd	do.	7 0 0	7 10 0
Riga	do.	6 0 0	8 10 0
St. Petersburg, 1st yellow	do.	8 10 0	10 0 0
" 2nd	do.	7 10 0	9 0 0
" white	do.	7 0 0	10 0 0
Swedish	do.	7 0 0	15 0 0
White Sea	do.	8 0 0	17 0 0
Canada, Pine, 1st	do.	15 0 0	26 0 0
" 2nd	do.	10 0 0	16 10 0
" 3rd, &c.	do.	7 0 0	10 0 0
" Spruce, 1st	do.	6 10 0	8 10 0
" 3rd and 2nd	do.	6 0 0	8 0 0
New Brunswick, &c.	do.	5 0 0	16 0 0
Boards, all kinds	do.	0 10 0	0 14 0
Flooring, Boards, 9q., 1 in. prep.	do.	0 8 0	0 10 6
Second	do.	0 6 0	0 7 9
Other qualities	do.	0 4 0	0 6 0
Cedar, Cuba	do.	0 4 0	0 6 0
Honduras, &c.	do.	0 4 0	0 6 0
Mahogany, Cuba	do.	0 4 0	0 6 0
St. Domingo, cargo average	do.	0 5 0	0 6 0
Mexican	do.	0 4 0	0 6 0
Tobacco	do.	0 5 0	0 6 0
Honduras	do.	0 5 0	0 6 0
Box, Turkey	ton	5 0 0	13 0 0
Road, Rio	do.	8 0 0	16 0 0
Bahia	do.	13 0 0	18 0 0
Sath, St. Domingo	do.	0 6 0	1 3 0
Porto Rico	do.	0 9 0	1 3 0
Walnut, Italian	do.	0 4 0	0 7 0

METALS.		£. s. d.	£. s. d.
IRON—Bar, Welsh, in London	tn	6 17 6	8 0 0
" at works in Wales	do.	6 10 0	7 0 0
" Staffordshire, in London	do.	6 10 0	8 0 0
" British, cast and ingot	do.	63 0 0	63 10 0
Best selected	do.	65 0 0	66 0 0
Sheets, strong	do.	71 0 0	72 0 0
Chili, bars	do.	59 12 0	0 0 0
YELLOW METAL—	do.	0 0 5 0	0 0 0
LEAD—Pig, Spanish	do.	13 5 0	0 0 0
English, com. brands	do.	13 7 6	0 0 0
Sheet, English 3 lbs. per square foot and upwards	do.	15 0 0	0 0 0
Pipe	do.	15 10 0	0 0 0
TIN—	do.	96 10 0	0 0 0
Straits	do.	96 15 0	0 0 0
Australian	do.	100 0 0	0 0 0
English Ingots	do.	100 0 0	0 0 0
OILS.			
Lined	do.	24 7 6	24 15 0
Cocanut, Cochin	do.	32 10 0	0 0 0
Cocanut, Ceylon	do.	27 0 0	0 0 0
Palm, Lagos	do.	20 0 0	0 0 0
Rapeseed, English pig	do.	31 5 0	0 0 0
" brown	do.	29 15 0	0 0 0
Cottonseed, refined	do.	23 10 0	0 0 0
Tallow and Oleine	do.	21 0 0	40 0 0
Lubricating, U.S.	do.	5 10 0	6 0 0
" refined	do.	7 0 0	12 0 0
TAR—Stockholm	do.	1 4 0	0 0 0
Archangel	do.	0 15 0	0 0 0

TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

BARKING.—For rebuilding three shops at the Broadway, Barking, for Messrs. Pelling & Hart. Mr. Edward Clark, architect, 432, West Strand, W.C.:

D. Argent, Barking	43,371 0 0
Patman & Fotheringham	3,140 0 0
T. L. Green	3,070 0 0
Grover & Co.	3,050 0 0
G. Hirt, Barking	2,940 0 0
W. J. Adcock, Dover	2,967 0 0
J. Smith, Barking	2,746 0 0

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 entries for Cottage Homes, Widening Lane, Sewer Extension, etc.

PUBLIC APPOINTMENTS.

Table with 5 columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Includes entries for Surveyor, Clerk of the Works, etc.

BERKHAMPTSEAD.—For the erection of a villa residence at Berkhamptead, for Mr. S. Rowland Trueman, Mr. James F. Goodley, architect, 2, Victoria-chambers, Colchester:—

C. Miskin, St. Alban's £2,318 0 0
H. & J. Mathews, Berkhamptead 2,072 0 0
W. Smith, Tring 1,878 0 0
Co-operative Builders, Brixton 1,790 0 0
O. Dobson, Colchester 1,748 0 0
F. Dupont, Colchester (accepted) 1,672 0 0

BERMINGHAM.—For erecting new Bar and Throat Hospital, Edmonstone street, for the Building Committee, Messrs. Jethro A. Cassin & Peacock, architects, 33, Colmore-row, Birmingham. Quantities by Mr. George Kenrick:—

Table with 3 columns: Builder, Extra for facings, Total. Includes entries for S. Surman & Sons, H. J. Moffatt, H. Lovatt, etc.

BOURNEMOUTH.—For proposed alterations to Linden Vale, Christchurch-road, Bournemouth, for Mr. J. T. Exton, Messrs. Lawson & Donkin, architects and surveyors, Bournemouth. Quantities supplied:—

Table with 3 columns: Builder, Extra for facings, Total. Includes entries for McWilliam & Son, W. Hoare, George & Harding, etc.

BOURNEMOUTH.—For proposed stable, Denbigh Lodge, for Mr. A. Jones, Messrs. Lawson & Donkin, architects, Bournemouth:—

Table with 3 columns: Builder, Extra for facings, Total. Includes entries for F. Hoare & Son, Barrow & Entwistle, etc.

GARSTON (Liverpool).—For erecting a new Jubilee Church Institute at Garston, for the Rev. T. Oliver, B.D., Mr. H. T. Waklam, Assoc.-M.Inst. C.E., architect, May Cottage, Allerton, Liverpool. Quantities supplied:—

Table with 3 columns: Builder, Extra for facings, Total. Includes entries for Turner & Moss, Garston, C. Curt, Wellington-road, Liverpool, J. Williams, Garston, etc.

LEYTONSTONE.—For building the "Red Lion Hotel" and four shops, High-road, Leytonstone, Essex. Mr. W. D. Church, architect, 12, South-place, Finsbury, E.C. Quantities by Messrs. C. Stanger & Son, 21, Finsbury-pavement, E.C.:—

Table with 3 columns: Hotel, Shops, Total. Includes entries for J. Johnstone, Kilby & Gye, J. Marsland, etc.

LONDON.—For proposed alterations to premises, Nine Elms-lane, S.W., for Messrs. Underwood & Co., Ltd. Mr. John A. J. Woodward, architect. Quantities supplied:—

Table with 3 columns: Name, Amount. Includes entries for Jones, Higgs & Hill, Leggy Bros., Ford, etc.

LONDON.—For rebuilding the "Primrose" No. 53, Oxford-street, W., for Mr. W. G. Dickinson, Mr. Edward Clark, architect, 432, West Strand, W.C.:—

Table with 3 columns: Name, Amount. Includes entries for Drew & Adams, C. F. Kearley, E. Toms, etc.

LONDON.—For building warehouses, Golden-lane, E.C. Mr. C. J. C. Pawley architect. Quantities by Mr. W. Walter Browne, 1, Boxworth-grove, Barnsbury, N.:—

Table with 3 columns: Name, Amount. Includes entries for J. R. Hunt, St. Paul's-road, Bow Common, C. Simmons, etc.

LONDON.—For pulling down and rebuilding Nos. 460 and 471, Bethnal Green-road, for Mr. Alderman Evans, Mr. Rowlandson, architect:—

Table with 3 columns: Name, Amount. Includes entry for A. Hood, Bethnal Green (accepted) £2,450 0 0.

LONDON.—For the erection of a detached house on "The Frogmal Mansion Estate," Hampstead (exclusive of stoves, mantel-pieces, painted glass, mosaic, painting, papering, and decoration). No quantities supplied. Mr. James Neale, F.S.A., architect and surveyor, 10, Bloomsbury-square, London, W.C.:—

Table with 3 columns: Name, Amount. Includes entry for Allison & Koskett, Hampstead £2,000 0 0.

LONDON.—For alterations and additions to the "Salisbury" Hotel, Fulham, S.W., for Mr. James H. Squires, Mr. H. I. Newton, architect, 49, Victoria-street, Westminster, S.W.:—

Table with 3 columns: Name, Amount. Includes entries for Tirk & Randall, Woodwich, Patman & Fotheringham, etc.

LONDON.—For alterations, &c., to the "Lord Elgin" Hotel, Elgin-square, Maidstone, W., for Messrs. Rolfe & Co. Mr. H. I. Newton, architect, 49, Victoria-street, Westminster, S.W.:—

Table with 3 columns: Name, Amount. Includes entries for Todd & Hackney, J. Tjerman, S. Godden, etc.

LONDON.—For alterations and additions to the "Red Lion" Waltham Green, S.W., for Mr. James H. Squires, Mr. H. I. Newton, architect, 49, Victoria-street, Westminster, S.W.:—

Table with 3 columns: Name, Amount. Includes entries for Turtle & Appleton, Clapham Junction, F. Mark, Edgware-road, etc.

LONDON.—For repairs and alterations to the South-wark Wesleyan Chapel, for the South London Wesleyan Mission, Mr. F. Boreham, architect, 75, Finsbury-pavement:—

Table with 3 columns: Name, Amount. Includes entries for Goodman, Castle, Goad, etc.

LONDON.—For pulling down and rebuilding the "William the Fourth" Tavern, Vauxhall-cross, for Messrs. Thorne, Messrs. Lee Bros. & Pain, architects. Quantities supplied:—

Table with 3 columns: Name, Amount. Includes entries for Roberts, Gregory & Co., Turtle & Appleton, etc.

LONDON.—For erecting a boundary-fence between Parliament Hill, Hampstead, and Lord Mansfield's property, in accordance with the terms of the Hampstead Heath Enlargement Act, for the London County Council:—

Table with 3 columns: Name, Amount. Includes entries for Wilson & Watson, J. Wood, J. Stanning & Son, etc.

LONDON.—For rebuilding premises Nos. 383, 385, 387, and 389, Commercial-road E., for Mr. G. F. Bence, Messrs. H. S. & C. A. Legg, architects, Mile End. Quantities by Mr. W. Hawker:—

Table with 3 columns: Name, Amount. Includes entries for Henric & Son, F. & F. J. Wood, Ashby & Horner, etc.

LONDON.—For the erection of Christ Church Mission Church and caretaker's premises on the site of 612, Old Ford-road, Bow, E. Messrs. Walter A. Hills & Son, architects:—

Table with 3 columns: Name, Amount. Includes entry for Coleman, Ward, Clarke, & Co., etc.

LONDON.—For repairs, &c., at the "Yorkshire Grey Tavern," 124, Great Suffolk-street, South-wark, for the directors of the Hatcham Brewery, Mr. W. E. Potter, architect:—

Table with 3 columns: Name, Amount. Includes entries for D. Dawes, Peckham, T. Channing, etc.

LONDON.—For alterations and additions to No. 16, Woodchurch-road, Priory-road, West Hampstead, N.W., for Mr. L. Wood, Mr. Walter J. Ebbetts, architect, Naylor's House, 115, Strand, W.C.:—

Table with 3 columns: Name, Amount. Includes entries for Teten & Sons, South Kensington, Macey & Sons, Strand, etc.

LONDON.—For internal fittings, &c., for the "Anchor and Hope" Fore-street, E.C. Mr. C. J. C. Pawley, architect, 68, Victoria-street, Westminster:—

Table with 3 columns: Name, Amount. Includes entries for Geo. Stephenson, Turtle & Appleton, F. Gill, etc.

LONDON.—For paving the Fulham-road with wood-paving from "The George" Waltham Green, to Putney Bridge (20,056 square yds.) for the Vestry of Fulham, Mr. James P. Norrington, Surveyor:—

Table with 3 columns: Name, Amount. Includes entries for Improved Wood-Paving Co., Newell & Robson, T. H. English, etc.

LONDON.—For tarp-paving two paths and forming three cinder-paths, with gullies, &c., on Peckham Rye, for the London County Council:—

Table with 3 columns: Name, Amount. Includes entries for James Bowles, Thomas Adams, W. E. Constable & Co., etc.

LONDON.—For making-up and paving Dobly-road, for the Vestry of Fulham, Mr. W. Skyes, New Streets Surveyor:—

Table with 3 columns: Name, Amount. Includes entries for Nash, Fulham, Greenham, Hammermith, etc.

LONDON.—For alterations and additions to the "Lord Elgin" Hotel, Elgin-square, Maidstone, W., for Messrs. Rolfe & Co. Mr. H. I. Newton, architect, 49, Victoria-street, Westminster, S.W.:—

Table with 3 columns: Name, Amount. Includes entries for Todd & Hackney, J. Tjerman, S. Godden, etc.

LONDON.—For alterations and additions to the "Unicorn," Vivian-road, Old Ford, for Messrs. Beach Bros. :— A. Hood, Bethnal Green (accepted). £223 0 0 [No competition.]

LONDON.—For the erection of a public staircase, for Messrs. Francis & Son, Limited, Clapham Junction. Mr. J. Sawyer, architect, 63, Chancery-lane, W.C. :— Carmichael, * Wandsworth-common £190 0 0 * Accepted.

PRESTATYN (North Wales).—For the erection of a house, "Bryn Hyryd," for Mr. F. J. Smith, Chester. Mr. J. H. Burton, architect, Ashton-under-Lyne :— J. Mayers, Chester £502 5 0 Jones & Roberts, Rhyl 790 0 0 W. Williams, Idlyl 753 0 0 S. Foulkes & Sons, Rhyl 680 0 0 Griffiths Eames, Prestatyn 610 0 0 G. Wright & Sons, Chester* 580 0 0 * Accepted subject to certain alterations.

SHEERNESS.—For the erection of news-shop, &c., at Sheerness. Mr. James F. Goodey, architect, 2, Victoria Chambers, Colchester :— Rollason Bros. Eastbourne £5,072 0 0 E. P. Hughes, Sheerness 6,413 0 0 Grimwood & Son, Sudbury 5,632 0 0 G. Dawson, Colchester 5,338 0 0 L. Seager, Sittingbourne 5,575 0 0 F. Dupont, Colchester 5,575 0 0 Co-operative Builders, Barton-road, Eriston, S.W. (accepted) 5,365 0 0

SOUTHEND-ON-SEA.—For the erection of stables at Florence Villa, Southend, for Mr. T. Hudson. Mr. W. J. Wood, architect, 1, Finsbury-circus, E.C. :— Darke & Son, Southend £324 0 0 Dupont, Colchester 287 0 0 Woodhams, Southend (accepted) 237 0 0

SOUTHEND-ON-SEA.—For the erection of house and offices at Southend, for Mr. Walter J. Wood, architect. Quantities by Mr. Henry Bushell, 1, Finsbury-circus, E.C. :— Baker & Wiseman, Southend £502 10 0 Woodhams, Southend 797 0 0 Orfer, Colchester 795 0 0 Dupont, Colchester 735 0 0 Edmunds, Poplar (accepted) 715 0 0

SOUTHEND-ON-SEA.—For repairs, &c., 15, Royal-terrace, Southend Essex, for Mr. J. Taylor. Mr. W. J. Wood, architect, 1, Finsbury-circus, E.C. :— Woodhams, Southend (accepted) £113 0 0 (Drainage, sanitary work and fittings extra.)

SOUTHEND-ON-SEA.—For the erection of stables at "Ernesbrake," Southend, Essex, for Mr. J. Baldwin. Mr. W. J. Wood, architect, 1, Finsbury-circus, E.C. :— Woodhams, Southend (accepted) £208 0 0

TOTTENHAM.—For the erection of school buildings for 975 boys and infants, for the Tottenham School Board. Mr. Edward E. Ellis, architect. Quantities by Messrs. D. Campbell & Son :— Willmott & Sons £11,439 0 0 Lewis 11,400 0 0 Longley 11,100 0 0 Linzell 11,000 0 0 Porter 10,795 0 0 Brass & Son 10,465 0 0 Selmon & Co. 10,460 0 0 Kilby & Grayford 10,450 0 0 Watson 10,250 0 0 Chappell 10,247 0 0 Treasure & Son 10,230 0 0 Lawrence & Sons 9,907 0 0 Nighthale 9,980 0 0 Flew & Co. 9,970 0 0 Fairhead & Son 9,900 0 0

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TO CORRESPONDENTS. W. M. C. & Son.—H. H.—F. M.—P. E. (thanks).—K. D. Y.—C. W. W. (we cannot see any novelty in this to claim mention).—A. J. (we never do public notices of that kind).—Central London Railway Bill (we can take no notice of anonymous communications).—Dunlop Railway (we have already published notice of it).—H. A. G. (no space).—E. H. L. B. (shall have attention). 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. LVIII. No. 242.

SATURDAY, JUNE 28, 1896.

ILLUSTRATIONS.

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The Sheffield Municipal Buildings: Second Competition.



HE six designs submitted in the second competition for the Sheffield Municipal Buildings have been exhibited this week in the Mappin Art Gallery. The architects who

were selected to take part in the second competition were (we give them alphabetically) Messrs. Flockton & Gibbs (Sheffield); Messrs. Harvey and Bernard Smith, in conjunction (London); Mr. Hare (London); Mr. Lindsay (Glasgow); Mr. E. W. Mountford (London); and Mr. Tulloch (London). Mr. Waterhouse, the assessor, reported on Thursday last week in favour of the design of Mr. E. W. Mountford, but the formal acceptance of the choice was not confirmed by the Town Council till their meeting on Monday last,* when, after a desultory discussion on various points connected more or less distantly with the immediate object of the meeting, the decision of the assessor was accepted by a majority of 39 to 12, 3 members declining to vote. We gather from the nature of the discussion, however, that the division in the voting did not arise so much from any question as to the acceptance of the design selected by the assessor, as from differences of opinion as to whether it was advisable to erect such a building at all at present, on which subject there seems to have been a good deal of party warfare in the Council.

The perspective view and the two principal plans of Mr. Mountford's design are published in the present number, and a considerable portion of the architect's report is reprinted in another column, which will sufficiently explain his intention in regard to plan and design. The design we think exceedingly suitable for the purpose and situation of the building. It is eminently municipal in character, and proclaims itself unmistakably in that sense; it is dignified without losing picturesqueness; and considering that a tower of very large dimensions and striking character

could not have been included for the limits of cost desired by the corporation, the idea of placing it rather in a side position, as a picturesque addition, is a good one; though we rather like to see a tower represent something more decisive on the plan than is the case here, nor can we quite see that the tower grows out of the plan, as the architect claims (and justly) that his design does in general; it seems to us rather to be utilised on the plan afterwards, as a place for strong rooms, &c. The upper portion of the tower, with its rather crowded treatment as contrasted with the plain stalk below, is very picturesque: it is worth notice in passing how commonly this idea of a tower has come to be accepted by the present generation of architects, as the means merely of raising a picturesque bit of architecture high in the air, the main portion of the tower being treated plainly and regarded merely as affording the element of height and verticality. Ruskin was to some extent responsible for starting this kind of view of the function of a tower, for which he adduced the example of the early Italian campaniles, and there is much to be said for it; it is an almost unerring means of giving character to a tower, and at less cost than in the case of a tower carried up with the same degree of richness from the ground; but the latter type, when it can be afforded, has its characteristic beauties also, and must not be despised. The open loggia in connexion with the suite of entertaining rooms is a good feature both in plan and architecturally, and fills up the angle by the tower agreeably. Mr. Mountford has not overdone his building with sculpture, and the amount which he has shown is (see the report) proposed to be carried out with a distinct illustrative intention which will give the more interest to it; but we doubt whether even this moderate amount will come into the "80,159.2"; the question was asked at the Council meeting, we perceive, and no reply was forthcoming. Tenpence per foot is not a large price for a building of this class, and if it is to be carried out within the stipulated sum we think it will be, as Mr. Waterhouse cautiously remarked, "with care." There is one little detail we may suggest for improvement (as the author modestly appends to his report the remark that the plans and design must only be considered as first sketches capable of much improvement), that is, the finials to the balustrade piers over the plasters. Surely it is time we endeavoured

to vary a little the small choice between vases and decanter-stoppers, which seems to be all that modern architecture affords us.

In regard to the plan, the arrangement of the Mayor's entertaining-rooms *en suite* along the Pinstone-street front appears the only one which the conditions of the competition admitted of. From the placing of the accountant's public office close to the central entrance from Pinstone-street, we presume the author entirely threw over the idea of making this in any way a state entrance. The arrangement for access to the accountant's office is convenient enough in itself, but we should have thought the motley crowd who will assemble there at rate-receiving times were more suitably kept away from the principal entrance. That is a matter, however, of taste rather than convenience. We presume that the principal staircase, however, will be kept mainly as a special staircase for Councillors and for use at receptions, as it leads into the very middle of the state-rooms and Council Chamber portion of the building. The Council Chamber is in exactly the right place, facing the quiet side of the site, and with good windows and not dependent only on roof-lighting. The arrangement by which each department lies wholly between two staircases or entries, so as to be reached from any one of them without going past any other department, is of course a good one, but appears to be almost a matter of course in planning such a building; too obviously so to be made a special claim. The plan is very compactly arranged, and simple in its lines of traffic, but there are points in it which we cannot concur in. In the first place we have always been of opinion that a mistake was made in the "Instructions" in ordering the lavatories for ladies and gentlemen in connexion with the reception-rooms to be placed upstairs. The result of this must inevitably be that at a reception the staircase cannot be a state staircase at all; it will be practically part of the street; guests will be coming up it in cloaks and coats and hats, instead of getting rid of these below and ascending the staircase *en grande tenue*. A state staircase is part of the dignity of a reception; but with the cloak-rooms placed above this must all vanish. The position of the ladies' cloak-room, opening right off the main corridor, seems to us extraordinary; it would have been quite easy to have made a small lobby and entrance round the corner to it, over a small part of the auditor's room. The

* We should nevertheless have stated last week Mr. Waterhouse's decision in favour of Mr. Mountford, had it not been for the eccentricities of a London Post-office, whose messenger failed to deliver the Borough Surveyor's official telegram, sent in good time, till it was too late to be of any service. The fault is admitted as theirs by the Post-office manager.

ante-room to the Council Chamber is not in the proper sense an ante-room, which should be a room interposed between the main room and the outer corridor to give greater quiet and privacy, and afford a neutral ground for meeting and conversation. The Mayor might have claimed a private stair from the street; and he has to traverse the whole length of the Council-chamber to arrive at his chair of state. The committee-rooms are placed on the noisy and not on the quiet side of the building. But what surprises us most is the immense distance which separates the Town Clerk's private office from the Mayor's private room. If the Town Clerk wishes to consult the Mayor, he has to traverse nearly the whole length of two sides of the building. Surely this is not as it should be. If the Council of Sheffield are satisfied with this plan, of course no one has any right to complain; it certainly seems to us to be open to a good many minor objections of this kind, when regarded with a view to its special functions, though no doubt a well-arranged plan in regard to general principle. We think also that it might have been possible to have arranged for future extension so as not to leave the building with an unfinished appearance, as this must have on the Cheney-row side.

Mr. Hare's plan reverses the arrangement of the principal suite of reception-rooms, placing the Mayor's parlour at the Surrey-street end, and the dining-room at the Cheney-row end. The Mayor's parlour seems unnecessarily large and the reception-room too small; the dining-room would be a fine room: but the author evidently takes a different view of the functions of the Mayor's parlour, regarding it as for use only on State occasions, he gives the Mayor a small sitting-rooms on the Cheney-row side, between the Town Clerk's room and the Council-chamber; this is convenient enough in itself, but unless it is to be regarded only as a retiring-room from the Council-chamber, and to be reached through it, it is in a very out-of-the-way part of the building. The Borough Accountant's office is L-shaped, with a large entrance adjoining it on the Surrey-street side, but the counter space for the public is not large enough. The Town Clerk is hidden away at the back of the building; he should be as central and accessible as possible from the principal entrance; he is the mainspring of the Corporation business. The committee-rooms are all on the wrong side for quiet, Surrey-street side, except one which appears to be regarded as a kind of state committee-room, placed on the Cheney-row side, close to the state dining-room, with which it has nothing to do, and with a most roundabout access from all the departments to which the labours of a committee might bear relation. The ante-room is properly placed, and is a real ante-room; the ladies' cloak-room opens out of it, and as on reception occasions the council-room would be closed, this would do well enough, but the gentlemen's room should not open exactly opposite to it. It is strange how these little matters of arrangement are so constantly overlooked. It seems odd that as nearly two entire sides of the Council-chamber are outside walls, it should not have occurred to the author to give the Councillors some windows to look out of.

The tower is placed very much in the same position as in Mr. Mountford's design, and, as in that, is only used for accessory rooms, a plan-room on the ground-floor, a mayor's robing-room (in connexion with Mayor's parlour) on the first floor. There are affinities of style between this and Mr. Mountford's design; the tower is not so good, but the Pinstone-street front we prefer; the drawing is not one to do full justice to it, but it is very dignified in treatment and would have had a fine effect in execution. The author adopts the device of strengthening and projecting the ends of the facade and retiring the centre portion; the ends have two large gables richly treated, and a large and lofty oriel window is corbelled out from each, these windows forming the main

ones of the Mayor's parlour and the dining-room. In the centre portion the lower story is kept rather plain, with mullioned windows; the main story has deeply recessed arches between pilasters, with mullioned windows occupying part of the wall plane in the rear of the arches. The author understands the value of the contrast afforded by massing the windows and having plenty of expanse of plain wall space; and also the value of a strongly marked continuous horizontal line, formed by the cornice with triglyph frieze which runs continuously along the wall between the ground and first floor stories. Altogether this is a very fine building as an architectural design, though we think the plan far inferior to the design.

Messrs. Harvey and Bernard Smith adopt a plan which fills up the whole site as nearly as possible, following the outline of the ground, with unbroken corridors running right round on the ground-floor; but on the first floor the main staircase and its landings is entirely cut off from all corridor communication with the rest of the building, merely leading to the Council-chamber and reception-rooms. This seems to us a great defect. The business corridors at the side communicate direct with doors into the Mayor's parlour and the dining-room, one at the end of each long corridor; a very naive arrangement, convenient for the Mayor's parlour, but utterly unnecessary as far as the dining-room is concerned. The Council-chamber, top lighted, is placed in the centre across the building between the corridors. The staircase to public gallery of the Council-chamber is not from the street, but from one of the ground-floor corridors; close to an external entrance, however. The plan is a very inartistic one, there is no effect or climax in it at all; it is simply spaces cut up into rooms; the ante-room to the Council-chamber is placed in the most ineffective manner, a long room turned end on to the entrance-door of the Council-chamber, so that it becomes a sort of passage, an effect which is increased by its being preceded by another lobby of the same width, out of which the cloak-rooms open. On the other hand, the plan has some practical merits: the committee-rooms are all ranged in a row on one corridor on the Cheney-row side (the quiet side), and are easily accessible from the council-chamber; and the Town Clerk is put close to the Mayor's private rooms as well as near the council-chamber. The two doors right off the corridor, however, into one end of the council-room, practically do away with all the good of the ante-room at the other end, which should be a kind of buffer between the Council-chamber and the ordinary business traffic of the building. The ground plan is a great deal better arranged than the first-floor plan, except as to the rates office; there would be a great crush in the corridor on rate-paying days. But the authors seem to have no feeling for the art of planning, as distinguished from mere arrangement. The place of their design in the second competition is probably in great measure owing to its principal elevation, which is a good one of the chateau type, with a strongly rusticated ground story, and a pilaster order above, with lofty roofs above; a pavilion at each end and a roof a little lower, but accentuated with a ridge turret, in the centre. The windows are mullioned, with cornices and decorative friezes over them. There is no tower in connexion with the principal front, but a small and graceful tower breaks the line of the Surrey-street front and marks one of the principal entrances.

Mr. Lindsey submits a classic design with a tower in the same position as in that of Mr. Mountford, set back from the Pinstone-street front with one side facing and shutting on Surrey-street, and rising immediately behind (in this case) the Mayor's parlour. The whole design has been kept very simple, and with strongly-marked horizontal lines. The Pinstone-street, or principal front, has a circular-headed entrance in the centre, approached by a broad

flight of steps, the Mayor's reception and dining-rooms being lighted by seven large windows set between single partly-engaged columns of what appears to be the Composite order. At each end the front is brought forward slightly and finished with a low pediment, the whole being connected by a balustrade which is carried over the central portion of the frontage. The tower, 25 ft. square, is of two stages above the roof of the Pinstone-street front. It has broad angle pilasters and a single arched opening in each face with a balcony in front. No clock is, however, shown. The pilasters are finished with angle turrets, which are connected with the central lantern by radiating walls. The top is finished with what may be styled an egg-shaped dome. In the Cheney-row and Surrey-street elevations the horizontal lines in the design before mentioned are very apparent. The centre of the Surrey-street front, and the portion facing Norfolk-street, have been carried up a story higher than the others, and are devoted, the former to the offices of the Sewage Department, and the latter to spare offices. The public entrance to the offices has been placed in the centre of the Surrey-street elevation, and is treated in almost an exactly similar way to the main entrance. The plan may be roughly described as an irregular square, occupying the eastern half of the site, with the Surrey-street side prolonged to its full extent. The Cheney-row front has been only partially used, the half towards Norfolk-street being left for extensions. In the centre of this square, the Council-chamber has been placed at right-angles to the Grand reception-rooms, around it and the two open areas between which it is placed runs a corridor communicating with the various offices and committee rooms. On the ground-floor is the large entrance hall with gentlemen's and ladies' lavatories immediately in front (under the Council-chamber), some of the Water offices on the left, and the Health offices on the right, the Borough Surveyor's offices being placed at the further half of the Surrey-street side. The lower ground-floor, entered from Surrey-street, has the principal Water offices on the right (some top-lighted from the area) and the Borough Accountant's department on the left. The Council-chamber is shown with a domed roof, and has a public gallery at the south end within easy access of the public entrance in Surrey-street.

The design bearing the name of Mr. James Tulloch is Renaissance, with a free use of ornament in portions of the chief front. The principal front towards Pinstone-street has three large gables flanked by octagonal turrets, and a central entrance. The tower here occurs in the same position, and, with the exception of a small oriel on the Surrey-street front, which lights a serving-room, it rises well above the roofs, without windows, the sides being relieved by shallow pilasters. Up to the main cornice it is square on plan; above this it rises in three stages, octagonal, with open arcades, and a dome finishing the whole. The Surrey-street elevation has four gables, between which are octagonal turrets. The plan shows the whole site covered by buildings. No doubt this has been partly rendered necessary by the amount of space given to the hall and staircase, which has pushed back the Council-chamber to the centre of the site. This arrangement gives three spacious courts, which light the corridors, but it results in the extension of the whole scheme considerably. The Town Clerk's office, and those of the Water and Health departments, are on this floor, but some of the rooms of both these latter are also found on the ground-floor, which does not seem to us a good arrangement. The Borough Surveyor's rooms are also divided.

Messrs. Fleckton & Gibbs propose an altogether different treatment of the site and arrangement. The building has been put diagonally on the site with the chief entrance facing the moulding. In plan it may be described as a cross with a block of buildings at the end of each arm, these blocks being joined together by octagonal turrets, two

(those on the chief front) being used as official staircases, and the other two as lavatories on the various floors. As less ground is covered greater height has become necessary, and there are two mezzanines placed below and above the principal or first floor. The entrance is under a lofty tower, the hall extending directly in front of it, with the staircase at its further end, forming two arms of the cross. On the first floor the Council-chamber is opposite the top of the grand staircase, and the reception-rooms are at right-angles to it, forming the other two arms of the cross. Committee-rooms are also arranged on this floor. On the lower ground-floor are the Health and Waterworks departments, some of them being top-lighted. The lower mezzanine is devoted to the offices of the Borough Surveyor and the Town Clerk, and the upper to the Sewage offices, and some rooms in connexion with the Town Clerk's offices. The elevation, as may be supposed, varies greatly from those of the other designs in general proportion, there being much greater height for the frontage, and this in itself seems a defect, as it necessitates a greater number of stairs. The future extension has been placed at the Norfolk-street end of the site, detached from the main building, which thus forms a complete design in itself. This is a better way of doing it than omitting a portion from what would be otherwise a complete design. But all things considered, we believe the right choice has been made in the final competition.

GROUND-RENTS.

THE title of the work before us, which is really "Urban Rating," is somewhat misleading, since the book deals chiefly with the subject of the proposed taxation of ground-rents. The object is stated in the preface, and the first chapter deals with "The Origin and Nature of Ground-Rents." Such a book as this fulfils a useful purpose. It is difficult for a general subject such as the taxation of ground-rents to be adequately considered by readers of the daily press. It is one which should be considered impartially in its bearings after reading a careful treatise such as that before us. On the other hand, Mr. Sargent is too much impressed with the importance of his subject, and he often becomes both prolix and pompous. "When suburban land gradually comes into the building market it is very rarely indeed that the landowner possesses the capital and the special knowledge required for the erection of houses; and that being so, he is in general compelled to dispose of it to some other person for the purpose." After this long-winded way of telling us what every one knows,—that landowners often dispose of their property for building purposes,—Mr. Sargent proceeds to inform us that it may be either sold outright or leased. We advert to this fault because books of this kind, if they are to be widely read, ought to be written in a readable manner and as concisely as may be.

As regards the question of the taxation of ground-rents, Mr. Sargent is adverse to the proposal, chiefly on the ground that they already bear a share of taxation. That this is the case is undoubted, and it would be well if persons who speak as if the ground-landlord was unaffected by local rates were to bear this in mind. It is clear, because the amount of taxation which a house has to bear affects the amount of the rent, and thus the rent which the ground-landlord receives is reduced by the amount of taxation which the tenant bears. Examples of this elementary proposition are really not needed; the curious thing is that persons who are comparatively well informed do not appear to realise it. The payment by the ground-landlord is, of course, done indirectly, for a proportion of the taxes which the tenant bears, and which, if

they did not exist, would go into the landlord's pocket, form the contribution of the landlord. It comes to the same thing as if the tenant paid the landlord a higher rent than in fact he does, and the latter were himself to pay a corresponding proportion of the taxes.

But on the other hand it is obvious that ground-landlords are not equally burthened. The hargain which is made when a building-lease is entered into is made, of course, having regard to existing taxation, with probable increase. It is necessarily an approximate calculation only, and if rates and taxes increase faster than the landlord and his lessee expected the occupier may have to pay in one district a larger proportion of taxes than in another, or, again, a larger proportion than the landlord and his sub-lessee contemplated when the contract was entered into. But even admitting this, it is obvious that to tax existing ground-rents would lay a burden on the ground-landlord which he did not expect, and which would in the case of fresh contracts necessarily raise the rents of occupiers, unless it were a portion of the taxes paid by occupiers generally. Because, as we have already pointed out, and as is known to all who have to do with property in land or buildings, the amount of rent which a landlord receives is regulated, to some extent, by the rates and taxes which tenants have to pay.

But apart from this theoretical objection to the taxation of ground-rents, there is a practical objection,—namely, the difficulty of levying it. The owners of ground-rents do not reside on the property as a rule, and, indeed, are often purchasers of the rents from the ground landlord or from intermediate parties, and in order to get at them, it would be necessary for an occupier to refer the authorities to the immediate landlord, and for him to pass them on to the ground landlord or his assigns. The more, in fact, the subject is considered, the more strong do the practical objections to it appear. One of the great objects of all competent financiers is to levy taxes which are most easily collected; a tax on ground-rents would be one surrounded with difficulties, and one which is not required by any urgent necessity. In some respects, also, it would appear to be positively an unjust tax. Thus, if A and B each buys half of a particular estate, and A lets his share out on huddling leases, but B sells his share to the occupiers, A has,—assuming taxation of ground-rents to be in force,—to pay a tax on the interest of his money which comes to him in the shape of rent, whilst B, having invested his purchase-money in stocks and shares, has to pay no such tax (p. 6). The report made last year by the Town Holdings Committee showed that the leasehold tenure was not open to many of the objections urged against it, and, therefore, the question must be asked, why should it be made liable to taxes which would tend to put an end to it? It may be that many of those who are in favour of the taxation of ground-rents would reply that that result is one for which they pray.

It may be just as well also to remind our readers that it would probably in nine cases out of ten offend against a proper constitutional maxim,—viz., that taxation without representation is tyranny. The occupiers of the metropolis are the masters of the local rates, and the ground-landlords have nothing to do with them. Consequently persons would be taxed who had no voice in the levying of the taxes, and instead of taxpayers recognising more fully their responsibility for local taxation they would care less about it. Such a result is one which cannot be too strongly deprecated.

Stapleford and Sandiacre Waterworks.—These works are now commenced, and a good supply of water has been found in the Dunter pump at a considerable depth. A steam-pump has been used to test the quantity of water, and 240,000 gallons a day have been pumped without any appreciable diminution. The engineer to the works is Mr. W. H. Radford, C.E., of Nottingham, and the contractor is Mr. W. Cooke.

NOTES.

THE important trade deputations to the Institute of British Architects, of which we publish a report in another column, were, we may presume, mainly prompted on the part of the trades represented by a desire to escape the cutting down of wages and the sweating consequent upon an extensive employment of the system of subletting, the argument addressed to the Institute of Architects being that this system was also a prominent cause of bad work and scamping. This we can readily believe, though we hope that some of the extreme instances quoted are not of such general occurrence as the deputation would perhaps have wished the architects to think. A case, however, seems to be made out for a serious consideration of the question whether subletting of contracts should or can be disallowed. The question really is whether in the present state of life it is possible to do away with it; of the advisability of putting an end to it if possible we have no doubt at all, as far as good building is concerned. The mischief of the present system of hurry and competition is that the master-builder, who should be the real head of the work, is getting pushed further and further from direct contact with the work, becoming a mere calculator of quantities, and sometimes not even seeing the drawings. That all this, and the hurried erection of buildings by gangs of overtime workmen, is directly adverse to the production of good architecture or good building, we have long felt and said. What is to be feared is that we live in an age when there is no time to consider this, and when every one must go the pace or drop out. But we should welcome an effort to stem the torrent.

THE *Semaine des Constructeurs* for June 21 contains a short leading article by M. César Daly on Architectural Education, drawing attention to what he describes as "a grave cause of error." The substance of the article in brief is this—That there is a "fâcheuse" tendency in many minds to cut up the moving panorama of history into distinct portions, considered without relation to one another; one person hetaking himself to the study of Classic architecture, another to Gothic, another to Renaissance, as if these were unconnected developments of architecture, which is as reasonable as it would be to consider the stages of childhood, manhood, and old age, in a human life, as if each were a separate evolution of the individual. He lays down in substance the following propositions: (1) that each historic style is an integral portion of the whole past of architecture; (2) that no one of these styles can be imposed on modern society as completely satisfactory; (3) that each of the styles having had its own æsthetic principle, that principle cannot be applicable to any other period—we must create our own principle; (4) that such principle must be founded on a co-ordination of all the constant truths of the past with the new truths of our own day. The public, at present so indifferent to architecture, will take a new interest in it when they see it as the art of to-day and not of yesterday. The point of departure, for this end, is to renounce "that detestable system" of confining ourselves to studies of fragmentary portions of architectural history, and looking at only one of the many sides of architectural evolution. "Il faut voir le tout pour voir vrai."

THE annual report of the Society for the Protection of Ancient Buildings presents the same characteristics as usual; an absurd but apparently perfectly unconscious self-complacency, combined with a most amusing frankness in recording all the slights the Society has received from persons upon whom they have pressed their services, e.g.:—
"I am in receipt of your letter from the Society for the Protection of Ancient Buildings. I was perfectly aware of all in that letter previously, and a good deal besides. I beg leave to state that I

* "Urban Rating; being an Inquiry into the Incidence of Local Taxation in Towns." By C. H. Sargent, Barrister. London: Longmans & Co. 1890.

have perfect confidence in my architect, and I mean to alter the church as he and I think fit."

Apparently the idea of the Society is that the publication of such a letter can only redound to the discredit of the writers of it. Some persons, we fear, will think that it is a very natural kind of answer for any man with a grain of spirit to make to the communications of a Society which habitually assumes such an offensive tone of superiority in its communications. If the clergyman (we presume) who wrote that letter really meant to pull about an old church, irrespective of its past history, "as he thought fit," he would be going quite beyond our sympathies; but it does not follow that he intended to do anything of the kind; only that he was not going to be schooled by the Society for the Protection of Ancient Buildings. The Society demanded also that Sir Arthur Blomfield should submit to them his design for the new nave at Southwark. We are in no sympathy with the idea of building a new nave in the Mediaeval style; we have already said so; but none the less we think the application to the architect to submit his plans to a purely self-constituted body having no official standing of any kind is a piece of sheer impertinence. We do not think Sir Arthur Blomfield's polite answer, and the argument that he "would not be acting fairly to his professional brethren" in complying with the request, is at all the best reply that could have been made, and the remark about the "professional brethren" gives the Society an opening for a point which they have adroitly turned to account: the letter quoted above is a much better specimen of a reply. The Society, we observe, reiterate, though in a veiled way, the nonsense they circulated last year about this Journal being conducted in the interests of architects and of restoration. They got some plain language on the subject on that occasion, with some references showing the utter falsity of the statement; but they are again mauding about the practice of "running historical and art criticism on party and professional lines," and a "fettered press" &c. By a free press they would mean (like a great many other people) one which would only see their side of the question. What is wrong with us is that we have a faculty of seeing both sides, while the S.P.A.B. people have not. Mr. William Morris, in seconding the report at the meeting, told the truth very pithily about St. Alban's and Lord Grimthorpe. As reported in the *Times*, he said that—

"They might think the design of the restoration of St. Alban's Abbey had been made by the greatest fool in England. On the contrary, the man who made that design was one of the cleverest men in England. He was so clever that he had made a large fortune, and he had bought the people who ought to have taken care of the building and put them in his pocket."

That is exactly the truth. But the Society would have tried to prevent any one from putting a new west front to the newly-constituted cathedral, irrespective of whether he could do it well or ill. The right or wrong of that depends mainly on the condition of the old west front, which in fact was merely a patched up and decaying fragment. The transepts are another matter; there was no valid reason for meddling with them, but the S.P.A.B. can understand no distinctions of this kind. Their whole position is radically wrong, first in worshipping whatever is old irrespective of its value; second, in assuming the right of private interference. Let them indulge in public criticism, public meetings, readings of papers, &c. as much as they please and in as strong language as they please—no one will blame them; but their system of writing private letters, often in a most absurdly "superior" style, to those concerned about a building, and demanding that architects should submit their plans to them, is a systematic impertinence, and will be felt to be so by every man of sense and spirit. The fact is, that, whatever the individual merit of many of its members, the Society in its official communications is habit-

ually what is called "priggish," and no one can be surprised that they get treated accordingly.

WE give in another column a brief report of the last meeting of the Architectural Association for the consideration of its new departure, and of the resolution proposed and carried. We think that the malcontents who have carried on so determined an opposition to the schemes of the Committee have acted in a manner very detrimental to the best interests of the Association. The resolution referred to is, we presume, practically intended to shelve the whole scheme, at any rate for the present, and certainly appears to us a direct vote of want of confidence in the Committee, whose labours in preparing the proposed alterations of the rules in accordance with the instructions given them by the special business meeting on May 30 appear to have been so unsatisfactory to the meeting of last Friday, that they have deliberately ignored the work of the Committee and appointed a special committee to do the work in a more satisfactory manner. We fear the committee must now feel themselves in rather a dilemma, as, on the one hand, the resolutions passed on May 30, and the instructions given by that meeting to carry them into effect, have not been rescinded, and on the other hand the first step taken by the Committee has been discredited by the proceedings of last week. We are quite unable to understand the motives of "the opposition," as they may be termed, but their action appears to us to be characterised equally by want of foresight and want of public spirit.

IN reference to Mr. Tate's generous gift of pictures to the nation, and his desire to make the beginning of a gallery of English painting, an English Luxembourg, it is pointed out by a correspondent, "Y," in the *Times* that Mr. Sheepshanks contemplated exactly the same thing, and left directions to that effect, and "Y." urges that it would be a very inconvenient and illogical thing to have two galleries of British art under two different managements. That, however, does not by any means militate against the idea that the erection of a new and specially British Gallery would be desirable. The two collections could be united in it, as more space at South Kensington is continually being wanted. The proposition that St. James's Palace might be made the London Luxembourg is not, we fear, practical. Better to have a building designed for the purpose, and properly lighted. As the Government have had the onus of providing a National Portrait Gallery building taken off their hands by individual liberality, they may very well show their appreciation of this by devoting some public money to building a British Art Gallery. As to the position of this gallery it is not easy to suggest anything at the moment, but we may be quite certain it will not be in Whitechapel, according to the Rev. S.A. Barnett's rather preposterous suggestion. The excellent loan picture exhibitions which have been annually got up by him in Whitechapel have been a new interest to the neighbourhood, certainly; but they served to prove one thing, viz. that however eagerly "the lower classes" may crowd to a picture exhibition, they do so only as a child takes to a "picture-book"; of the real meaning of painting they have not a notion, and will not have till after some generations of improved educational methods.

THE Roman section of the *Mittheilungen* of the German Archaeological Institute has just issued its first number for 1890, and publishes in plate i. a very curious and interesting monument belonging to a class of which but few specimens are at present known. The monument in question is a terra-cotta, and represents a parody of a scene in a school. The head-master's chair is occupied by a figure draped in a long *himation* and having a donkey's head. In front of him, on two benches one above the other, are six figures of small children with monkeys'

heads, while several monkey-headed figures are standing about, one apparently saying his lesson. Isolated instances of parodied scenes in art are, of course, known, but, spite of Panoika's preliminary tract on the subject (1851), their consecutive history has yet to be written. More frequently mythological scenes are selected for animal parody, as e.g., when in a wall-painting at Pompeii the well-known scene of the flight of Æneas with his father and son from Troy is represented by three monkey figures; or, again, the judgment of Paris by a cock presiding over an assembly of three female birds of various kinds. Two notable parodies, however, of purely human scenes of ordinary life occur on papyri, one in the Turin, the other in the British Museum,—in the one a besieged fortress is defended by an army of cats, in the other an instrumental concert is being given by a band consisting of a donkey, a lion, a crocodile, and a monkey. Both papyri belong to the twenty-sixth dynasty (*circa* twelfth century B.C.).

AT the annual meeting of the Hellenic Society on the afternoon of Monday, the 23rd, Mr. Ernest Gardner, Director of the British School of Archaeology at Athens, read some extracts of his annual report. He observed—and most truly—that though the amount of discoveries made during the past year,—i.e., since the close of the Acropolis excavations,—were sensibly less than in the years immediately preceding, no year could be held uneventful which was marked by discoveries so signal as those at Lycosura and at Baphio, near Sparta. The Lycosura "find" we have already noted in some detail; it only remains to add from Mr. Gardner's report that the Damophon sculptures are now shown to the public in the Central Museum, and that of the four principal heads three remain,—i.e., those presumably of Persephone, Anytos, and Artemis; only Demeter is missing. Of the remarkable find at Baphio it was scarcely possible to speak,—so extraordinary were the rumours,—until the publication of the pair of remarkable *reposés* cups, in the last issue of the *Εφημερίς Αρχαιολογική*. Both cups represent scenes, depicted in an extraordinarily naturalistic style, of the capture of wild bulls,—a bull tossing a man, a bull caught in a net, a bull escaping at full gallop, and the like. They have certainly little resemblance to anything at present known in archaic Greek art, but we may note that the galloping bull reminds us of the galloping Assyrian lions of the British Museum basement; and the bull with head turned back seems also an echo of archaic common type; or rather, perhaps, all show the common inspiration of a close study of animal nature. The gold cups are, of course, the most sensational portion of the "find," but the collection of "island gems" is well worth attention. The principal of these are also published in the same issue.

AT a meeting on June 17th current the City Sewers Commissioners decided to refer to their Improvements Committee the question of pulling down All Hallows Church, London-wall, which, it is alleged, forms a serious hindrance to the traffic in that part of Broad-street Ward. The church was built after the designs of George Dance the younger, in 1765-7, at a cost of 2,914*l.* It occupies the site of one that had been demolished, in the previous year, by reason of its ruinous condition. Hatton describes the earlier fabric, which, together with the neighbouring old Carpenters' Hall, escaped the Great Fire, as being "of the Gothic and Tuscan Orders." About five years ago we published a view of its exterior, from the work produced by W. H. Toms and R. West, in 1740. The description given by Toms, and quoted in our columns, is manifestly copied *verbatim* from Hatton's "New View" of 1708*. A Corinthian temple surmounts the present stone tower, which has urns at the four angles; the rest of the church is of brick, and presents a very

* For the view, Mr. Brock's lecture, and the description, see the *Builder*, April 25, 1885.

plain exterior. In his "Churches of London," the late Mr. George Godwin animadverts upon the interior. He describes it as "a monument of bad taste, being not merely inappropriate, but of itself ill-designed, and very ugly. Attached columns of the Ionic order at the sides of the building support a frieze—instead of an entablature—from which rises a cambered ceiling, divided into a number of small panels, all absurdly overlaid with leaves and flowers, by way of ornament." The dedication of this church to All the Saints is indicative of an early foundation. The parish books begin with the year 1455; they record some benefactions by an anchorite who was then living near; and one Thomas, called Richer de Sanston, was rector in 1835. Close to the church's northern side stands the old City wall, whereof some superimposed portions may yet be seen here, and elsewhere, in the street known as Londowall. The portion eastwards of All Hallows forms a garden wall to some houses in New Broad-street. In the spring of 1855, a piece, of 150 or more feet in length, of the original wall was exposed during the construction of some buildings, named Blomfield House, at the corner of Blomfield-street (*antiquæ*, Brokers-row), on the site of the former Portuguese Synagogue, and close to All Hallows Church. This length was found to be laid upon a foundation of large flints; above this lay a course of rough rag, then two layers of tiles, or bricks, embedded in mortar—the tiles being about 1½ in. thick—and next, a course of rag stone, 2½ ft. deep, to nearly level with the existing ground. At the suppression, in King Edward VI.'s reign, of the fraternity of poor priests known as St. Augustine Papey in the Wall, their church, near to Bishop's Gate, was demolished, and the parish added to that of All Hallows. The patronage of All Hallows had already passed from the Priory of Holy Trinity without Ald Gate, to the Crown. It is now in the Lord Chancellor's gift, and worth about 1,100*l.* a year, *teste* Mackeson's "Guide."

THE City of Bath has now been lighted by electricity. One by one the provincial towns set an example to the Metropolis, which is singularly slow in adopting the new light. The question of expense is no doubt a difficulty, and it is becoming a serious question whether, if electric lighting companies are to do a good general business, they must not make a general lowering of their charges. Rightly or wrongly, cheapness is what people look for in these days, and they make use of cheap articles often much to their own detriment. But electricity as an illuminating power will not become general, and cease to be a luxury for the rich and for wealthy companies, until it is lower in price.

THE "I. Allgemeine deutsche Pferde-show," just opened at Berlin, has some points of interest to the architect. The horses (some 2,000 in number) have been housed on the barrack system, and not only have these barracks been neatly disposed on the site, and placed in good connexion with the show-rings, and not too far from the central hall of the "dead" exhibition, but they also show careful interior arrangements, practical and cheap division into loose-boxes, stalls and loose-stalls, ample central passage, and very pretty straw decoration, which latter deserves special mention. In the "dead" exhibition the numerous three-stall stables, full size, with every possible novelty in the way of construction, drainage, fittings, &c., will be of great interest to the specialist, as will also be the numerous models of larger stable-accommodation, and such architectural designs as a "Royal stable," an "ideal riding-school," and a "horse-hospital." The main exhibition building, in which these exhibits are to be seen, shows some interesting wood construction, well coloured, and having on its chief frontage a highly-decorated Royal box. It may be well to take note that even at a horse-show an architectural and constructional

department can be easily arranged, and that if well contributed to, this department would by no means be the least interesting part of the whole.

THE case of *in re* an arbitration between Ward and Cave, decided by Mr. Justice Grantham on Monday last, is of interest, though a full report of his judgment is not yet before us. He overruled some objections to an award by an arbitrator who was an architect. One of the objections to the award was that the arbitrator allowed his clerk to go round the buildings, and that the arbitrator should have done the work himself. It would appear, therefore, according to this judgment, that an architect who is arbitrator may depute the merely rule-of-thumb work to a clerk. This is common sense and sound law. If, however, the judgment goes further than this, and empowers an arbitrator to depute anything more than the merest rule-of-thumb work to an assistant, then it appears to be wrong both in common sense and law. We express a doubt on this point because on the report of the case before us it is doubtful in what way the word "inspecting" is used. If an arbitrator acts in any way on the judgment of another, then he deposes his judicial duties to another, which is exactly what he ought not to do.

DR. PARSONS'S report to the Local Government Board on the prevalence of enteric fever in the Coppen Urban Sanitary District, Northumberland, turns mainly on the point of defective water-supply. Not only is the present water-supply stated to be insufficient for the requirements of the increasing population, but the manner of supply is unsatisfactory. Where the water is not under pressure it is supplied through 9-in. earthenware socket-pipes. The report says:—

"The course of this conduit runs through the Bedlingtonshire Urban District, parallel with the Blyth and Tyne Railway, by Choppington, Barrington, and Bedlington station. In walking over it I saw one place where there was a considerable loss of water, and the earthen pipes are said to be frequently obstructed by roots of trees. At Bedlington station there are several privies within a few feet of the line of pipes, which are here of earthenware and about 12 ft. below the surface, a state of things which must involve risk of contamination of the water. At Belside, also, close to the reservoir, the conduit passes through a field which, at the time of my visit, was heavily manured with heaps of night-soil over the course of the pipes, which here also are of earthenware. The water passes through a filter bed into a covered reservoir, and is thence distributed in iron pipes under pressure." . . . There can be no doubt that the water supply of Coppen much needs improvement in the direction both of obtaining a larger daily quantity of water and of securing better filtration, and it is to be hoped that the Local Board will not delay taking the necessary steps."

IT is an unfortunate thing in England that no competition can be decided, apparently, without an immediate attempt on the part of one or more of the unsuccessful competitors to prove that they have been wronged in the decision. In the case of the Sheffield competition this characteristic is not absent, but it takes the rather novel form of an attempt on the part of the authors of one of the unsuccessful designs, Messrs. Flockton & Gibbs, to show that the accepted plan, as modified in the second competition, is an infringement of a patent, for which they have obtained what is termed "provisional protection, for a special arrangement of the plan of a public building. Messrs. Flockton & Gibbs have addressed a letter to the Town Clerk of Sheffield on the subject, the following extract from which shows the nature and assumed ground of the claim they are making:—

"The patent was embodied in our original design, and described by us as follows:—'Each set of offices for a department is made complete in itself, the entrance for the public being into, and by way of, the general or inquiry office, from which access is easy and direct to a corridor in which are the private offices. These corridors give the officers the means of communication with each other without entering the general office, and also with the general office at different points.' The advantages of this plan over the usual

arrangement of public corridors consist, not merely in the feature that no facilities are given for the public to seek admittance where they are not wanted, but that the private offices are rendered more quiet and undisturbed, the intercommunication more easy, and the control by the heads of the departments more perfect.

The arrangement (though something approaching it has been adopted in municipal buildings, such as the Corporation of Sheffield already used for some of their departments) has, so far as is known to us, never been adopted in municipal buildings where there is a combination of such departments; so that our design, as originally submitted, was entirely novel in this respect.

Your supplemental instructions were, we take it, prepared after our original design had been inspected and reported upon by the head of each department, and probably the self-evident advantages of our novel arrangement led to its being made a condition of the final competition, and its consequent incorporation in Mr. Mountford's final designs; probably also in the other four final designs."

How far the assumption in the last paragraph is correct we are in no position to form an opinion; but we have a very decided opinion that the arrangement of the plan of a building does not come under the class of inventions which can be protected by a patent, and that architects will find it better to dismiss that idea from their minds.

ARCHITECTURE AT THE ROYAL ACADEMY.—VIII.

1,896. "The Cathedral, Athens": Mr. R. W. Schultz. Two elevations and a plan of this curious old Byzantine building, an illustration and some account of which, along with other Byzantine buildings in and about Athens, was given in the *Builder* for November 30, 1889.

1,898. "Norwich Cathedral from the north transept": Mr. Albert D. Smith. This shows what cannot but be a favourite view with all who visit Norwich; looking through one of the Norman arches of the crossing with its flat soffit and parallel shafts, to the low ponderous arcade of the triforium gallery, with the large clear-story and spreading ribs of the late vaulting over it. The drawing is a well-executed one, in pencil, though it does not give all the force of contrast of the actual scene. It is not very apparent where it is taken from; it appears to be below the level of the triforium gallery but above the floor of the church.

1,899. "Business Premises, Davies-street, Berkeley-square": Messrs. Wimpey & Arber. A building treated with some character as regards its three stories of mullioned windows, the lower story beneath wall arches; but the details, such as the semicircular finish to the dormers, are either coarse or coarsely drawn; the broken circular pediment over the doorway shows the illogical character of this feature even more than usual, being deeply recessed and thin in substance; it looks exactly as if the middle portion had given way and fallen out.

1,900. "St. Mary's, Clumber": Mr. G. F. Bodley, A.R.A. A rather heavy water-colour drawing of the exterior of the church, showing the east end with a decorated tracery window, and the tower with a plain spire rising in rather an effective manner out of a mullioned and battlemented open screen surrounding the base of the spire, and through which are carried the flying buttresses from the angle pinnacles: there is open tracery in the leads of the screen-pinnacles. This screen round the base of the spire is the only individual feature in the building, which is otherwise like scores of other modern Medieval churches in general aspect, though we have no doubt it is better carried out in detail than many.

1,901. "Organ for Great Library, Blenheim Palace": Messrs. Romaine Walker & Tanner. This is the case for the large new organ which has been built for the Duke of Marlborough by Messrs. Henry Willis & Sons, in Vanbrugh's building, decorated too as it is with paintings of sham Classic architecture and flying figures, a design in any very pure style would have been out of place, and perhaps what is done does not exactly represent what the architects would have done for a building of more refined taste. The front is treated with a centre flanked by two towers with richly carved cylindrical wooden capping finishing with a Classic cornice; the wings terminate with two lower towers of similar design; all the towers being protected on brackets. The base of the whole is panelled with a cornice and frieze, and the panels filled with carvings of fruit and foliage &c.

Between the main towers is a kind of tribune with a niche, as if for a statue, and a little railed platform looking as if it were intended as a place to make a speech from. Above the main design rises another portion of the organ, set back and in shadow; not the swell apparently (which is sometimes put in this position), as there are front pipes and no shutters are seen, so it is not very easy to understand what part of the organ this is. There is a generally rich and rather dignified effect about the whole, though it cannot be said that it presents any new idea in the designing of organ-cases.

1,902. "West Window, north aisle, St. Benedict's Church, Ardwick, Manchester": Messrs. Ward & Hughes. This looks a pleasing window of two lights, each light divided in the centre and the four filled each with an angel; but it is hung too high to see any of the detail.

1,903. "North Front, St. Mark's, Venice": Mr. Gerald C. Horsley. Not the north front (a blunder of the catalogue compiler), but a charming little pencil-drawing of an arch and some sculpture beneath, which was illustrated in the *Builder* for January 4 of the present year.

1,904. "Design for an Entrance-hall Window": Mr. P. H. Newman. Rather original and very suitable as a hit of domestic Renaissance glass. A large scrolled shield, with ornament on a white ground, encloses a framed picture indicating apparently the reception of a guest who has just dismounted. The angles of the window beyond the shield are filled up with festoons &c. on a light blue ground.

1,906. "St. Sepulchre's, Holborn. Design for reconstruction of the organ": Mr. W. D. Caröe. This is a very interesting and delicately-executed drawing, illustrating a scheme of great architectural merit, but which on other grounds we view with considerable apprehension. St. Sepulchre's is one of the finest and most monumental organs in London, and it is here proposed to divide it into two separate organ-cases at either extremity of a screen stretching across the church, the player being placed amid a little erection of pipes in the centre of the screen. The nitty of the instrument will be impaired by this, however the architectural effect may be improved; and after all, organs are built to hear and not to look at. Architecturally the treatment is very good. The two organ-cases stand on the screen and are bracketed out from it so as to oversail in a picturesque manner; the pipes are picturesquely grouped, the woodwork is diversified by various figures of cherubs, &c., effectively put in. The old and very pleasing arrangement is used of representing a small organ of small pipes bracketed in front of the lower portion of the main mass. In the old German organs this was really the choir organ (*positiv*) with its pipes; whether these are really choir organ pipes, or only a pretty little bit of sham, of course one cannot say from the drawing. The whole design, a water-colour elevation on a small scale, is quite the best of the organ-case designs which appear this year; we only hope it is not going to spoil the organ.

1,907. A frame including pen sketches of Thring Memorial Chapel, Uppingham; Guests' House, East Grinstead; and Infant Schools, Westminster, by Mr. Arthur E. Street. The first, a quiet hit of true Gothic; the second, a very pleasing little house with a half-timber upper story on plain stone walls with a few mullioned windows irregularly introduced; the third, infant schools with ecclesiastical-looking windows, but we fear not quite efficiently lighted for London air.

1,908. "Congregational Church and Schools, Beckenham": Messrs. H. D. Appleton and E. W. Monntford. A picturesque group of buildings of a simple Gothic style, which however owes some of its effect, we are inclined to think, to the artistic execution of the pen-and-ink drawing.

1,909. "Design for Interior Decoration": Mr. Rowland G. Jones. Apparently a music-room decoration, intended to be gay in effect, and with some originality. The main wall is left a plain surface of rather sickly tint, the pilasters and frieze with light fawn and strap ornament on a warm buff ground; or rather this is not the frieze, but a kind of sub-frieze ranging with the gilt capitals of the pilasters; the genuine frieze is in a faint green tone, also with lighter floral ornament and gilt panels with the names of musicians. The dark purple of the dado is not a nice colour, and rather kills

the rest of the scheme, which has distinct merit, however, as an original effect.

1,915. "Illustration from Flowers of Paradise": Mr. Reginald Hallward. Looks like a sketch for a window in imitation of Blake's manner, but the colour effect is good and unusual.

1,917. "Design for West Window of South Aisle, Wells Cathedral": C. Hardgrave. A very nice bit of window design, in four lights each containing a figure: on the left the angel of the Annunciation, in the next compartment the Virgin with bowed head and hands crossed on her bosom; the next the same figure turning the other way to meet the hennidion of Elisabeth, whose aged figure is seen on the right-hand panel. This and the angel figure are both raised a little above the line of the Virgin figures, giving a little point to the composition, as the two outside figures are each conferring a blessing on the central one. The colour effect of the draperies and the diaper ground is rich and harmonious, and the whole a very pleasing example of a window with some individuality of design in it.

1,918. "Business Premises, New Broadstreet": Mr. G. Vigers. A red brick building with dressings and horizontal bands of light-coloured stone, with terra-cotta figures and ornament introduced in panels and over the sprandils of windows. The heavily moulded round arches in the ground story have a good solid effect, and there is a certain breadth of effect in the general treatment, with its parallel lines of vertical buttresses (rather than pilasters) under the gable, but the details are wanting in refinement; e.g. the great stone decanter-stopper finials to the said buttresses. What is the beauty or advantage of these lumps of coarsely-moulded stone?

1,919. "St. Catherine's Church, Melincryddan": Messrs. Seddon & Carter. Three sketches of a simple unostentatious country church in the Early English style, the interior view showing a timber arcade and piers dividing centre from side aisles; a characteristic treatment, with which more might be done in churches for country districts and where economy is an object.

1,921. "Riding School, Palace Court": Messrs. W. Harvey & B. Smith. There is nothing to show how the riding-school is treated in the way of roofing and arrangement of space, which is the real *crux* in a riding-school. This is nothing but a neatly-drawn brick front with a large circular-headed window; it might be anything else besides a riding-school.

1,922. "Glass and Decoration of Folkestone Parish Church": Mr. Alfred O. Hemming. This is an important scheme of decoration, shown in a geometrical coloured drawing. The groups of lancet windows beneath segmental arches are filled with stained glass, each light containing a figure of a bishop, with a scene from his life as a predella beneath. A series of frescoes of scenes in the life of Christ form a broad band of decoration running between the windows, the wall-space below the pictures being treated with decorative jointing with a simple ornament added. Above the frescoes the wall is powdered with flowers on a warm light-tinted ground, the heads of the window arches cutting into this field of decoration. A strong red dado forms the base to the whole. The only details we do not like are the trellis ornament immediately above the dado, and the notch ornament beneath the pictures: both these are out of keeping with Gothic work, and they are coloured so as to have an effect of relief which is unpleasing, especially as all the rest of the ornament is kept perfectly flat.

1,923. "Church Schools, Ice-me Bay": Mr. Ernest Turner. A very pretty pen-and-ink sketch, which certainly owes its place to the draughtsman rather than to the architect. The school may be very well planned; Mr. Turner's schools are likely to be so; but there is no plan to tell us this.

1,927. "All Saints' Church, Moda, Constantinople": Mr. J. Coates Carter. We should have liked a plan of this also, which seems to be a rather interesting attempt to combine European Gothic forms (lancet windows, &c.) with a somewhat Byzantine form of building. What we see in the drawing is two rather low-pitched gables side by side, with a lower one filling up the space between and forming the porch, the wall of which is decorated with bas-relief figures. Behind this, and recessed, a higher gable rises in the centre of the composition, with a circular window in it. The whole com-

position is quite unusual in appearance, and it would be interesting to see how it is treated in plan.

1,930. "New Premises, Duke-street, Grosvenor-square": Mr. W. D. Caröe. A rather heavy and loaded pen-drawing, which has however a good deal in it that is worth original at, and has the merit of being so far original that it is difficult to describe it under the generally accepted architectural terms. The property is one, as shown by the continuous treatment of the ground-floor shops as one design; but overhead it soars into variations of a very picturesque description. One portion rises into a stepped gable (which would be better without the scrolls), under which the windows are specially grouped in reference to it, at another point a projecting bay goes up on corbels, finished by a bulbous turret, which (like that in No. 1,881) is plumped down rather awkwardly on its supportings; but it is a thing one would sketch if one found it in a seventeenth-century building. The Building Act walls above the roofs are shaped at the lower portion into large console forms, and architecturally related to engaged columns on the wall below. Altogether a very interesting piece of street architecture.

1,931. "Hotel Sta. Catalina, Las Palmas, Grand Canary": Mr. J. M. Maclaren. A capital pen-drawing, but it is a tropical landscape with a building dimly seen in the distance, rather than an architectural design. As far as can be seen, the hotel is laid out with some originality of disposition, but a plan should have been given.

1,936. "Holy Trinity Church, Chelsea": view of entrance to Chancel: Mr. J. D. Sedding. This shows the lower portion of the chancel of this church, of which a sketch was given in the *Builder* for Jan. 4 of this year; there is nothing more original in the collection than this bit of interior church furnishing; especially to be noted are the treatment of the organ gallery stretching across the north arch, with its panels filled with painted figures, and the fine and free design of the wrought iron altar railing. We ought equally to commend the admirable and artistic execution, though slight, of the water-colour drawing in which it is illustrated, by the same hand as the sketches of Beauvais and Abbeville (1735 and 1832) previously mentioned. Those who do not soar above the "architectural draughtsman's" style of water-colour should look at this bit of free and artistic water-colour work, which forms in this sense one of the best drawings in the room.

1,937. "Symbolic Figures designed to be modelled in terra-cotta for Porch of a Public Building": Mr. W. Ammonier. These are good specimens of architectural sculpture; the figures represent "Mercy," "Temperance," "Fortitude," and other virtues, but it is a pity the author did not get some one to design the architectural framework for him, the details of which are very bad; the interpenetration of the arch by the head of the fugal spring from the decoration below is in the very worst architectural taste.

1,939. "New Class-rooms, Crouch Hill Presbyterian Church": Mr. W. Dunn. No plan; a pretty pencil-sketch showing that the class-rooms are treated with three successive shallow polygonal bay windows, which promise to combine good light with a picturesque external effect. The range of low windows on the left we presume indicates a passage to the class-rooms. If so, the building tells its tale well; still, we could have estimated that better with the help of a plan.

1,940. "View in South Aisle, St. Victor, Xanten, Germany": Mr. H. W. Brewer. A pencil edition of the drawing published in the *Builder* of May 17 of this year.

1,941. "Heraldic Design for Painted Glass": Mr. Rowland G. Jones. Nine panels with small oblong leaded lights, which are independent, however, of the design. The designs show treatments of armorial bearings and scrolls in light colour on the white ground, with very good and refined effect; they are eminently suited for domestic windows, where the object is to have decoration without obscuring light.

1,942. "St. John, Stansted Mountfitchet, Interior looking West": Mr. W. D. Caröe. This large and powerful pen-drawing, the last we shall have occasion to mention in this year's exhibition, is reproduced in the present number of the *Builder*, and description of it is therefore unnecessary. As the reader will see from the illustration, it is an exceedingly solid hit of

church building and church roofing. It perhaps has the defect of looking rather low in proportion to its width and length; possibly this is partly owing to an unintentional exaggeration of length in the perspective.

AN ANTEFIXA OF THE TEMPLE OF JUNO, DISCOVERED AT CIVITÀ LAVINIA, NEAR ROME.

In making some excavations for Lord Savile, at Cività Lavinia (the ancient Lanuvium), near Rome, were found some *antefixa* of terra-cotta, representing the head of Juno, in archaic Greek style of the sixth century B.C.

Undoubtedly these *antefixa*, one of which is illustrated, belonged to the roof of the Temple of Juno Sospita, or Lanuvina, celebrated by Livy, and which probably stood on the eminence now called S. Lorenzo, on the property of Lord Savile, where further excavations are also in progress.—L. B.

THE CONGRESS OF FRENCH ARCHITECTS.

THE French architects have this year, in holding their annual congress, celebrated also their jubilee of the Société Centrale. It was in 1840 that, thanks to the initiative of some eminent men, such as Visconti, Constant Dufeux, Lassus, Viollet-le-Duc, Lacroix, Albert Lenoir, and Baillly, an association was formed to look after the moral and material interest of the profession. Of the first founders there remain now only the venerable M. Lenoir, active and alert in spite of his ninety years, and M. Baillly, of whom

"la verte vieillesse
s'illumine parfois des feux de la jeunesse,"

but who has nevertheless handed over to M. Garnier, for a year past, the onerous duty of presiding at the meetings of the Société Centrale.

In deference to the wishes of a certain number of the Departmental Societies, the meeting, which generally takes place at the beginning of June, has been postponed to the third week of the month, and it is probably owing to this change of date that the unusually large influx of provincial delegates is to be attributed.

The opening meeting took place on the 16th in the hémicycle des Beaux-Arts, under the Presidency of M. Joly, assisted by MM. Chenais (Nantes), Journaud (Lyons), Marteau (Lille), and Boileau and Roux (Paris). As usual, the special technical questions in regard to such subjects as "concours publics," "honoraires," "hygiène," "voirie," "propriété artistique," "responsabilité en matière de construction" &c., were referred to Special Committees.

On the same day M. Daumet read an interesting paper on the life and works of Diet, whose decease has been already commemorated in the *Builder*, and who died prematurely, it is to be feared, from the effects of the strain of over-work.

At this paper M. Achille Hermant dealt with "Propriété Artistique," which is the subject of a decree now being proposed and considered by the legislature. M. Eugène Guillaume, who followed, treated at some length of "architecture, son rôle et son engagement spécial." This eminent sculptor, who also possesses the highest talent as a lecturer, was much applauded, but his paper was to some extent a repetition of that which he read at the Congress of 1886 on "The Unity of Art," expressed in the same kind of flowing and elegant language. In his opinion, a concurrent education in the three arts is above all things to the profit of architecture, which he calls the "le plus inventif," and of which M. Garnier's Opera House is the most complete type, in view of the association of architecture, painting, and sculpture exemplified in it.

On the next day, at a meeting presided over by M. Marteau, M. Lucas read a paper on "Sociétés d'Architectes." He observed that a complete study of Architectural Societies, native and foreign, ought to form a part of the proceedings of the annual Congresses. Then, in a historic sketch of ancient societies, he passed in review the colleges of priests, the constructors and master-workmen of the Middle Ages, the Académie Royale, the "experts jurés de bâtiment," the societies founded in Paris at the commencement of the century, that of Lyons, the regional and departmental societies, and lastly the provincial association which has been founded at Tours. No one can treat such



Ancient Roman Antefixa lately found at Cività Lavinia.

a subject better than M. Lucas, who is thoroughly acquainted with it, and his lecture was of the greatest interest.

M. Duchâtelet, who is one of the oldest Commissioners of Roads of the City of Paris, had promised to speak on the new road regulations, but had to send an excuse at the last moment, which is much to be regretted, as the subject is intimately connected with questions of public health and of construction generally. It would have been interesting to the foreign architects to have heard a competent treatment of the subject of the new legislation and of the treatment of main and lesser roads, the regulations as to flues in party-walls, for the prevention of danger from fire, as well as that relative to the heights of buildings, which are now determined in relation to the width of the roads on which they are built. According to this last legislation, houses cannot now contain more than seven stories, of which the minimum heights vary from 2.80 to 2.60 metres.

On the same day, at the école des Beaux-Arts, there was a lecture on decorative art and industrial art in the Exhibition of 1889, and another by M. Guadet on the life and works of André.

The next day most of the members visited Beauvais, which was this year the object of the country excursion. Beauvais, now the chief town of the department of the Oise, is about eighty kilometres from Paris, in a fertile valley at the meeting of two rivers. Boulevards planted with trees have replaced the old fortifications made in the thirteenth century. This shady promenade looks in some places over fields, in some over the ruins of old churches among which rises the imposing height of the cathedral. The town is badly laid out, the streets crooked and narrow, but many objects of interest are to be met with.

The members, under the direction of M. Voillez, Architect of the Department and President of the Society of Architects of the Oise, visited first the national tapestry manufactory, founded in 1664, by a merchant named Hynard. This establishment, the productions of which rival those of the Gobelins, includes two blocks of buildings. That situated between the court and garden preserves the character of the architecture of the seventeenth century, with stone façades surmounted by an enormous roof. The ateliers are convenient and well-lighted for the work. In summer, the windows let in a flood of fresh air laden with the scent from the trees in the garden. There are five ateliers, containing about forty frames; four out of the five are always in active operation. The method differs from that at the Gobelins, the looms being worked by pedals instead of by the hand, and the workman, with both hands at liberty, gets through his work much faster.

The garden contains many fine trees planted

under the direction of Hynard, and under their shade is a stone building, a range of stables, which is a memorial of the visit made here by Louis XIV. in 1686. Near these old buildings are various schools built in modern times for the use of the workmen, and the manufactory also possesses now an industrial museum which is of much service to those engaged in learning the art of tapestry weaving.

The church of St. Étienne, next visited, was commenced in the eleventh century and finished in the sixteenth. The portal dates from the thirteenth century. There are many splendid windows and some curious pictures painted on wood. But the principal object of the visit was of course the cathedral, commenced in 1225 on the site of the church built in the tenth century, and which twice suffered conflagration. The existing church would certainly have been one of the largest in existence if the nave and principal façade had been completed. As it is, it consists only, as is well-known, of a transept and an immense choir. The history of the fall of the vault (in 1284), and the necessity for building intermediate piers, is well known. The cathedral does not offer much of interest in regard to its contents. The grille at the entrance is very simple, and the tomb of the Cardinal Forbin interior worthy of special note.

Adjoining the cathedral is the Church de la Basse Œuvre, now almost entirely ruined and built up with houses. It was formerly the cathedral. Some archaeologists contend that this ancient church dates from the Roman foundation of the town; and there is certainly some resemblance to Roman masonry here and there; but other indications point to a date not earlier than the eighth century. Internally there are neither carvings nor ornaments of any kind. It has never been vaulted, and ought to be covered in with a timber roof. The façade, with three entrances and crowned with a gable, dates from the eleventh century.

The Congress next visited the fine episcopal residence built some years ago by M. Vaudremer, as well as the Palais de Justice installed in the ancient episcopal palace with its eleventh-century tower.

Thursday morning, the 19th, was devoted to the meeting of Committees and to various communications received, and in the afternoon the members repaired to the Boulevard de Vaugirard to visit the new Lycée Buffon built by M. Vaudremer, who did the honours of the visit. The building we have described in a former communication. The various classrooms, of natural history, physical science, chemistry &c., were all visited, and were all judged to be convenient and very well lighted; and the building itself is rather heavy in appearance, and without that rather heavy and prison-like character

which is often seen in French buildings for secondary schools.

The same day took place the banquet which always forms a feature of the Congress, at which 350 guests assembled at the Hôtel Continental. Among those present were M. Bourgeois, Minister of Fine Arts, M. Jules Roche, Minister of Commerce, M. Tirard, M. Larroumet, M. Jules Comte, and many political and literary celebrities. At the end of the dinner M. Charles Garnier made a very humorous speech in compliment to the Ministers—the outgoing Ministers whom we all regretted, and the incoming ones from whom we had so much to hope for. The Minister of Fine Arts showed not less piquancy in his brief reply. The evening was concluded by a musical and theatrical performance for which M. Escalier had designed the programme, and in the course of which the actors of the Théâtre Cluny gave an amusing little piece by M. Charles Garnier entitled "Architecture Revue."

Friday morning the 20th was devoted to the work of the "caisse de défense mutuelle," and in the afternoon took place the delivery of the medals awarded by the Société Centrale. This ceremony was presided over by M. Larroumet, the Directeur des Beaux-Arts, supported by MM. Garnier, Bailly, Kaempfen, Moyaux, Marteau, Chenantais, de Joly, Boileau, Paul Sédille, and Roux. M. Paul Sédille then presented his report on the awards made in regard to domestic architecture. The silver medal prize founded by M. Lesoufaché and M. Jules Sédille was awarded to M. Destailleur of Paris for his works, among which may be mentioned the Hôtels Béchague, Luynes, and Monclay at Paris; in the provinces, the château of the Duc de Massa, and the enlargement of the Château Mouchy; abroad, a splendid mansion in Silesia, and in England the mansion of the Baron Ferdinand de Rothschild.

M. Auhurtin, architect, of Paris, the designer of various schools and private houses, and M. René Ménard, of Nantes, also received silver medals. The silver medal for jurisprudence in connexion with architecture was awarded to M. Gaston Rozet, author of a work on "La Législation de la Propriété," a convenient summary of the subject. The silver medal for archaeology was given this year to M. Grébaud, director of the museum of Boullak, who continues worthily the work commenced by Mariette-Bey and M. Maspero.

In the absence of M. Loviot, who was prevented by a family bereavement from taking part in this year's Congress, M. Roux presented the second report in the name of the "Commission des récompenses."

M. Lechat, who has directed, with a zeal and intelligence worthy of the highest praise, the excavations undertaken in the island of Corfu, on the site of the ancient Corcyra, obtained the silver medal given for the French School at Athens; and M. Henri Deverin obtained the medal for studies of French monuments.

The Destors medal was awarded to M. Chaussemiche, student of the école des Beaux-Arts; M. Berger obtained the Chaplain medal, and M. Bruniaux, pupil of M. Trélat, obtained the medal founded by M. Bouvens van der Boyen in favour of private schools of architecture.

The usual medals were then awarded in connexion with the school of apprentices, the Masons' Club, the "Société Civile d'Instruction du Bâtiment," and lastly the medals to old artisans for continued and faithful service. Among the names of these venerable workmen may be mentioned that of M. Palluan, foreman slater, seventy-seven years of age, who has obtained the bronze medal founded by M. Salleron. At the close of the ceremony M. Garnier announced that the Minister of Commerce and Industry also intended to present M. Palluan with a silver medal in the name of the Government.

On the 21st the Congress devoted two sittings to reports of various societies and to the study of propositions formulated by various committees, and was then adjourned to next year.

Moscow.—The famous old tower on the Town Hall-buildings will have to be pulled down as quickly as possible, as the foundations have suddenly shown signs of giving way. Nothing has yet been settled as to the re-erection of the tower. According to a Russian contemporary, a simple ridge-turret is thought of instead of the more monumental idea.

SUB-CONTRACTING, &c., IN THE BUILDING TRADE.

On Monday afternoon last the Council of the Royal Institute of British Architects received two deputations of building operatives who desired to bring their views of the disadvantages of sub-contracting before the representative body of the architectural profession. There was a largely-attended meeting of the Council, Mr. Waterhouse, R.A., in the chair.

The first deputation was received at four o'clock, and consisted of six representatives of the London United Building Trades Committee, which claims to represent all branches of the London building trades. The deputation consisted of Mr. John Mackie, of the Associated Carpenters and Joiners (Chairman); Mr. Paul Weighill, of the Operative Stonemasons' Society; Mr. Jesse Bell, of the Operative Bricklayers' Society; Mr. Alexander Turner, of the National Union of Operative Plasterers; Mr. Charles Drinkwater, of the "Perseverance" Society of Carpenters and Joiners; and Mr. J. Douglas, of the Glaziers' Society.

Mr. Mackie, who first addressed the Council, apologised for the unavoidable absence of Mr. George Dew, the Secretary of the London United Building Trades' Committee, the body they represented. That Committee, he might say, consisted wholly of the representatives of the London building operatives, and it had been formed partly in consequence of the apathetic manner in which the London Trades' Council had dealt with the interests of the building trades. He understood that a deputation from the London Trades' Council was to appear before the Council of the Institute an hour later, and that the members of that body were practically at one with the deputation on whose behalf he was speaking as to the objects which they sought to attain; but he believed he was right in saying that the London Trades' Council had not moved in the matter until they heard of the intended action of the Committee for whom he was speaking. That Committee consisted of practical building operatives elected by the various trade societies connected with the building industries, such as the "Amalgamated," the "Associated," and the "Perseverance" carpenters, and the stonemasons', bricklayers', plasterers', slaters' and tilers', glaziers', and lath-renders' societies; they also had the support and sympathy of the plumbers, although, owing to some informality, the plumbers were not represented in the deputation. Their object in coming to the Council of the Royal Institute of British Architects was to ask them and the members of the architectural profession generally to use their influence with their clients to procure the insertion in contracts of stringent clauses requiring that all work should be carried out in a tradesmanlike manner. They believed that the best way to secure that end would be to insert clauses in all contracts binding the builder to pay not less than the recognised trade union rate of wages; that the hours worked should be those generally recognised as fair in the trade; and that no portion of the work in any trade should be sublet. He thought that it would be agreed that subletting was one of the worst forms of "sweating."

Mr. Waterhouse asked for a definition of the term "sweating."

Mr. Mackie, continuing, said that while, perhaps, there were some few forms of subletting work which could not fairly be described as "sweating," it was their experience as executive workmen that where building work was sublet it was generally "scamped" either in workmanship, owing to the employment of cheap and inferior labour, or in material, owing to the sub-contractor seeking to make his living out of the job by using adulterated materials. Sometimes the sub-contractor took work at so low a rate that he had to resort to both cheap and inferior labour and bad materials in order to make his profit. Perhaps there was no trade in which subletting was so general as that of the plasterer, and there was certainly no trade in which so much deception was practised. All sorts of rubbish were used in sub-contracted plasterers' work—rubbish that would not be used by the general contractor who had a name to lose, and who ought to be held responsible. Such clauses as the deputation advocated had lately been introduced into all contracts for work to be done for the School Board for London and the London County Council. That such clauses were necessary was shown by the had results obtained in certain

Board School buildings, in an important public building completed a few years ago, and in another important public building now nearing completion. In regard to the last-named building, the general contractor, although bound down not to sub-let the work, had sublet nearly the whole of it; the stonework had been sub-let twice over, and the second sub-contractor had sub-let the fixing. In the same building the plasterers' work had been shamefully "scamped." With the permission of the Council, he would read the propositions which the deputation had formulated, and for which they asked the careful consideration of the architectural profession, viz.:

(1) "That the contractor shall not be allowed to sublet any portion of his contract."

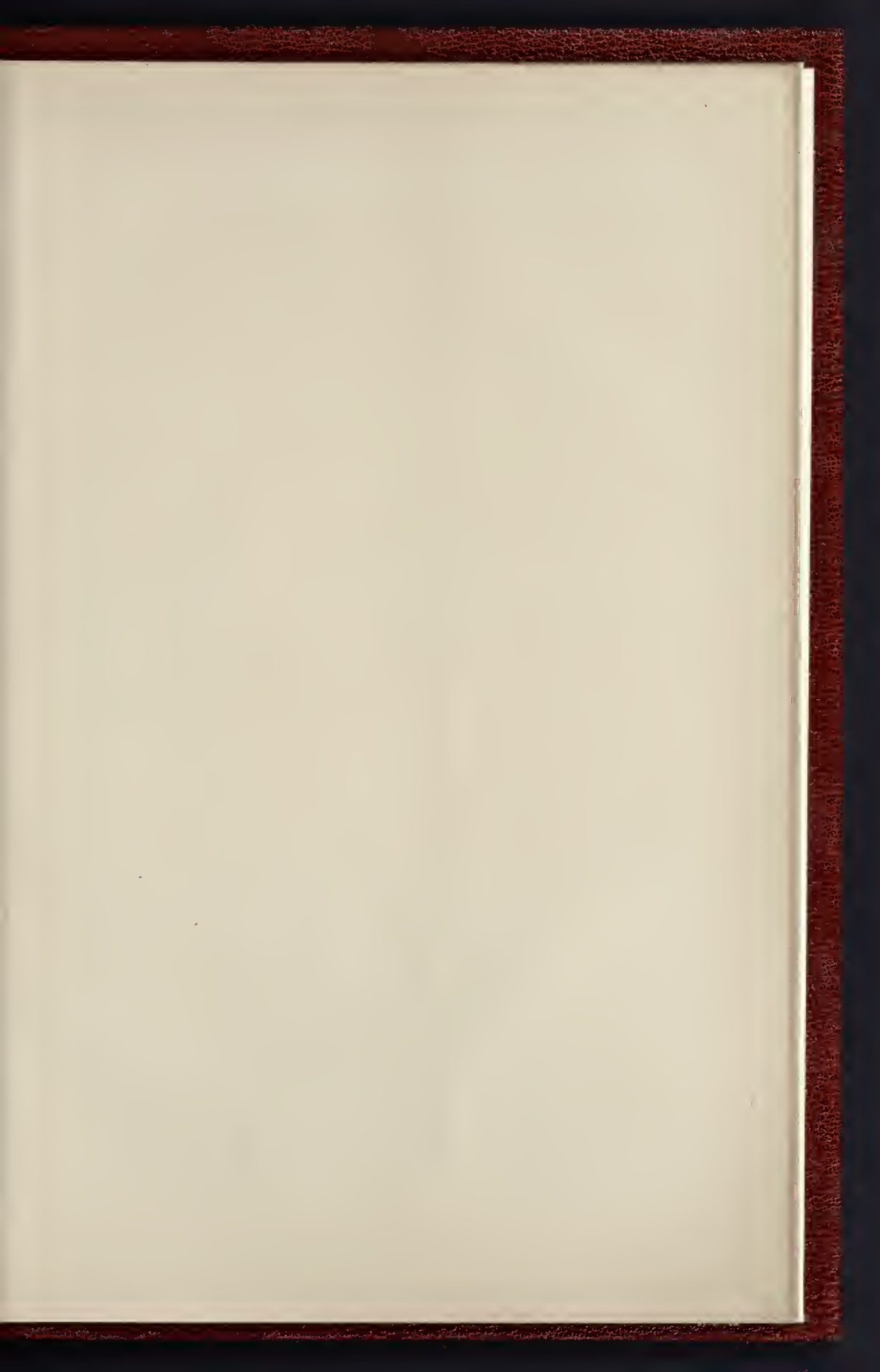
(2) "That all labour employed by the contractor shall be of the best quality."

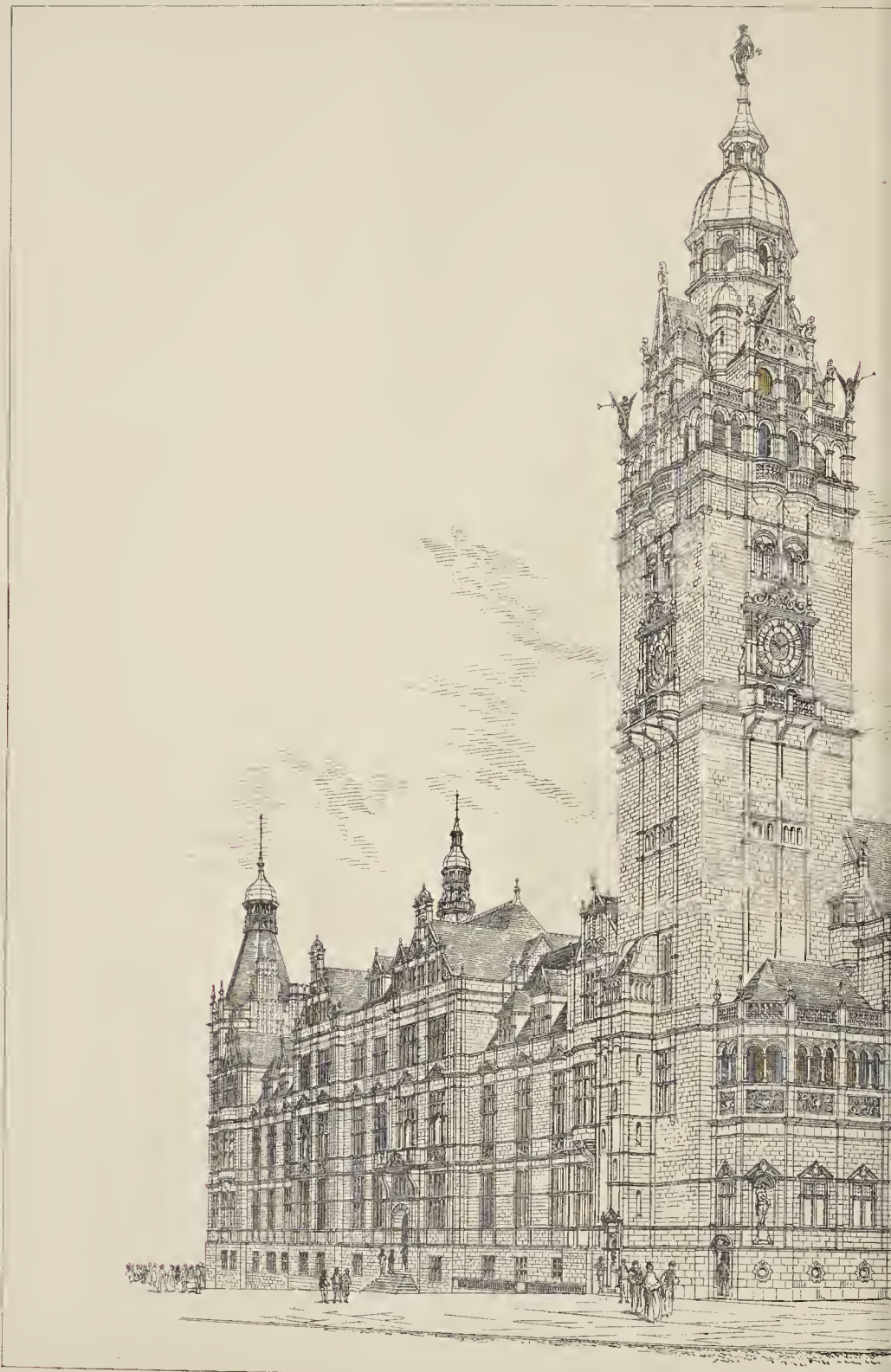
(3) "That the contractor shall pay not less than the recognised or trades union rate of wages, and shall observe all recognised rules and customs as to working hours."

They did not ask that every man should be paid the same rate of wages, whether he was worth it or not; they asked that only competent workmen should be employed, and that they should be paid the regular fair rate of wage. If architects insisted upon good workmanship, the end which they as trade unionists had in view would be attained, for the best work in all trades was done by trades unionists; that was not his testimony; it was the testimony of one of the largest and most respectable of London builders. The best workmen in the trade lamented the degeneracy of craftsmanship which was engendered by the sub-contracting system, with its natural tendency to hurried and "scamped" work, and which he feared sometimes induced architects to put less art-work into their designs than would be the case if they had less difficulty in getting it properly carried out. That difficulty was due to the present system of sub-contracting, and another consequence which was greatly to be deplored was that the coming generation of carpenters, joiners, and other craftsmen would have less and less scope for their skill if the sub-contracting system were to continue unchecked.

Mr. Paul Weighill, as a representative of the operative stonemasons, supported the general tenor of Mr. Mackie's remarks, and referring in particular to his own special trade, he said that the system of sub-letting work was productive of the worst results. If the general contractor sublet the work, the sub-contractor necessarily took it at a lower price than the general contractor received for it, even although the general contractor might have put in a low price for the work; the natural result was that the sub-contractor, rather than lose money by the job, "took it out" of the workmanship, by employing inferior workmen at under-paid rates, or out of the material,—so that when people thought they had a Portland stone front it often happened that other stone was mixed with the Portland. The system of sub-contracting led to the use of machine-worked stuff in situations where machine-worked stuff ought never to be used. When such machine-worked stuff was new and wet, it was often possible with one's finger-nail to scrape off the surface to the extent of an eighth of an inch, owing to the pulverisation of the surface by the machinery. Was it any wonder under such circumstances that mouldings and other features rapidly decayed and lost their sharpness? He confirmed the statement of Mr. Mackie as to the sub-letting two or three times of the stonework of a new public building, in contravention of the terms of the contract. The result of such arrangements always was that the workmen employed were underpaid and unskilled, and that the material used was not such as was specified.

Mr. Jesse Bell, on behalf of the operative bricklayers, said that bricklayers' work, in common with other branches of the building trade, suffered greatly in quality owing to the sub-letting system. The sub-contractors, taking the work at a low figure, sought to recoup themselves partly at the expense of the workmen and partly by using inferior materials. The workmen were driven to scamp their work, and they became demoralised and careless. It was often said that building craftsmen of the present day were not as skilled as those of old, but he contended that the workmen who had been regularly brought up to their trades were quite as skilful, although, owing to the pernicious system of sub-contracting, they had few opportunities of demonstrating their skill. It was obvious that if the sum allotted by the general con-



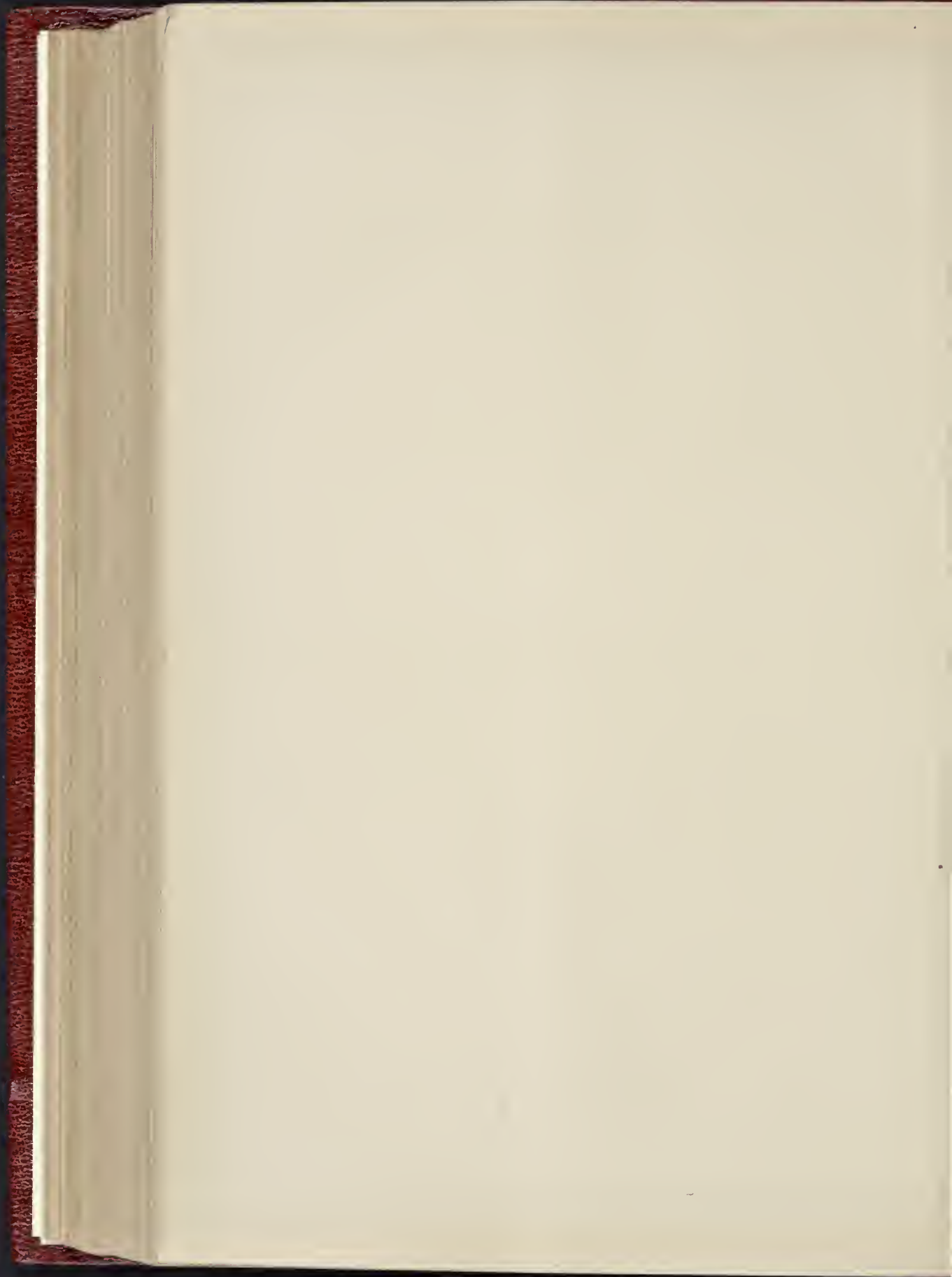


SELECTED DESIGN FOR SHEFFIELD MUNICIPAL



PHOTO LITHO. SPRAGUE & CO., 32, MARTIN LANE, CANNON ST., LONDON, E.C.

INGS.—MR. E. W. MOUNTFORD, F.R.I.B.A., ARCHITECT.



er for brickwork or the work of any other was a fair one, the sub-contractor who work at a lower figure must make the ly him somehow, and in making it pay him the work necessarily suffered.

Alexander Turner, speaking on behalf of operative plasterers, said that there was no of the building trade in which the evils of sub-contracting were more serious than in work of the plasterer. Obviously the materials were very easily tampered with, and the materials and workmanship plastering generally seriously scamped. That was a which was very detrimental to the interests of operative plasterers. The sub-contractors work at such low prices,—fivepence or once a yard, to wit,—that they could hardly it pay, even though the workmen were and the materials adulterated. kinds of tricks were resorted to by sub-contractors. For instance, in running a cornice, durable the material should consist of half plaster and half putty; but the general now was to use four or five pails of putty ly one pail of plaster: hence the failure of ch plaster-work. Other branches of work also "scamped," including even work done a fibrous plaster system. Again, stringings, or other features where hardness and ability were most essential, and for which it usual to specify Keene's, Parian, or some cement, were often run simply in putty or coloured so as to deceive the architect a clerk of the works. Not only did the ing-owner suffer from such malpractices, the architect suffered in reputation as well e workmen, to whom such a system was demoralising. They had either to connive deceptions which were practised, or lose bread and cheese.

Charles Drinkwater on behalf of the tive carpenters and joiners, spoke of the y systematic overtime brought about in ade by the sub-contracting system. They that overtime was often unavoidable, but objected to sub-contractors persistently their hands fourteen, sixteen, or even hours a day. The work would be done by men working the normal number ours.

J. Douglas, on behalf of the glaziers, that the work of his trade also suffered the system of sub-contracting.

Waterhouse asked whether the third e which had been submitted by Mr. us was meant to strictly limit the number urs worked by the men, or whether there to be some amount of elasticity, as sug- y by Mr. Drinkwater's remarks?

Mr. Mackie replied to the effect that they did wish to lay down a hard-and-fast rule, as quite recognised that on many jobs over- was unavoidable.

Professor Aitchison asked this question: osing by some alteration of trades union there was less work ordered to be done e men than was done by them at the time contract was entered into, and supposing ilder or contractor who wished to get his done (and had to get it done under ty) at a remunerative rate found he was g money by the altered conditions of work, was he to protect his interests except by letting the work?

Mr. Mackie said he could not conceive of any eulty of the kind arising. A contractor e in the rates of wages and hours of labour of men in the different trades, and took those into account in framing his estimates. changes as were hinted at in the question not brought about without due notice. In ver to other questions by Mr. J. D. Sedding, Waterhouse, and other members of the eel, Mr. Mackie said that it was the un- der if not the written law of the building es that six months' notice of any changes ed be given on either side.

Answer to Mr. T. E. Colcutt, Mr. Turner, representative of the plasterers, said that hough the insertion of clauses against sub- ing work might not greatly ameliorate the of the working plasterer (for the general ractor would perhaps prove as hard a task- er as the sub-contractor), it would un- tedly improve the character of the plaster s, for work done under a general contractor always done with better materials than e done under a sub-contractor.

Mr. Weighill, on behalf of the operative emasons, wished to add to his former arks a word or two as to quarry-work- e. Having stone worked at the quarries

simply meant having it sub-contracted for. It was done with cheap labour, and no discrimina- tion was made in the selection of the stone, except that that which was softest to work was naturally selected by those who had to work it. The quarry-master and the general contractor profited by that arrangement, but the durability of the building inevitably suffered. Stone worked at the quarries was sent on to the works "faked" so as to hide defects,—"slobbered" over with slurry, and so forth.

Mr. Waterhouse thanked the members of the deputation for their remarks, and promised that the subject to which they had called attention should have the careful attention of the Council of the Royal Institute of British Archi- tects.

The deputation then withdrew, Mr. Mackie expressing their thanks for having been per- mitted to lay their views before so august a body as the Council of the Institute.

The second deputation, representing the Building Trades' Department of the London Trades' Council, was then, at 5 o'clock, introduced. It consisted of Mr. George Shipton, of the Amalgamated Decorators and Painters Society; Mr. Abrey, of the "Perseverance" carpenters and joiners; Mr. E. Coulson, of the Operative Bricklayers' Society; Mr. Gregory, of the Operative Stonemasons' Society; Mr. Smyth, of the "Metropolitan" Plasterers; and Mr. Hobbs, of the Amalgamated Plumbers' Society.

Mr. Shipton, Secretary of the London Trades' Council, in introducing the deputation, said that they were all practical men, fully conversant with the essentials of good work in their respective branches of trade; and they were there to say that the prevailing system of sub-letting work was detrimental to the best interests of the public and of the workmen. Fully impressed with that view, they came to the Council of the Institute of British Archi- tects, whom they regarded as the guardians of the public interests in building, first of all to express their thanks for what the Institute had already done, and secondly to ask them to do a little more. They were aware that the Institute, in the Fourth Clause of their "Heads of Conditions of Builders' Contracts," had sanctioned the following stipulation:—

"The Contractors are not to sub-let the works, or any part thereof, without the consent in writing of the Architect."

He did not know how often or to what extent sub-contracting was sanctioned by architects under that clause. The clause as it stood was of a permissive nature; could it not be modified and made imperative, so as to permit of no sub-contracting whatever? If the Institute could make the condition referred to compul- sory, they would strike at some of the worst abuses in the building trades, those, namely, which arose out of the system of sub-letting work.

Mr. Abrey, on behalf of the carpenters and joiners, said that amongst other evils of the system of sub-letting work, it was a fact that the work had to be done under such conditions of hurry-scurry and "scamping" that in vain was all the knowledge gained by assiduous apprentices and earnest workmen who, desiring to excel in their trade, attended Polytechnic classes in the evening. Strivings after good work were thrown away when men were constantly told "not to waste time" on their work, but to "knock it off" accompanied by the remark that "anything was near enough."

Mr. Smyth, on behalf of the plasterers, cor- roborated the remarks of the plasterer who spoke as a member of the first deputation. He said, in effect, that in no trade were the evils of sub-contracting so rampant as in that of the plasterer. Not only were the men "sweated" for their earnings, but the materials were shamefully sophisticated. He cited the new public building mentioned by the other plasterer as a case in point. He argued that it was necessary to take steps to stop so much rascality, and quoted from the Report of the Royal Commission on the London Livery Companies* the following extract from the return of the "Plasterers' Company":—

"The Plasterers' Company was incorporated in the year 1601, to search, and try, and make, and exercise due search as well in, upon, and of all manner of stuff touching and concerning the Art and Mystery of Pargetors, commonly called Plasterers, and upon all work and workmen in the said Art or Mystery, so that the said work might be just, true, and lawful without any

deceit or fraud whatsoever within the City of London, or suburbs thereof."

It was greatly to be regretted that there was no such system of surveillance now in vogue.

Mr. Gregory, on behalf of the operative stone- masons, lamented that in builders' yards of the present day there were so few masons to be seen at work. Why? Because stonework had all gone into the hands of sub-contractors, who had now the biggest yards in London. All sorts of tricks were played with masons' work in some of these sub-contractors' yards and shops. Hardly a single stop or moulding was worked on the stone; they were stuck on with plaster and the joints disguised with slurry before the stone went on to the job. Balusters, instead of being cut out of the die, were in sub-contractors' yards often made in two halves and stuck together, the *modus operandi* being disguised in the same way. Needless to say that one kind of stone was often substituted for another with impunity, the substitution never being discovered by the clerk of the works or the architect. There was always a good substantial bag of plaster in a sub-contractor's workshop, and shellac was an article which was also in much request there.

Mr. Hobbs, operative plumber, said that the sub-contracting system operated detrimentally to plumbing work and to the good plumber by encouraging the employment of cheap and im- perfectly skilled labour. For instance, an un- skilled workman would be liable to make imperfect joints, thus allowing of the passage of sewer-air. Take again the case of a bend in a 4-in. soil-pipe. Although the soil-pipe might be of 7-lb. lead, the unskilful workman in making the bend would reduce the thickness of metal in the heel of the trap to that of perhaps only 4-lb. lead.

Mr. Octavius Hansard said he supposed that in the London building trade there were very few contractors who had a staff of slaters. How would the proposed clause prohibiting sub- contracting affect the work of that trade, which was mostly done by one or two respectable firms?

Mr. Shipton, after consulting with the deputation, said they were of opinion that slating was a very exceptional trade, and would be an exception to the general rule against sub-con- tracting.

Professor Aitchison asked whether it was not a general rule for all builders to sublet the whole of their work?

Mr. Shipton replied that it was by no means a universal custom. There were some firms who did so, but they were mere capitalists rather than builders. A firm of capitalists did not care a rap for the art of building. The best firms of builders were those where the partners had served their time to some trade, and who took a pride in their work. Naturally, if the head of the firm were a mason by trade, he would care most for the mason's work; if he had been a joiner, he would take special pains with the woodwork. But a man who had a practical acquaintance with any one branch of the building trade would have a general knowledge of the other branches, and would take some pride in their proper execution.

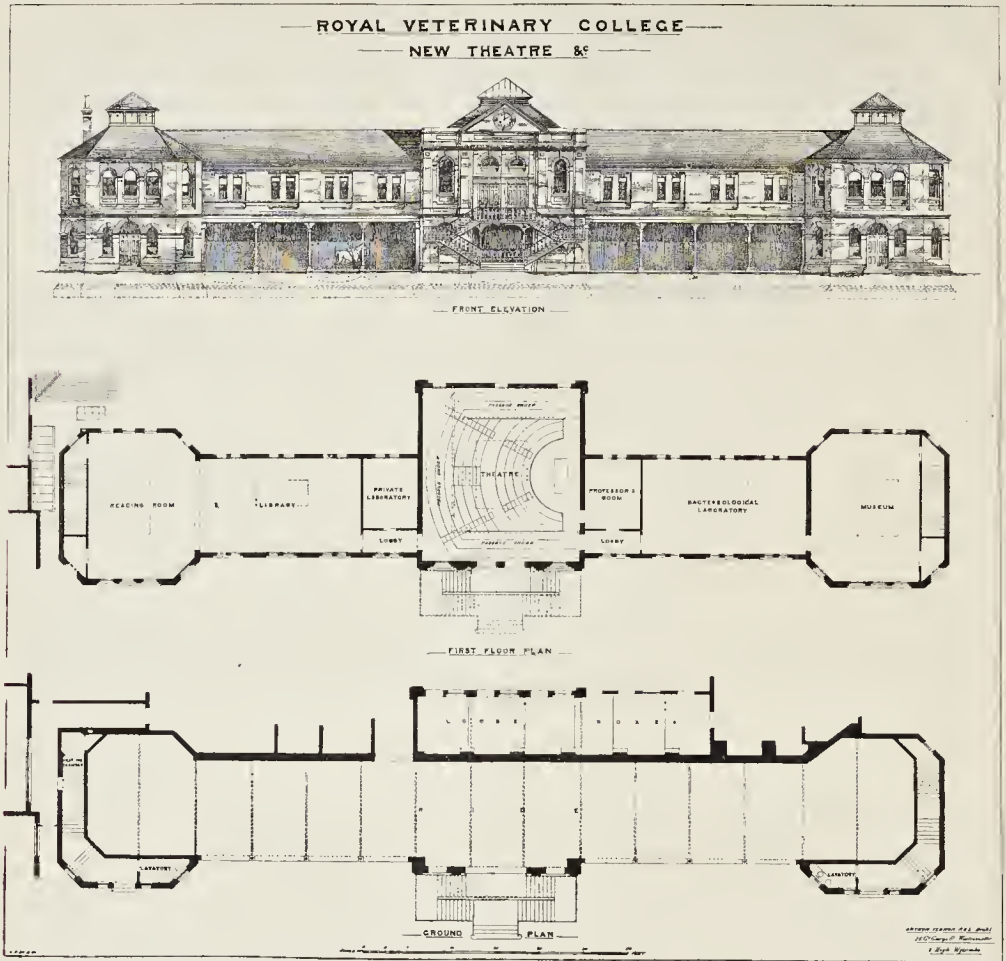
Mr. J. M. Brydon asked whether the Brick- layers' Society objected to the payment by the piece for cut and carved work?

Mr. Coulson, in replying, said that although they considered the system under which such work was done to be a form of "sweating," they could not stop it. In some general remarks he lamented the degeneracy of modern brickwork. The old method of doing brick- work, with struck joints was far preferable to the modern pointed work.

Mr. Macvicar Anderson said he had been in the habit sometimes of selecting the tradesmen for one or two trades, and of leaving the work they were to do out of the general contract, carrying out to a certain extent the system in vogue in Scotland and the North of England. He had generally found the results of such a course to be very satisfactory. What were the views of the deputation in regard to that method of getting work done?

Mr. Shipton said that if he understood the question aright, each specialist employed for each special kind of work was the contractor for that work. If that were so, they were decidedly in favour of that system, for by it the

* The Charter from which these words are quoted was granted by Henry VII., March 10, 1601, and was confirmed by Henry VIII., Elizabeth, and Charles II.



skilled workman would be employed directly by the contractor.

Professor Aitchison said that no doubt the best work was done under the separate contract system if the architect could take the trouble of it, but that system of doing work would add enormously to the architect's labours.

Professor Aitchison said it had been represented to him by some builders that when they had entered upon a contract to carry out works at a certain price, they sometimes found that the men would not work with such celerity as would enable them to carry out their contracts without serious loss, and that they had no option but to let the work to sub-contractors to save themselves from ruin.

Mr. Shipton said he thought such representations on the part of contractors should be taken *cum grano salis*. He in all his long experience of workmen had never known them to fail to respond to all reasonable calls made upon them to do a fair day's work. If a sub-contractor could afford to carry out a work at a lower rate than the original contractor, it was difficult to see how the original contractor, paying a fair rate of wages, and getting the best and most efficient workmen, would be unable to do so.

Mr. Thomas Drew, R.H.A., of Dublin, said he was not conversant with all the conditions of London work: but he should like to know whether the Operative Bricklayers' Society had any rule prohibiting a bricklayer from laying bricks with both hands; and, if so, how they justified that rule?

Mr. Coulson, in reply, said that the alleged rule was a pure myth,—a fiction. He had been in the trade for over forty years, and he had been Secretary of the Society for thirty years, and

there was no such rule upon their books, nor had any such rule ever been passed.

Mr. Waterhouse having assured the deputation that their statements should have the careful consideration of the Council, the deputation withdrew shortly after six o'clock, Mr. Shipton expressing their thanks.

THE ROYAL VETERINARY COLLEGE.

THE illustration represents the additional building to the well-known Veterinary College in Great College-street, Camden Town, and which was opened by the Duke of Cambridge a week or two ago. The new building is opposite the main entrance to the College grounds, and it comprises a new wing exceeding 200 ft. in length, and it provides on the ground-floor for a ride or testing space for horses. On the first floor, in the centre, is a large lecture theatre, to hold from 350 to 400 students; it has an external staircase of iron, and is about 40 ft. by 36 ft. Adjoining this lecture theatre will be provided a private laboratory and professor's-room, large bacteriological laboratory, 37 ft. by 22 ft.; museum, of octagonal shape, 34 ft. by 30 ft.; and on the opposite side a large reading-room and library, nearly 70 ft. in length. The buildings are intended for the special training of students, with increased facilities in the higher branches of the veterinary science. They are being constructed in white gault brick, with malm dressings, and slated roofs. A good deal of iron is in use in the construction. The cost will be between 6,000*l.* and 7,000*l.* The contractors are Messrs. G. H. & A. Bywaters, and the architect Mr. Arthur Vernon.

Illustrations.

SHEFFIELD MUNICIPAL BUILDINGS: SELECTED DESIGN.

WE publish this week the perspective view and two principal plans of the design, by Mr. E. W. Mountford, which has been recommended by the Assessor, Mr. Waterhouse, R.A., for adoption, from among the six sent in, by his previous selection, for the second competition.

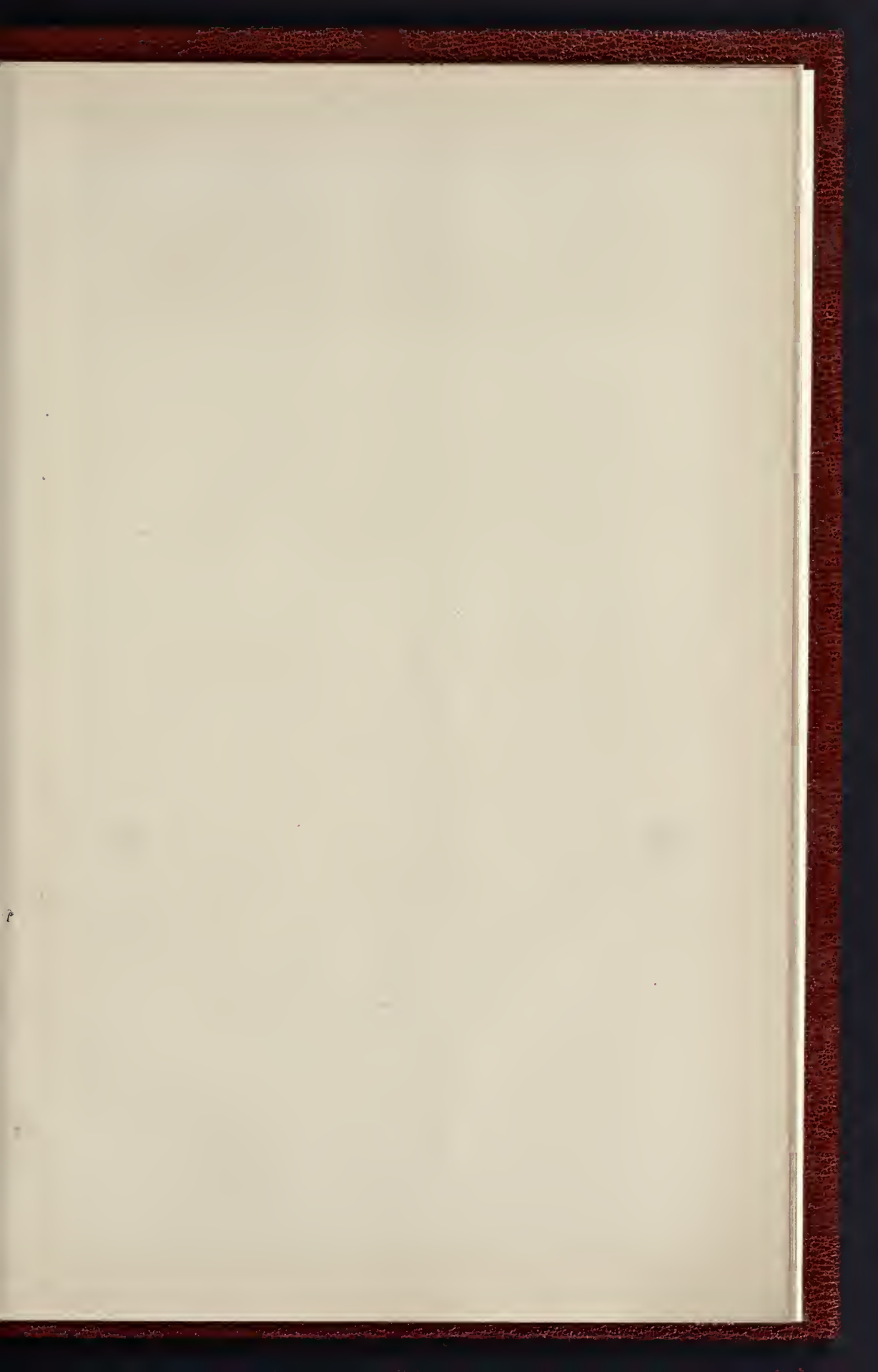
The following extracts from Mr. Mountford's report will explain the intention of the plan:—
“The various rooms of the respective departments, with the few exceptions specified in the ‘Instructions,’ are invariably placed upon the one floor therein assigned to them.”

Each of the four fronts having a central entrance, with a closely adjacent staircase, direct access to every part of the building is attainable from either of the surrounding streets. Moreover, each department, being contained wholly in the space between two of these entrances, or the stairs leading therefrom, may be reached without the necessity of traversing any other department.

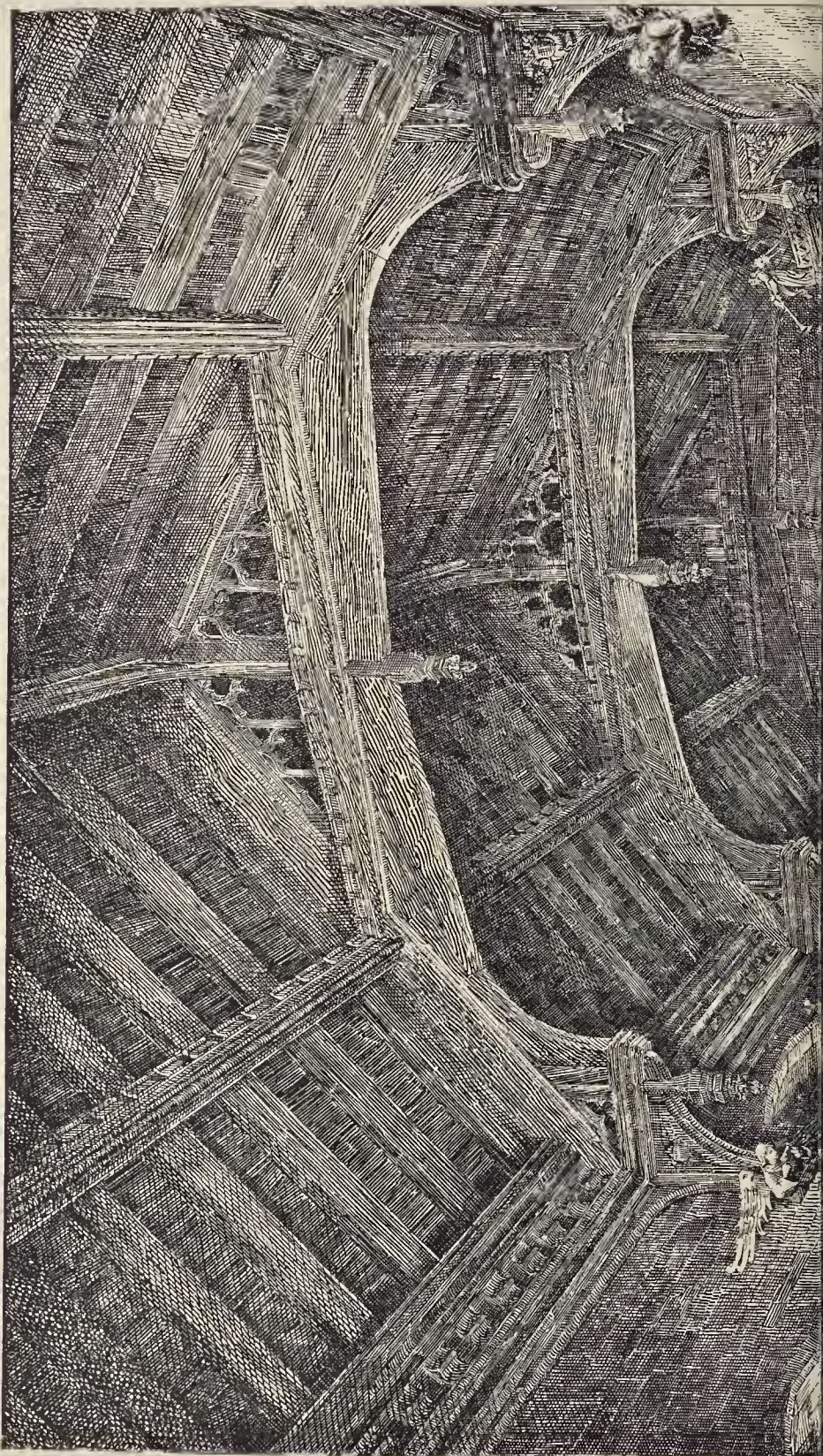
The whole of the official or state apartments, including the three large committee-rooms and the grand staircase, may be shut off and used independently of the remainder of the building without, in the least degree, interfering with the working of the business departments.

All rooms and corridors are thoroughly well-lighted throughout. I believe, as an absolute certainty, that there would not be a dark corner in the building, excepting in certain unimportant parts of the basement, and this without the necessity of using ‘borrowed’ light.

Future extension is amply provided for, as is



THE BUILDER, JUNE 28, 1890



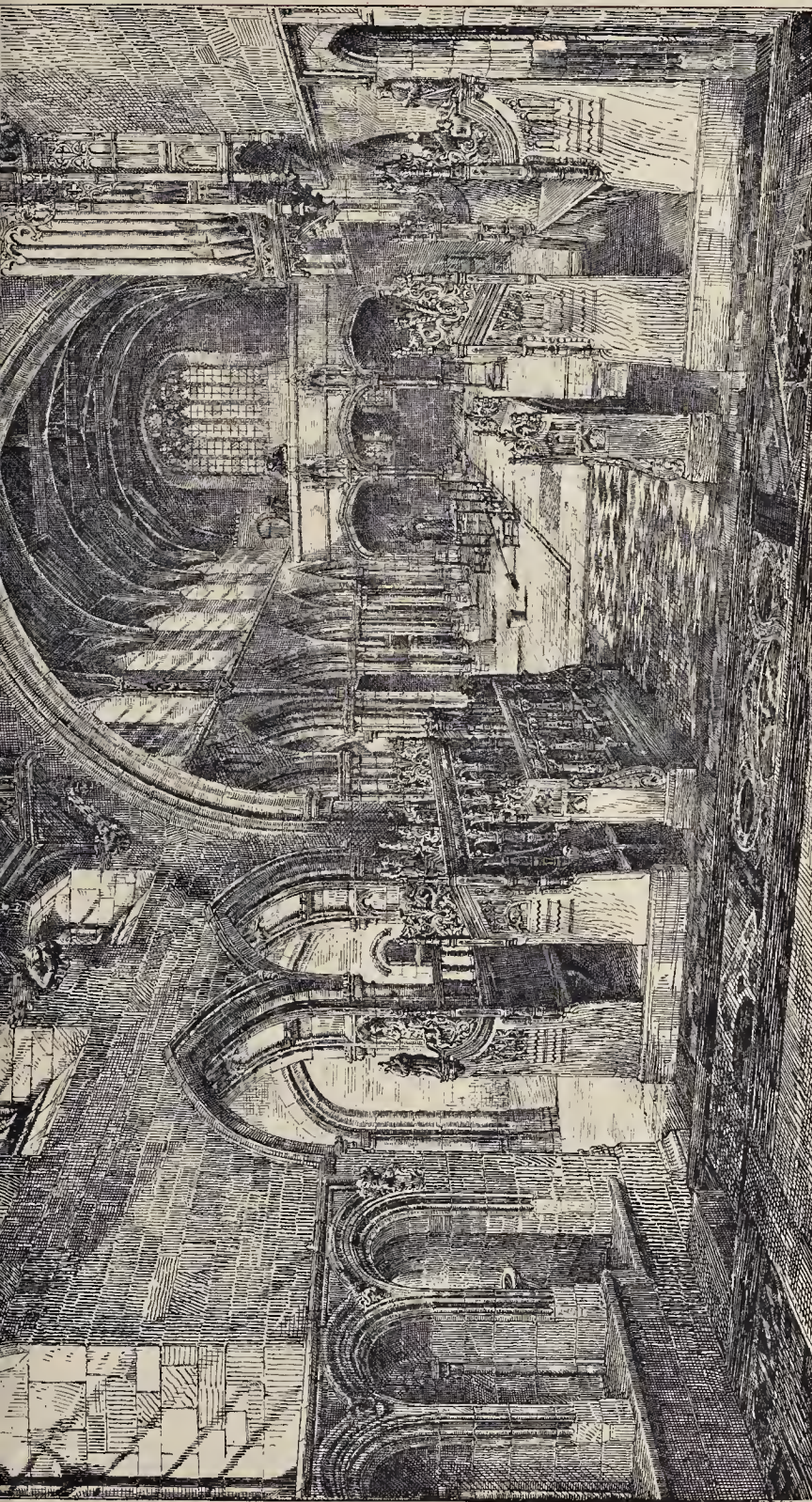
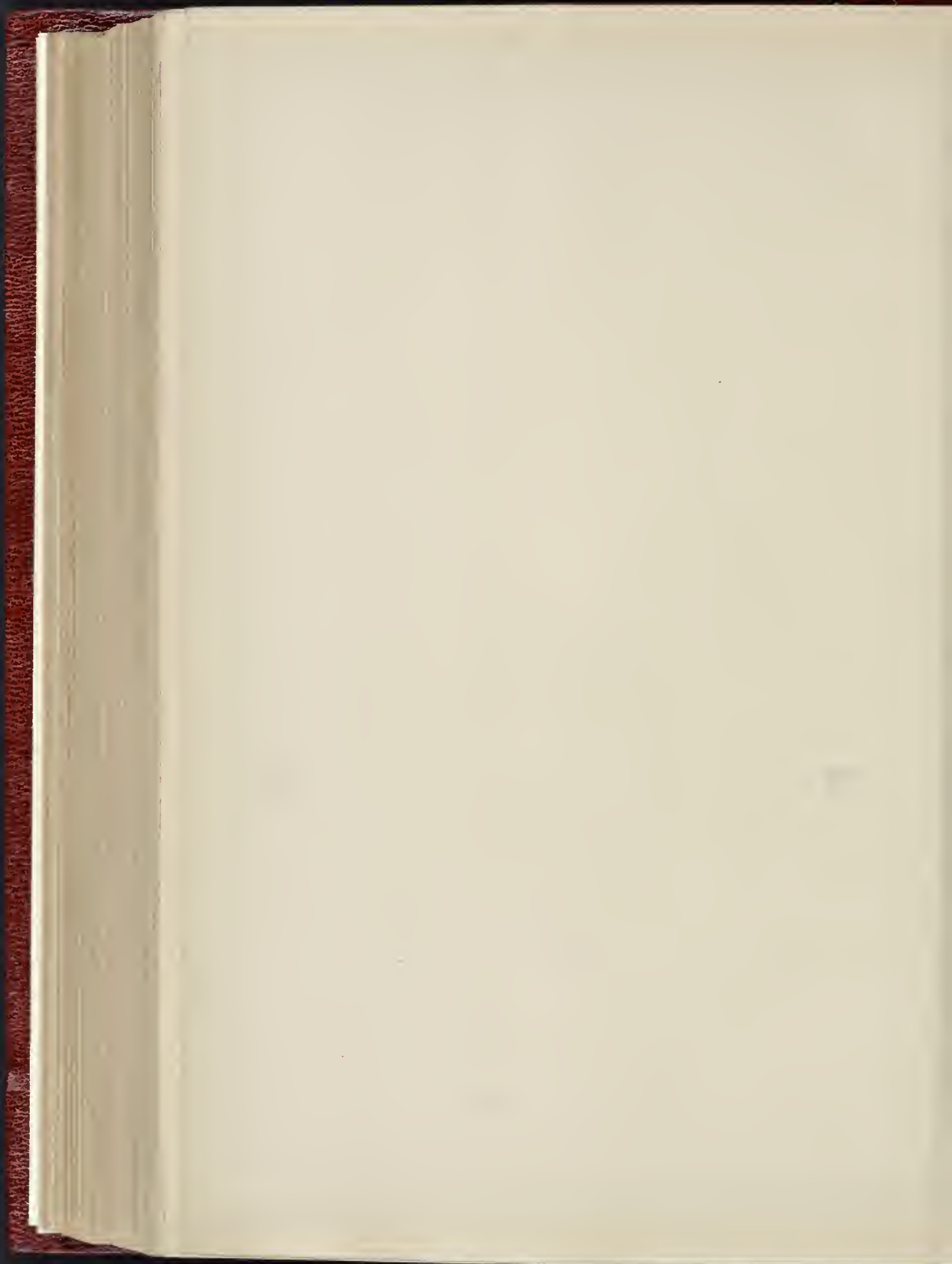


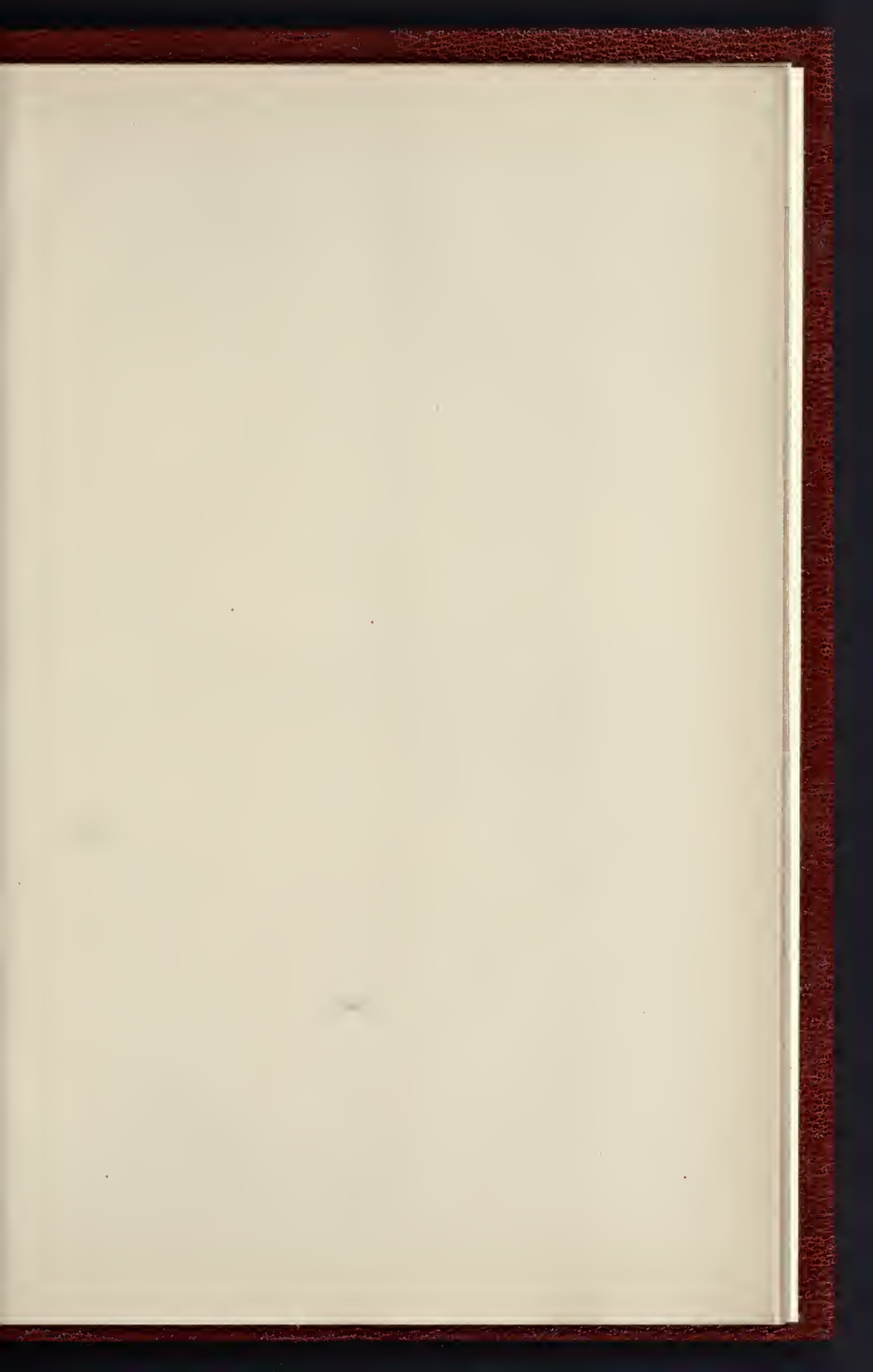
PHOTO. ALPH. BARRAUD, S. P.

ST. JOHN'S CHURCH, STANSTEAD-MONTFICHET.—MR. W. D. CAROË, F.R.I.B.A., ARCHITECT.

INTERIOR, LOOKING WEST.

No. 1942 Royal Academy Exhibition, 1890.





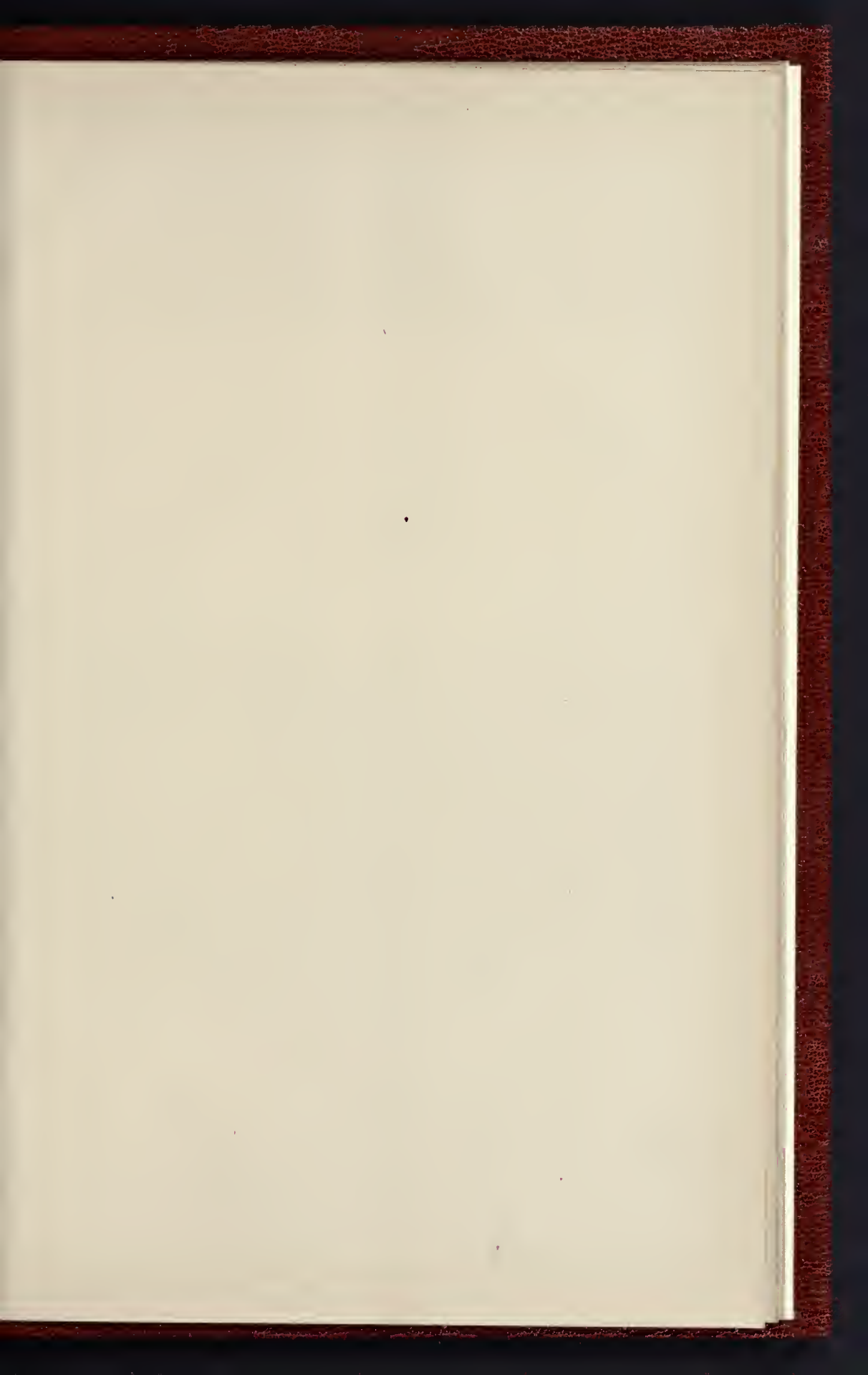


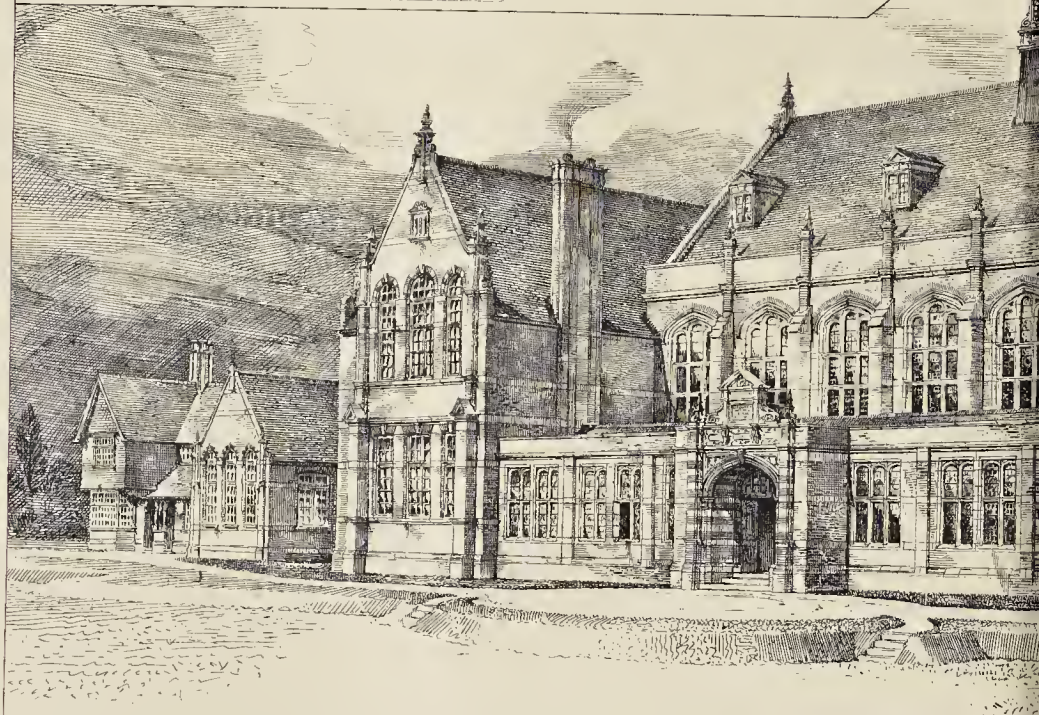
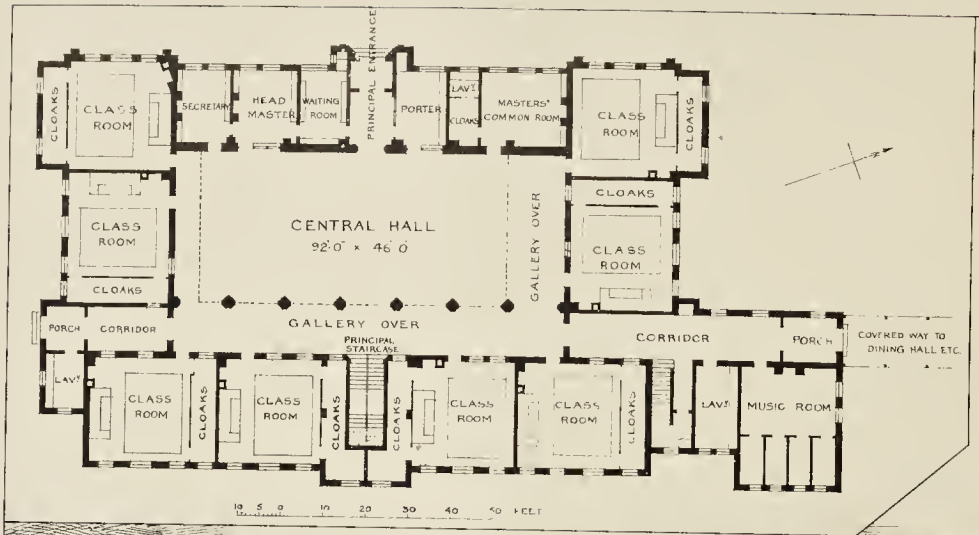
City of Sheffield Municipal Buildings

SELECTED DESIGN FOR SHEFFIELD MUNICIPAL BUILDINGS—MR. E. W. MOUNTFORD, F.R.I.B.A., ARCHITECT.

Scale: 1/4" = 1'-0" (1:30)

THE BUILDER. JUNE 28, 1890.





FIRST PREMIATED DESIGN FOR HYMERS' COLLEGE

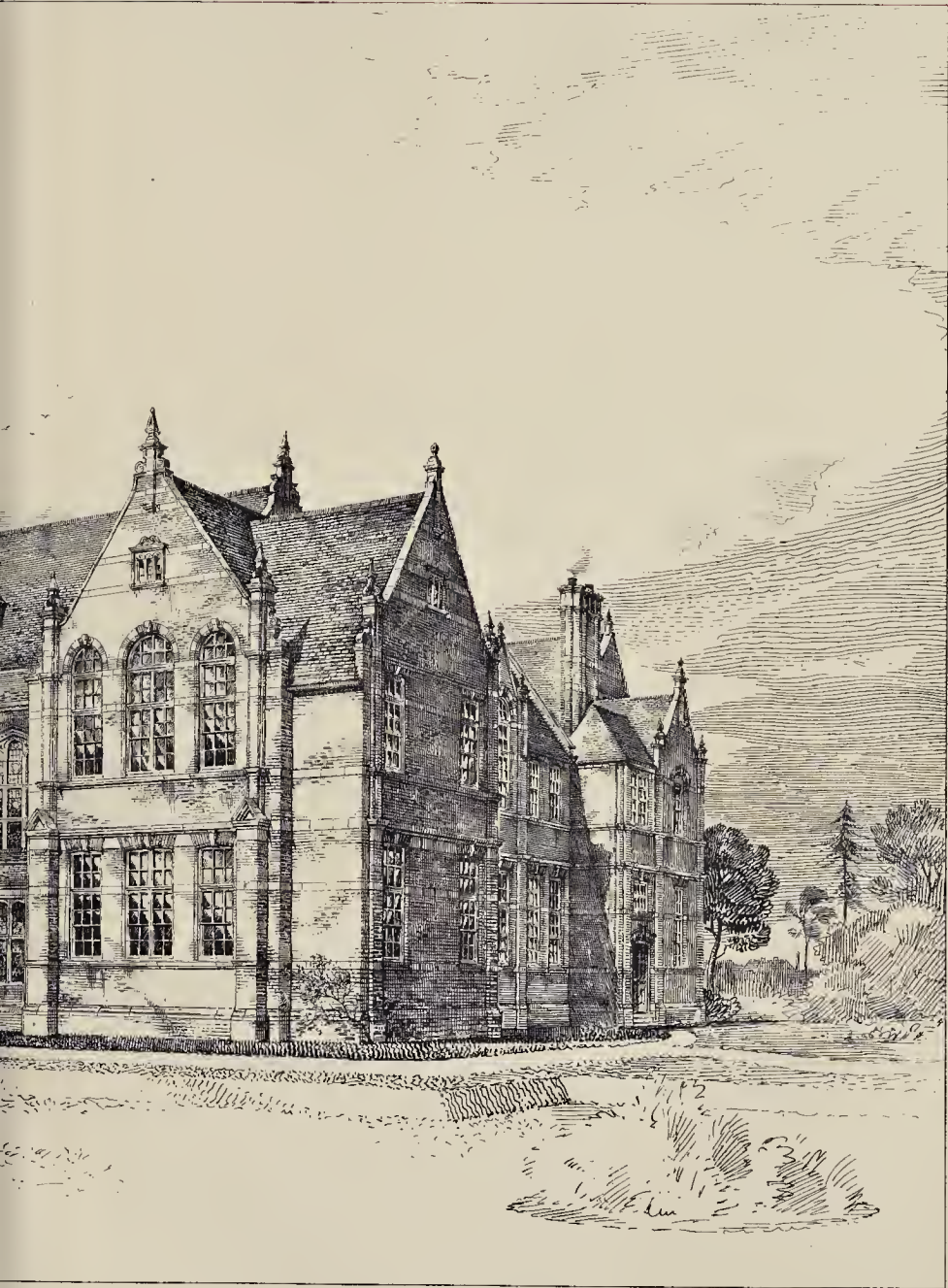
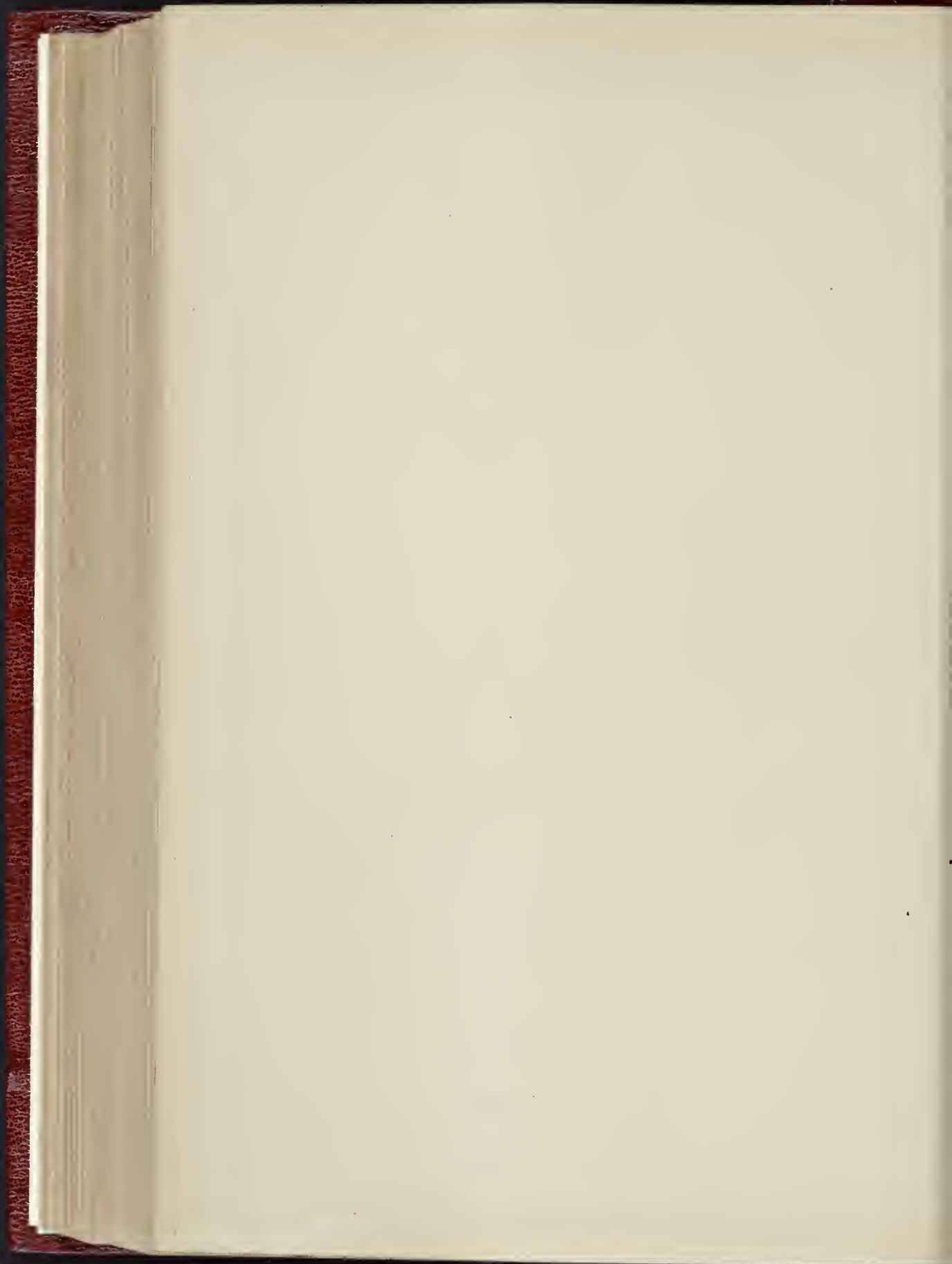


PHOTO LITHO. SPRUCE & CO. 22, MARTIN LANE, LONDON E. C.

LL.—MESSRS. BOTTERILL, SON & BILSON, ARCHITECTS.



shown upon both plans and elevations, and forming part of the general scheme will be an absolute improvement to the building, both internally and externally. Exclusive of corridors, 2,270 square feet additional space is provided, upon each of four floors, equivalent to twenty-eight new offices, each measuring 20 ft. by 16 ft.

Principal, or First, Floor.

This contains the Mayor's apartments and the rooms for Town Clerk, and is approached by four staircases, one on each entrance.

The principal staircase (8 ft. wide, with a rise of less than 6 in. to each step) leads direct to the Council Chamber and Mayor's reception-hall. The alteration in plan of this stair, in deference to your suggestion, is undoubtedly an improvement both to the staircase and hall, the latter being made much more open and dignified.

The Mayor's apartments occupy the whole of the Pinstone-street front, the three state rooms measuring together 157 ft. by 35 ft., exclusive of bays, with a clear height of 23 ft. These can all be thrown into one grand hall when required, and, if desired, the openings between them may be made very much larger than shown in plans.

A corridor, 11 ft. wide, well lighted by windows and lantern lights, as well as from the grand staircase, communicates with all these rooms, to facilitate the circulation of guests.

An open gallery, external from the Mayor's reception-room, is provided off principal entrance, and another, opening out of dining-room, at the corner of the Pinstone and Surrey-street fronts. These galleries, while adding considerably to the appearance of the principal front, would be extremely useful at elections or other similar occasions, as well as at large receptions or banquets.

The Council Chamber, approached directly from the grand staircase, occupies the centre of the site, measures 64 ft. by 39 ft. and is 30 ft. in height. It is lighted by two large traceried windows at each end, and three upon the east side. The ceiling is flat, with moulded and enriched panels. The drawings clearly indicate the suggested fittings, but, of course, these are open to any modification to meet the views of the Council.

The ante-room is shown to be lighted principally from above, and immediately adjoining are the gentlemen's cloak-room and lavatory, the ventilation of the latter having been carefully considered and numerous windows provided. The ladies' cloak-room is upon the opposite side of the grand staircase, and here again the lighting and ventilation of the lavatory is made as perfect as possible.

The various committee and sub-committee rooms are placed in one corridor, close to the Town Clerk and Council Chamber. The three large rooms adjoin the official or state apartments, and may be used on suite with them, while, by closing the Town Clerk across the corridor, near the head of the Town Clerk's stairs, these, with the other official apartments, are entirely severed from the departmental offices, and then only be approached by the grand stairs. These committee-rooms have, after the official rooms, the finest position in the building, and may, under ordinary circumstances, be readily approached from either of the four entrances.

A business room for the Mayor communicates with the suite of large committee-rooms on the one side, and the Town Clerk's office on the other, and is close to the Council Chamber.

The planning of this important department has been most carefully studied. The rooms are all close together, the Town Clerk's own rooms being placed between his general office and the Mayor's business room, and at the same time close to the Council Chamber and committee-rooms. The department communicates by means of the staircases, directly with the Surrey and Norfolk-street entrances, and is also accessible from the grand staircase, and that from Cheney-row.

Ground Floor.

The principal entrance from Pinstone-street is 20 ft. in width, and 16 ft. in height, having an inner glazed screen with swing-doors in addition to the outer doors.

Directly in front of entrance are the grand staircase and hall, the latter being 44 ft. by 40 ft. and 45 ft. high. The domed ceiling of the hall is surrounded by an arched lantern-light, having inner and outer skylights, the inner one paneled and filled with tinted glass. It is proposed to decorate the walls of this hall with tapestry or frescoes, representing scenes in the history of the town. The staircase would be of stone, with marble balustrade, and it is proposed to make the supporting columns also of marble, with moulded caps and arches of stone. The ball would be paved with marble mosaic.

The Borough Accountant's department extends from the left of the principal entrance to that from Surrey-street, being thus equally accessible from either. The general office is 32 ft. by 47 ft., exclusive of bay, and 16 ft. high. This remains as in the sketch design, but the arrangement of the minor offices has been somewhat modified in accordance with your supplemental instructions.

The Borough Accountant's room now opens out of his general office, being approached upon the other side thereof and mortgage office, which also opens out of the general office.

The strong-room is transferred to the Tower, where it is better placed for several reasons. It has the advantage of the thick walls of the Tower, is brought behind the counter instead of being upon the public side of it, and, requiring no windows, it allows the walls of the lower stage of the Tower to be left solid,—a great improvement, structurally and aesthetically.

Here follow descriptions of other rooms on this and the remaining floors.

Architectural Character.

"The style may most safely be described as Modern Renaissance, and as far as possible it is English in character and detail. So far as I know the design is as original as may be in the nineteenth century, that is to say, no existing building has been consciously copied either in whole or part, excepting, of course, in the matter of detail of doors, windows, &c.

My idea has been to obtain the dignity essential for the Municipal Buildings of a great town, combined with the utmost convenience of internal arrangement, and the largest possible amount of light for the interior. The first consideration has always been the convenience of plan, and in no case has this been sacrificed in order to improve the elevations. But these have not lost by this course of procedure, for, growing as they do naturally from the plan, they indicate externally the internal arrangements, and thus gain considerably in interest and variety. Throughout I have endeavoured to group the parts, so that they may look best in perspective, and upon this grouping, with its contrast of light and shade and general picturesqueness of sky-line, I depend for my effect.

Great ornamentation has been avoided, for the sum to which we are limited and the atmosphere of Sheffield unite in forbidding it. What carving there is about the building is in low relief, and confined almost entirely to the Pinstone-street front, while everywhere the ornament is concentrated in masses, and contrasted with broad effects of plain wall surface.

In looking at the site the necessity for a tower at the corner of Pinstone and Surrey-streets strikes one very forcibly. I have, therefore, placed mine there, where it will be conspicuous from all points, subdues into harmonious the opposite lofty buildings of the Yorkshire Penny Bank, and very conveniently separates the Pinstone-street front, with its lofty rooms, from the Surrey-street elevation and its lower offices.

The carving upon the Pinstone-street front I should propose to make of a distinctly local character, and would suggest the employment of Mr. Creswick, a Sheffield man, to carry it out. The frieze above the ground-floor windows represent six of the trades carried on in Sheffield. In the niches provided I should propose that statues of Gilbert, Earl of Shrewsbury; Sir Francis Chantrey, R.A.; James Montgomerie, the poet; Francis Hunsman, Mr. Henry Bessemer, and John Ruskin be placed, while the topmost niche of central gable would contain a statue of her Majesty the Queen, with the Arms of England upon the shield above her. The shields in the spandrels of the principal entrance would bear the arms of the town and diocese respectively, while those in the semicircular pediments on first-floor might have the arms of the Cutlers' Company and the Duke of Norfolk.

The elevations towards Surrey and Norfolk-streets and Cheney-row, as well as those towards the internal courtyards, have been as carefully studied as that to Pinstone-street, and are probably equal to it in merit. Upon the drawings they are shown as when completed, the future extension being drawn in lighter ink than the rest.

The Council-chamber is made the principal feature upon the south front (as seems desirable), and when completed this elevation will probably be the most successful of the four.

Heating and Ventilating.

I should propose to heat this building on the low-pressure system of steam heating. The boilers, placed in the heating-chamber shown on plan, would be of the Cornish type, with cross tubes and set in brickwork.

The principal divisions of the building would be heated by separate services, and every radiator or group of radiators would be separately governable by valves, so that any part of the building could be worked independently of the remainder.

In the Council Chamber and other large rooms the admission of fresh air would be arranged in connexion with the radiators, and, having regard to the Sheffield atmosphere, arrangements would be made for filtering the air before its admission to these rooms.

The hot-water circulation to the different parts of the building would be provided by heating water by steam in a copper vessel and conducting it thence to the various points where it is required, by copper pipes. This is an expensive process, but appears to be the most necessary by the nature of the water supply in Sheffield.

The architect estimates the cost of the building, at 103,700 cubic foot, as 80,150*l.*

He adds to this report the remark that the drawings should still only be regarded as sketches capable of improvement.

CHURCH OF ST. JOHN, STANSTEAD-MONTFICHET.

This drawing, which is exhibited in the Royal Academy of this year, shows the interior of a church of which exterior views were published in the *Builder* of August 10, 1889, and November 23 of the same year.

The architect is Mr. W. D. Caröe. The drawing is commented upon in the review of "Architecture at the Royal Academy" in another column. Nothing need be added to the description of the church which has already been published with the former illustrations.

HYMERS' COLLEGE, HULL.

THIS design was submitted by Messrs. Botterill, Son, & Bilson, of Hull, in the recent competition, and placed first by the assessor, Mr. E. C. Robins, F.S.A., who stated in his report that he considered it to be the only one which realised in every essential particular what he understood by the "Hall Passage" system. The general arrangement of the plan was definitely laid down in the instructions prepared by the assessor. Two floors of eight class-rooms each are grouped around a central hall, every class-room being entered directly from the hall or from the galleries which surround it on three sides. The administrative offices are placed beneath the hall windows on the fourth side, and the principal staircase is directly opposite the main entrance,—an arrangement by which the head-master's and porter's rooms command the entire hall with its entrances and staircase. The Classical school, on the ground-floor, consists of eight class-rooms for thirty scholars each, with a cloak-lobby screened off the end of each room, and entered from the class-room only. The class-rooms in the modern school (first floor) accommodate forty each, a floor-area of 18 ft. per head being allowed in both cases. A dado of cloak-lockers around the central hall provides accommodation for the cloaks of the modern school. In carrying out the design, it is proposed to omit the separate cloak-rooms on the ground-floor, and provide cloak-lockers for the scholars of both classical and modern schools, following the system adopted at St. Paul's School. A music-room with a drawing-school over, completes the main building. The dining-hall, with its kitchen offices, and a porter's house, were provided in a separate block, connected with the main building by a covered way. The latrines are placed to the east of the main building, opposite the end entrances. The materials proposed are red brick, with Ancaster stone dressings and red tiled roofs. The author's estimate for the main building, dining-hall, porter's house, and latrines was 14,970*l.*

THE ARCHITECTURAL ASSOCIATION.

At the adjourned special meeting, held on Friday last, there was a larger attendance than at the previous meetings; the whole of those present, however, were not members of the Association.

The President having announced that this, being a continuation of the former meeting, there would be no minutes, letters were read from Mr. William White, Past President; Mr. H. L. Florence, Past President; Mr. J. A. Gutch, Past President; and others, with reference to the object of the meeting.

Mr. Leverton and Mr. Douglas Mathews objected to the letter which had been sent out from the hon. secretary, Mr. Farrow, announcing the date of this meeting.

After some objections on the part of the leaders of the opposition, the real business of the evening commenced, and Mr. Brodie resumed the discussion, moving,—

"That the consideration of the alteration of Rule 43 be taken at an early date next session, and the remaining business proceeded with at once."

This, however, was not seconded, and the suggestion was dropped.

Mr. Garbutt moved as an amendment to the alteration of Rule 43 proposed at the last meeting,

"That all voting shall be taken by a show of hands, and the question decided by the majority, but no proposal involving any alteration of the Rules or Constitution of the Association shall be passed unless at least two-thirds of the members present agree thereto."

Messrs. Stannus, Needham, Wilson, Cole A. Adams, H. Surr, and A. B. Pite took part in the

discussion which followed, and this having become somewhat desultory owing to various suggestions having been put forward by some of the speakers, the President called attention to the fact that Mr. Garbutt's amendment was before the meeting, and that speakers must confine themselves to the discussion of that motion.

Mr. Stannus took the opportunity in discussing the amendment to urge his views once more, and was followed by Messrs. Earle, Mathews, Farrow, Hudson, and Fleming. Mr. Garbutt's amendment having been put to the meeting, and lost by a considerable majority, Mr. Stannus then proposed

"That a Special Committee be appointed by this meeting to revise the whole body of rules, and that all suggested alterations be referred to it, and that it shall report at an early date next session."

This was seconded by Mr. Cole A. Adams, and, after a brief discussion, in which Messrs. Brodie, Douglass Mathews, Slater, Millard, and Collard spoke, was carried by a considerable majority. The proposition of Mr. Stannus having been carried,

Mr. A. B. Pite moved:—

"That it is desirable that no question touching any alteration of the rules or constitution of the Architectural Association shall be decided upon at any meeting without first submitting such proposed alteration to each of the members, and furnishing each member with a printed voting paper."

This was seconded by Mr. Needham Wilson. On the question being put, the numbers voting on each side were equal,—36 for and 36 against,—under which circumstances the President declined to give the casting vote, and declared the proposition to be not carried.

It was then proposed by Mr. Bernard Dicksee, seconded by Mr. Stannus:—

"That the Special Committee consist of not less than nine members, five to form a quorum."

This was put to the meeting, and carried.

Mr. Stannus then suggested the following list of nine members, which was seconded by Mr. Dicksee:—Messrs. J. Slater, Cole A. Adams, A. B. Pite, F. R. Farrow, H. Sirr, R. Phené Spiers, H. W. Pratt, Leonard Stokes, and H. Stannus. Further additions were then suggested by various members: Messrs. T. E. Pryce, Needham Wilson, Max Clarke, W. J. Leverton, and Professor T. Roger Smith, being duly proposed and seconded.

It was then proposed by Mr. A. B. Pite, and seconded by Mr. Dicksee,—

"That the original nine members proposed by Mr. Stannus be appointed as the Special Committee."

Mr. Mathews proposed, and Mr. Pite seconded,—

"That nine, and nine only, be the number of the Committee."

Mr. Stannus then proposed, and Mr. Dicksee seconded,—

"That the original nine be asked to serve, and that any refusal be made up from those proposed subsequently."

This being put to the meeting as a resolution, was carried.

Mr. Stannus then proposed a vote of thanks to the President for the manner in which he had fulfilled the duties of his office during the year, which was seconded by Mr. Leverton, and carried by acclamation, and the proceedings then terminated.

THE ARTISTS' BENEVOLENT FUND.

The eighty-first anniversary dinner in aid of this Fund was held on Wednesday evening last at the Freemasons' Hall, Sir Richard Temple, Bart., G.C.S.I., & Co., in the chair. Amongst those present were the Earl of Derby, Mr. C. B. Birch, A.R.A.; Mr. T. Brock, A.R.A.; Mr. C. B. Dimond, and Mr. C. Purdon Clarke.

The "Artists' Fund" was established in 1810, and consists of two branches—the Annuity Fund and the Benevolent Fund. The former is raised and supported by the contributions of its members for their own relief in sickness or old age, and does not receive any assistance from the general public. The latter is purely charitable, having for its object the relief of the widows and orphans of such members of the Annuity Fund as may die without leaving them an adequate maintenance. The claims of all those who are entitled to the benefits of the society are admitted as soon as it appears that they stand in need of help, and the numbers are unlimited. The annual sums payable to those in the greatest need are supplemented by donations, and by the interest on benefactions and legacies made in former days. During the past year forty-nine widows and sixteen orphans received annuities amounting to 1,077. Since

the institution of the Fund a sum amounting to upwards of 53,000*l.* has been distributed in relieving distress. The society is under the special patronage of, and receives liberal support from, her Majesty the Queen.

Sir Richard Temple, in proposing "Prosperity to the Fund," referred to its twofold character, and pointed out the sound economical basis on which it worked, since it was the principle of the founders that charity should follow self-help. The claims of the society upon the alms of the public rested on the recognition of the value of art to the nation, educationally and in other ways. After speaking of the value of drawing to architects and engineers, he referred to the great architectural works of the Middle Ages,—works which he said were produced by men who were artists first, architects afterwards, and then civil engineers. Unfortunately in these degenerate days the order was too often reversed, a man becoming a civil engineer first, and then an architect, and finally taking his chance of becoming an artist,—a chance which was often very remote. For his own part he believed that art was a great addition to the happiness of the country; that it conducted to a proper view of religion; and that it assisted in a very large degree to raise people in the scale of civilisation.

The Earl of Derby, the President of the Fund, responded. He remarked that he was scarcely the right person to do so, but took confidence from the fact that it was a curious custom of the English always to allot important functions to those who knew little or nothing about them. He had personally no closer connexion with art than could be gained from a very sincere admiration of, and sympathy with, those who followed its laborious paths. It was often asked why, when pictures were sold at higher prices than ever before, and when the status of art and artists was so much improved, such a society as that which they were met to support existed. It was, indeed, true that very large sums were sometimes given for paintings; but he noticed that such paintings were usually the works of dead artists. Even if it were the fact that the prizes of the artistic profession were greater than they had ever been, that would almost constitute the chief reason for the continued existence of the Fund. When any profession was exceptionally favoured and successful, the result was that many more men were tempted into it—some, indeed, well qualified, others with no qualification except a strong desire to succeed. He thought there ought to be, and he was glad to think that there was, a real feeling of sympathy for those who, while possessing a true love for art and doing their best, had not been successful. Lord Derby concluded by giving "The Health of the Chairman."

Other toasts followed, including "The Artists' Annuity Fund," which was proposed by Mr. T. W. Wheeler, Q.C., coupled with the name of Mr. Thomas Brock, A.R.A., who, in responding, said that during the eighty years of its existence the Annuity Fund had disbursed 100,000*l.* to its members, and it now had a reserve of upwards of 17,000*l.*, so that it was in a sound condition financially.

During the evening, a list of subscriptions and donations, amounting to nearly 600*l.*, including a donation of 100 guineas from the Queen, was read by the Secretary, Mr. Lambton Young.

Industrial Schools, Shustoke.—An extension to accommodate 100 additional boys at the Industrial Schools, Shustoke, for the Corporation of Birmingham, is now being carried out by Mr. Daniel Arkell, architect, Birmingham, and will comprise a new large school-room, or an assembly hall, that will hold the whole of the boys. This will be carried out with a Renaissance treatment, the inside walls to have coloured glazed bricks as a dado, and red-brick facing above; a wrought moulded groined open timbered roof; and a large clock tower and bell turret carried above at the end next of the road. A stage is provided at the one end of the school, with ante-rooms adjoining; access is obtained to each by an underground corridor. The heating apparatus is in the basement. At the opposite side of the quadrangle is a large swimming-bath lined with glazed brick and heated by steam; the bath is provided with dressing-rooms, and adjoining is the officers' room, with the board room and Master's office over. The builder is Mr. William Hopkins, of Latimer-street, Birmingham. The works will cost between 3,000*l.* and 4,000*l.*

ARCHITECTURAL ASSOCIATION VACATION VISITS:

II.—AUDLEY END AND SAFFRON WALDEN.

On Saturday last the second Vacation Visit was made to Audley End and Saffron Walden. A party of about twenty members, including the President, assembled at Liverpool-street Station and proceeded by the 2.30 train to Audley End Station, where they were joined by two of their members who had ridden down on a tandem tricycle. A walk of twenty minutes brought the house into view from the road, while in the distance beyond, the tower and spire of the church of Saffron Walden could be recognised.

The name of Audley has only been associated with the locality since the sixteenth century, as will be explained by the following outline history of the Manor of Walden.

In the time of Edward the Confessor Walden (or Waledon) belonged to Ausgar, Master of Horse to that King. William I. granted it to Geoffrey de Mandeville, together with 117 other lordships, including thirty-nine in Essex, for his distinguished services at the Battle of Hastings. He commenced his castle here, the ruins of which still exist, and were visited by some of the party, although nothing remains of the house or residence connected with it. But it is probable that it was the building that we find referred to by the Patent Rolls of 1343, which Humphrey de Bohun, Earl of Hereford and Essex, obtained licence to enclose. In the time of Stephen the representative of the Mandeville family fell into disgrace from his mercenary and treacherous conduct, and, after being captured by the King, was compelled to give up the Tower of London, of which he was Constable, and also the castles of Pleshy and Walden. He then placed himself at the head of a robber band, and, after attacking and robbing Ramsey Abbey in order to pay his men, he laid siege to Burwell Castle, belonging to the same religious house. Owing to the heat he exposed himself without protecting his head, and was shot by an arrow. As he was under sentence of excommunication at the time, the Knights Templars placed his body in a leaden coffin, which they hung on a tree in their orchard until the sentence was annulled, when he was buried in the churchyard of the New Temple.

The title and property was restored by Henry II. to Geoffrey, second son of the last-mentioned nobleman, but on his death without issue in 1189, there was considerable controversy as to the rightful heir. William FitzPiers, who was a member of the family, and also Chief Justice at the time, managed to obtain the estates by agreeing to pay at once the sum of 7,000 marks offered in instalments by one of his kinsmen (it is said, however, that he never paid more than 3,000*l.*)

On the accession of Richard III. Henry, Duke of Buckingham, who had inherited a portion of the property, obtained a grant of the whole, but this was not confirmed by Parliament, which did not meet till after his attainder and execution. Historians think that the defection of the Duke was owing to the King's breach of faith, and it seems probable that this was the view which Shakespeare took when he makes him say:—

My Lord, I claim the gift my due by promise,
For which your honour and your faith is pawned,
The Earl of Hereford, and the noble knights,
Which you have promised I shall possess.

Rich. III., act IV., sc. 2.

From this time the manor of Walden was absolutely held by the Crown till 1538, when Henry VIII. granted it, together with the dissolved Abbey of Walden and many of the estates belonging to that foundation, to Thomas Audley, Speaker of the House of Commons, in exchange for land in Hertfordshire, and as a reward for his services in connexion with the Bill for the suppression of the smaller monasteries; he was rapidly promoted, and after being knighted became Lord Keeper, and next year Chancellor. He now undertook the larger measure of suppressing the larger monasteries. He was made K.G. 1538, and is said to have been the first Chancellor who obtained this distinction for other than military services. On the death of Lord Audley, his daughter Marjorie succeeded to his possessions. She afterwards married the Duke of Norfolk, but during the reign of Mary he received no recognition, having been brought up as a Protestant, Fox, the martyrologist, being his tutor. Audley's daughter was his second wife, and on her death

he married again, but being left a widower for the third time, he conceived the project of an alliance with Mary, Queen of Scots, which, of course, placed him in danger. It is said that Elizabeth once hinted to him "To beware on what pillow he rested his head."

He, however, continued to plot against the Queen, and was arrested, but released on a promise not to offend again; this he broke, and was beheaded 1572.

His son Thomas was restored in 1583, and served in the fleet under his kinsman Charles, Lord Effingham, against the Armada. He was created Baron Howard of Walden, and K.G. James I. made him Earl of Suffolk and Lord Chamberlain, and it was in the execution of his duties in the latter office that he discovered the preparations made by Guy Fawkes for the Gunpowder Plot.

It was this nobleman that built the house. The work was commenced in 1603, and completed about 1666, at a cost of 190,000*l.* In 1669, James, the third earl, sold the property to Charles II. for the sum of 50,000*l.*, 20,000*l.* of which was to be provided by the Hearth-tax. In 1691 this money had not been paid, so William III., who was anxious to get this tax repealed, agreed to restore the house and other properties to the representatives of the family, if they would agree to cancel the debt, which was done.

Among the earlier historians of Audley End there appeared to be some doubt as to who was employed as the architect of this famous house, the names of both Bernard Jansen and John Thorpe being mentioned in connection therewith, while it was also stated that a model in wood was obtained from Italy. The late Lord Braybrooke, who was the author of a very exhaustive history of Audley End, with the manor and parish of Saffron Walden, devoted considerable attention to this subject, and after studying the book of Thorpe's designs, then in the possession of Sir John Scane, came to the conclusion, from the similarity of the plans and many of the sketches for detail, that there was no longer any doubt that Thorpe was engaged upon it, although it seems very probable that his noble client took a large share in the direction of the work. The original plan embraced two quadrangles, the first of which extended in front of the present building, the existing entrance-front forming the fourth side; the three others were pulled down by the advice of Sir John Vanbrugh. It should be mentioned that there was an entrance gatehouse in the river front, forming a central feature which is somewhat wanting in the existing facade.

In 1750 the gallery forming the eastern side of the inner court was pulled down.

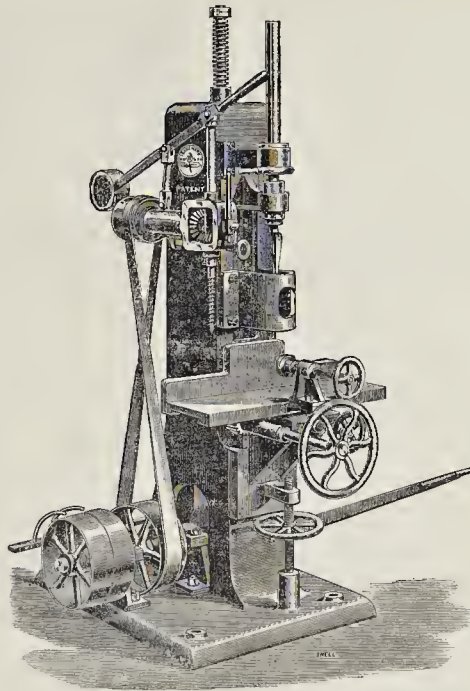
The remaining portion therefore consists of three sides of the inner quadrangle, the hall occupying a central position in the principal front, between the two entrance porches. The stone screen which is at the northern end of the hall is a fine specimen of Jacobean carving.

At the south end of the hall two flights of stairs lead to the drawing-room and the other principal apartments on the first floor. The features most worthy of note are the elaborate plaster ceilings, in some cases with pendants, but in others with simply a flat ribbon pattern, while the chimney pieces show some good carving and heraldry.

The private chapel is decidedly disappointing. It is nothing more than one of the ordinary oblong rooms in which side aisles have been formed by means of thin attenuated columns supporting pointed arches all in the most meagre neo-Gothic.

The fittings in the library are of a later date than the house, and may possibly be the work of Vanbrugh, who, as mentioned above, was employed for some time on alterations to the house. Externally, the house shows considerable signs of restoration, the two porches being perhaps the most interesting part of the front. The angle turrets, with their green copper roofs, are probably similar to the original ones, but appear from the somewhat heavy character of some of their details to have received considerable modification.

On leaving Audley End the party proceeded to Saffron Walden, and visited the fifteenth-century church, which is of large size, and contains some good brasses and other features of interest. The market square, with its Town Hall by Edward Bagnall, and the Bank by Nesfield, excited considerable attention, while several of the visitors were attracted by the old half-timber and plaster work of some of the houses in the town, which are worthy of study.



Reynolds's Power Mortising Machine, with Boring Attachment.

PATENT POWER MORTISING MACHINE WITH BORING ATTACHMENT.

Messrs. F. W. REYNOLDS & Co., engineers, have lately designed and patented a power mortising machine to work upon what is claimed to be an entirely new principle. The machine is capable of mortising through 11 in. to a width varying from 1/2 in. to 1 in. The chief features of improvement are the means used for actuating the chisel-bar, and the arrangement of foot-lever for bringing the chisel down into the work. The great difficulty experienced by engineers for years past has been the arrangement of a mechanical motion whereby a vibrating-chisel can be made to descend, whilst vibrating, by means of a hand or foot lever, and do its work upon the mortise without jerking or throwing the resistance to the blow upon the arm or foot of the operator. Messrs. Reynolds & Co. consider that by their patent these difficulties are entirely overcome. Instead of connecting the chisel-bar to the driving-shaft by means of complicated levers, as in the old style of machine, the connexion is made simply by a leather belt working in the interior part of the frame, and so arranged by passing over two pulleys that it vibrates the chisel with a stroke of 6 in., and also allows it to descend 9 in. when brought down to its work. The blow of the chisel, which works at a speed of from 250 to 300 strokes a minute, is modified by the spring of the belt, and there is consequently less danger of breakage. The foot-lever, for bringing the chisel down, is connected to this interior belt by means of a compound link, which throws the resistance and strain of the working on the frame of the machine instead of on the foot.

The bed for holding the work is made to rise and fall, and has the ordinary longitudinal and transverse motions. A pressure-plate and screw can be used for holding heavy work, and adjustable clips can be substituted for mortising sashes and similar light work. A guard is provided for placing over the chisel when vibrating at its highest point, which effectually prevents any damage to the work whilst it is being placed in the machine. The guard, however, is made so that it can be instantly lifted off without unscrewing any bolts or nuts. For re-

versing the chisel there is a simple arrangement which will turn the chisel for mortising in the opposite direction whilst the chisel is either in motion or at rest. A screw at the back of the machine is supplied for tightening the interior connecting-belt, and the tightening can be done, if required, without stopping the machine.

THE LONDON COUNTY COUNCIL.

THE ordinary weekly meeting of the London County Council was held on Tuesday afternoon at Spring-gardens, Lord Rosebery in the chair.

The Housing of the Working Classes: The Guinness Trust.—The adjourned Report of the Housing of the Working Classes Committee contained the following paragraphs:—"Your Committee reported to the Council on December 17 last that they had received a letter from the President of the Local Government Board, stating that the trustees of the Guinness Fund would be glad of any assistance the Council might be able to give them, as regards sites in its possession, or others which it might propose to acquire, and that they had addressed a reply to Mr. Ritchie to the effect that the Committee had learned with great pleasure the wishes and intentions of Sir E. Guinness, and would carefully consider in what way assistance could best be given to the Trustees, and had suggested the desirability of a conference on the subject. On December 18 the Trustees replied, thanking the Committee for their suggestion, and inquiring whether the Cable-street, Shadwell, site was for sale, and, if so, upon what terms. A conference was held on February 3 between the Trustees and six members of the Committee, at which the subject was discussed in all its bearings; and on February 22 the Trustees were informed that, without prejudice to future negotiations, the Committee would be prepared to recommend the sale of the three plots in the Cable-street scheme at a price named per square foot, upon condition that 970 persons of the working class were re-housed in dwellings not more than four stories high, that if a portion only of the area were acquired, a higher price should be paid for the land, and that the plans should be submitted to the Council for approval, and be

subject to a general observance of the building conditions approved by the Council on December 3. On February 26 the Trustees replied, stating that they were prepared to negotiate for plot A on the basis of the price named for the whole site, and to re-house the required number of persons, but were unable to comply with the stipulations as to the building regulations or as to the approval of the plans, as they desired to remain largely freehanded in making their practical experiment. The Committee answered this communication on March 10, pointing out that the building regulations had been approved by the Council after careful consideration, and expressing their opinion that it was absolutely necessary that plans of buildings to be erected on land, in dealing with which they were directly responsible, should in all cases be submitted for the approval of the Council. The Committee at the same time expressed their great anxiety to afford all possible assistance to the trustees. The Trustees replied on March 26, stating that they were willing to submit plans for approval, but were unable to comply with the general building regulations; and on April 14 the Committee pointed out to them in reply that the price of the land had been fixed at a specially low figure in order that satisfactory buildings might be erected, and expressed their willingness to consider on their merits any plan submitted to them. Your Committee have now received a communication from the Trustees in the following terms:—

"THE GUINNESS TRUST.
17b, Great George-street, Westminster, S.W.,
May 22, 1890.

SIR,—I am directed by the Guinness Trustees to inform you that they have to-day had under their consideration the letter of April 14, from the Housing of the Working Classes Committee.

The Trustees are greatly obliged to the Committee for the assurance that, in the event of their submitting plans for building on the Cable-street site to the Committee, they will be considered on their merits, but as the Trustees have now obtained all the sites on which they are at present prepared to build, they are not in a position to treat for the site in question.

The Trustees regret there should have been any misunderstanding as to the requirements of the Committee, but they concluded from the communications they had with the Committee, that the general regulations of the Council were indispensable.

Yours faithfully,
(Signed) THOS. H. VICKERS, Captain,
H. De la Hooke, Esq., Secretary,
Clerk to the London County Council.

Your Committee report the above facts for the information of the Council.

"The Home Secretary, as already reported, has signified his consent to the modification of the Cable-street scheme, and to the arrangement with the School Board for London for the extinction of their right-of-way into Chancery place. Your Committee think that the land should now be offered for sale, and they recommend,—

"That the Corporate Property Committee be instructed, as soon as the necessary modifying order has been received from the Home Office, to offer for sale by auction the vacant land comprised in the Cable-street scheme, with a view to the erection of artisans' dwellings, four stories in height, for the accommodation of the 970 persons required to be re-housed."

The recommendation was agreed to, after some discussion.

The London Sewage Sludge.—The Main Drainage Committee reported as follows:—

"Your Committee hoped before this to have received the report of Sir Benjamin Baker and the Chief Engineer upon the sewerage system, and upon the approximate cost of conveying the sewage to an outfall upon the coast. But your Committee do not now expect that this report will be received before the recess, or that it can be in the possession of the Council in time to admit of Parliamentary notices being given in November if any scheme shall be recommended and accepted requiring such procedure. Your Committee are therefore forced to the conclusion that no alternative system, if such were constructed, could be in operation before the expiry of six years from the present time. Meanwhile, they are assured that the Crossness works will be completed and in full operation next summer. These conditions have led your Committee to consider the provision of another sludge-vessel. Improvements and experience have brought about a reduction in the volume of sludge by lessening the percentage of water carried away and discharged at sea, and it might be possible for the two vessels, upon a system of continuous working, together with the auxiliary force of pressing machines which are to be set up at Barking, to deal with the whole of the sludge made at the Barking and Crossness outfalls.

But in the event of serious accident to either of the vessels at a time when the boilers of the other ship were being cleaned, the whole of the crude sewage must be poured into the river. Your Committee have met with no success in their efforts to obtain assistance by hiring vessels. If the preliminary work of preparing plans and revised specification and the advertising for and obtaining tenders is deferred till after the vacation, it may not be practicable to get the vessel built and ready at the time of the opening of the Crossness works. The condition of the metal market and of shipbuilding renders the present time very favourable for placing such an order, and when the tenders are opened, the Council will probably be in possession of the report of Sir Benjamin Baker and the Chief Engineer, and will be able then to determine whether it is desirable to contract for the construction of the vessel. In these circumstances your Committee recommend—

"That tenders be obtained for the construction of a sludge vessel upon the model of the older and less costly ship, with certain modifications to be described by the Engineer."

Mr. Eneas Smith moved an amendment which proposed to refer the matter back to the Committee, to be brought up again when Sir Benjamin Baker's report should be in the hands of the Council; but after a long discussion, the amendment was negatived, on a division, by 34 votes against to 28 for, and the report of the Committee was then adopted.

London Water Supply.—The Special Committee on Water Supply and Markets reported as follows:—

"We have received a communication from the Town Clerk of the City of London to the effect that the City Corporation has by a Committee entered upon a public inquiry on the question of water supply, and that the Corporation will be glad if any member of the London County Council will attend the sittings. We consider that upon the question of the water supply of London it is most desirable that there should be united action on behalf of the County, and with a view to securing it we submit the following recommendation:—

"That the Special Committee on Water Supply and Markets be authorized to enter into communication with a Committee of the City Corporation with a view to the promotion next Session jointly by the Council and the Corporation of a Bill for (a) Revising the method by which the Water Companies now charge on a basis of rating; (b) giving power to the Council and the Corporation jointly to establish an independent water supply to the County of London."

This was agreed to, and, after transacting further business, the Council adjourned.

"A PLEA FOR THE IMPROVEMENT OF SIX- AND EIGHT-ROOMED HOUSES."

SIR,—The casual plan of mine you were good enough to publish (p. 437, *ante*), and to which your correspondents refer, is to no scale; and so it is manifestly unfair to criticise its scintillations. The original was drawn double the size of Mr. Knightley's for the purposes of reduction.

Permit me, however, to add that what I submitted was Mr. Knightley's "everlasting plan" re-arranged; and surely our resources are not exhausted with the alternatives on page 399.

The plaintive melody of Mr. Knightley's outcry, together with the flaunting of such mediocre plans, recalls the challenge of Bombastes concerning his boots.

WILLIAM A. PITE.

June 21, 1890.

THE SYMBOLISM OF THE PASTORAL STAFF.

SIR,—I cannot agree with Mr. Bagnall (p. 455, *ante*) in his explanation of the examples I have given respecting the alleged symbolism of the pastoral staff. So far, at least, as my experience goes, rather than being exceptional, it is the rule to find monastic effigies grasping the staff with its head turned outwards.

As is well known, the examples of sepulchral abbatial effigies are very limited in number, and some are too much mutilated to be of use in the point now under consideration. Of those fairly perfect, with which I am acquainted, I know but two having the staff turned inwards,—one at Peterborough, the other at Folesworth; besides these, with the staff turned outwards, besides those already given, we have two at Westminster (Abbots Crispin and Estesney), and two more at Peterborough, making six in all. Thus, if there be any significance in regard to the disposition of the staff, now current.

I may add, too, that in the case of ecclesiastical seals, both episcopal and conventual, we find the

staff sometimes turned towards, sometimes away from, the effigy; no order whatever being observed with reference to this distinction.

I have no opportunity of examining the grave-stones at St. Albans, but believe they would be found to bear out my contention. Though the brasses may have been purloined, the matrices will afford evidence equally valuable to anyone interested in making an investigation with reference to the matter in point.

Perhaps at some future time, I may, with your permission, deal somewhat more fully with this subject.
HENRY LITTLEHALES.

MECHANICAL ENGINEERS.

SIR,—Will any of your readers inform me if there are any county or other boarding schools where boys, in addition to the usual routine of a commercial education, are prepared for the calling of a mechanical engineer? And does the Institution of Mechanical Engineers examine youths presented from any of the above schools, and issue certificates? If it does, and any of your readers would kindly give the names of the most successful ones, it would be valued. Or is there any better way of fitting a youth for such a calling? The fees would have to be moderate.
A. B.

SPRAY JETS FOR WASHING.

SIR,—In your issue of June 7, your correspondent "W." asks for particulars of the washing apparatus referred to by Sir Edwin Chadwick in his address to "The Association," at Leamington. The inventor is Mr. W. Bartholomew (Messrs. B. Finch & Co.), 82, Belvedere-road, Lambeth, S.E.

I enclose a circular of the spray bath mentioned.
SAMUEL C. LEGG,
Hon. Sec. Association of Public Sanitary Inspectors of Great Britain.

** We printed a note a fortnight ago [p. 435] from Messrs. Doultou, stating that they had made the form of bath in question for Sir E. Chadwick. That referred to by Mr. Legg, as illustrated in the circular enclosed, is a kind of cupboard with folding doors, into which the bather steps, and regulates the spray, by two valves, to any desired temperature. The sides can be made of marble, slate, glass, or waterproof canvas.

DISSENTING CHURCH BUILDING NEWS.

Prescot (near Liverpool).—Designs prepared by Mr. Thomas W. Cubbon, architect, Birkenhead, have been adopted for a new Congregational Memorial Church and Schools, about to be erected in memory of the late Mr. Richard Evans, of Haydock, by his daughter, Miss Ruth Evans. The buildings are being erected at "The Holt," Prescot, on a site containing about 3,000 square yards fronting the main road to Rainhill, and will include a church providing seating accommodation for about 650 on the ground floor, having organ-chamber, vestry, cloak-room accommodation, &c., in connexion therewith; also school buildings, including large assembly-room for about 300 children, having four class-rooms at the rear, each for about eighteen scholars. The buildings will be decorated Gothic in character, the church being cruciform on plan, having transepts and chancel, the latter being fitted with rostrum and communion. Three main entrances are provided. The clearstory will be carried upon moulded arches and octagon pillars having moulded caps and bases which, together with chancel and other internal arches, will be of Cefn stone. The whole of the buildings will be faced externally with local red sandstone. A tower and spire occupies the south-west angle of the building, and reaches an altitude of over 120 ft. The schools, which harmonise with the larger building, have an octagon bell turret to the right of the main gable, from which it is corbelled out and carried upon red granite shafts. The whole of the internal woodwork will be of pitch-pine, varnished, the windows being filled in with enriched cathedral lead-lights. A contract has been entered into with Messrs. Hughes & Stirling, of Bootle and Liverpool, whose tender was the lowest submitted in a limited competition. The buildings will be erected under the personal supervision of the architect, whose designs were selected from a large number submitted for approval.

Penryn (Cornwall).—The Trustees of the Wesleyan Methodist Society of Penryn, Cornwall, have accepted the plans prepared by Mr. J. Wm. Trounson, F.R.I.B.A., Penzance, for their new chapel and school buildings. The estimated cost is 3,500.

Liverpool.—Mr. Alfred E. Grindrod, heating and ventilating engineer, of Dovey-street, Liverpool, has been successful in competition

for the beating of the United Methodist Free Church and Schools, Grove-street, Liverpool, and he has just completed the erection of his improved hot-water heating apparatus there.

CHURCH BUILDING NEWS.

The Quinton (Worcestershire).—On the 19th inst. Christ Church, The Quinton, was re-opened, after restoration and re-arrangement, by the Hon. and Rev. Canon Pelham, rector of Lambeth, formerly rector of Halesowen. The works have been carried out under the superintendence of Messrs. Osborn & Reading, architects, Birmingham, by Messrs. J. Smith & Sons, contractors.

Birmingham.—A reredos has been placed in the Church of St. Catherine, Nechells, Birmingham, as a memorial of the first vicar of the parish, the late Rev. T. H. Nock. The dedication was on Saturday last, when a sermon was preached by the Bishop of Worcester. The reredos is oak in panels, having carved, canopied, and crocketed gables between buttresses, and has been constructed by Messrs. Jeffrey & Son, from designs by Messrs. Osborn & Reading, architects, Birmingham.

ROMAN CATHOLIC CHURCH BUILDING NEWS.

Crewe.—A new Catholic church has just been commenced in St. Mary's-street, Crewe, from the design of Messrs. Pugin & Pugin, of 117, Victoria-street, Westminster, S.W. Messrs. Treasure & Son, of Shrewsbury & London, are the builders.

Herne Bay.—The new R.C. church of "Our Lady of the Sacred Heart" was opened on the 26th inst. The plan consists of nave, sanctuary, baptistry, and two aisles, and contains three altars and two confessionals. There is a priest's sacristy, with organ-chamber over. In addition there is a large refectory for the community, with choir over and a tribune opening on to the sanctuary. The interior length is 90ft., the width 44 ft., and the height to apex of ceiling 40 ft. The spire is 97 ft. high. The church is built of Purbeck stone, with Bath stone dressings, and the style of architecture adopted is Early English. The architect is Mr. Albert Vicars, of Somerset-chambers, 151, Strand, London. The contractor is Mr. Adams, of Herne Bay.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—XXVI.

LAMPS.

THE ordinary incandescent lamp, fig. 70, is too well known, and, indeed, too simple to need any special description. The ends of a thin carbon wire or filament, P, are cemented to two platinum wires, P P, sealed into a glass globe in which the most perfect possible vacuum has been produced. A current is sent through the filament and raises it to a white heat; the

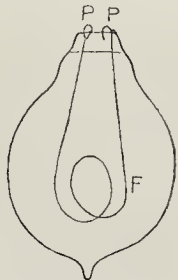


Fig. 70.

filament cannot, however, burn, as there is nothing within the globe with which it can combine. Platinum wires are used to conduct the current to the filament, as platinum has practically the same co-efficient of expansion as glass; when, therefore, the glass has been pressed in a semi-liquid state round the wires, an air-tight junction still exists, after both have cooled.

The efficiency of a filament depends upon the temperature to which it is thought advisable to raise it; about 35 watts per candle-power may be taken as the power usually employed. If more power is forced upon an incandescent lamp, the candle-power increases in much greater proportion, but the time the filament will last also decreases in greater proportion. Reliable experimental data are still required on these points. There is a close connexion between an electric incandescent lamp and an ordinary gas flame, in the former a carbon filament is raised to incandescence by an electric current, in the latter finely divided carbon particles are liberated and heated to incandescence by burning gas.

Far more efficient, however, is the electric arc lamp; in it two carbon rods touch to allow a current to flow between them when they are separated an arc is established as previously explained. At the surface where the arc springs from the solid carbon the temperature approaches that of the sun, and the carbon is slowly turned into vapour which produces further heat by burning in the air. From the heated carbon surface comes a pure white light closely resembling sun light. The arc itself emits a cold violet light, but the light from the carbon surface is white. The reason why the light from arc lamps appears to be so blue is because it is usually seen at night in contrast with the warm yellow light from gas or incandescent lamps; but when seen in daylight the resemblance between the light emitted from an arc lamp and that from the sun is very striking.

The mechanism of an arc lamp is very intricate and of importance, as similar devices are used in many pieces of electro-magnetic apparatus employed in the distribution of electric-power.

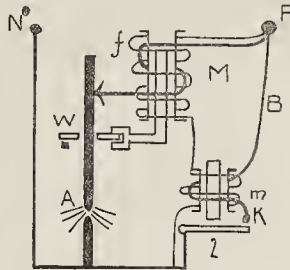


Fig. 71.

Fig. 71 shows, in the form of a diagram, the essential parts of a Brush arc lamp, a lamp which may be regarded as the prototype of most of the modern ones. The current enters the positive terminal P, passes round the coils of a sucking magnet M, and thence to the positive carbon, across the arc A and out of the lamp through the negative terminal N. The core of the magnet is sucked up and tilts a washer W which grips the rod carrying the positive carbon, raising the whole to keep the carbons apart and produce the arc.

An electric arc hinders the passage of a current not only because it has a resistance of so many ohms but also on account of its introducing an opposing electromotive force of so many volts. As, however, this back E.M.F. may be regarded as equivalent, with a given current, to so many resistance, we shall speak simply of the resistance of the arc.

If a constant E.M.F. is maintained between P and N, the resistance of the arc gets greater as the carbons burn away, the current diminishes, and the core, slightly drooping, causes the washer to release the carbon-rod, and allows it to slip by its own weight, until the points of the carbons are the proper distance apart. The Brush lamp, however, was designed to work on a series or constant current circuit, so that while the arc is established and maintained in the way described, a supplementary coil is necessary for its regulation. From P there also starts a great length of very fine wire, f, taking a fraction of the current, in the opposite direction to the bulk of it, round the bobbin of M, and is then connected to N. The fine wire circuit is therefore placed as a shunt across P and N. When the resistance of the arc increases the difference of potential between P and N rises, and a larger proportion of the total cur-

rent flows through the fine wire, the shunt-current reduces the magnetic effect of the magnet bobbin until the core falls, and the length of arc is reduced. The Brush lamp is furnished with an excellent form of cut-out for use on a series circuit,—a piece of apparatus already referred to but not described. The fine or shunt-wire, after leaving the magnet M, passes round a second little magnet M'. When the current in f exceeds a certain amount owing to the increased resistance of the arc, the electro-magnet, m, becomes sufficiently strong to attract an iron lever, l, which makes a contact at K, and so closes a circuit between P and N, as shown in the figure. A few turns of this wire, B, are carried round the cut-out bobbin in order to hold l in position when the current in the fine wire has fallen, owing to this short-circuiting of the arc circuit. If the arc is re-established by the falling together of the carbons, so large a proportion of the current is taken from B that the lever l falls, and the cut-out ceases to act. A cut-out of this description can be used in conjunction with any piece of apparatus on a series circuit, and will open a new path for the current when the resistance of the apparatus in question exceeds a given amount.

There is little doubt that electricity supply will eventually be used more widely for power than for lighting purposes; it might, therefore, have been reasonably expected that more space, than that taken up by a few brief references, would have been devoted to motors. But so far motors have been comparatively rarely used, and they have not yet emerged from the controversial stage, though a few years will doubtless change all this. It has, therefore, been thought better to omit any special treatment of motors, and to regard them simply, as, indeed, they practically are at present, in the light of dynamo-machines, arranged to convert electrical into mechanical power.

CONCLUSION.

The rapid developments, now being made in all branches of electricity supply, are causing many to turn their attention to the general principles of electrical engineering. Unfortunately we are endowed with no special senses, by which we can detect the presence of electricity or magnetism, similar to those which enable us to feel matter, light, or heat; indeed, the "electric shock" produced by the passage of electricity through the body, is the only way in which electricity directly produces a sensation. There is, then, no cause for wonderment that most approach the subject as one of a shadowy nature, if not altogether involved in mystery. Now, though little may be definitely known about electricity itself, probably more facts have been brought to light about phenomena due to electrification, in its widest sense, than of those arising from any other cause. Far more is known about electricity than, for instance, gravitation; yet so familiar is every one with gravitation phenomena, that the mystery of gravitation is entirely overlooked in the simplicity of many of its effects. In the same way, then, will the uncertainty of the true nature of electricity and magnetism prove no bar to the complete understanding of the influences of electricity or magnetism on matter.

The science of electricity cannot be learnt from books, except for the purposes of examinations; the real grasp of the subject must be acquired in the laboratory and workshop. Every student, in any branch of science, has felt of how little value is the clearest description of a piece of apparatus, even with the aid of working drawings, compared with the knowledge and experience gained by the actual use of the real thing. Reading alone will, however, teach the object to be achieved and the underlying principles involved in any class of electrical plant.

Having in view these facts, we have avoided any attempt to give, by lengthy description of details, complete information about any special mechanism. For, even assuming that such descriptions would serve any useful purpose, the space at our disposal would have enabled us to teach no more than could be learnt during a few hours spent in a manufactory. We have endeavoured, therefore, to explain broad principles and methods in language free from the higher branches of mathematics and requiring only the most elementary knowledge of algebra and geometry. If the general principles according to which electric machinery is constructed be first understood, every piece of

British Archaeological Association.—The closing meeting of the session was held on the 18th, the Rev. S. M. Mayhew being in the chair. The discovery of an ancient dungeon in Lancaster Castle was announced by Dr. Harker. An apparently solid block of walling having attracted attention, an effort was made to penetrate the mass. Traces of an opening were soon met with, and a curious vaulted chamber, which must have been closed for many years, was laid open to view. Mr. Loftus Brock, F.S.A., described a small and curious leaden hodge, found in London, similar to the pilgrims' signs, consisting of one half of a Tudor rose joined to a comet-like tail. Mr. J. W. Grover, F.S.A., exhibited some iron keys worked to patterns of great beauty, one of which, found many years ago at Hitcham Rectory, Bucks, was probably the key of a reliquary. A Roman knife-handle, carved with figures, a dog chasing a rabbit of almost unique workmanship, found at Dorchester, was also exhibited. The chairman described a large and remarkable series of ancient articles brought by him for exhibition. Among the most curious were three small Roman bowls, perfect, found in London; several beautiful examples of Roman glass; and a British urn found a few weeks ago at Burgate, Canterbury, thus rendering evidence of occupation of the city anterior to the Romans. Of later date was a head of the Saviour, found in Cripplegate, and a small gold reliquary picked from a barrowful of old iron. A paper was then read by Mr. Wood on two round-towered churches of Essex, South Ockendon (St. Nicholas), and Bardfield Sailing (St. Peter and St. Paul). These two completed the description of the churches, six in all, in the county which possess round towers, the others having been previously described. South Ockendon has been "restored" in recent years, and its identity destroyed. During the process the ancient hour-glass was thrown away with the rubbish, but was fortunately recovered by the village blacksmith, and is now replaced. Bardfield Sailing Church is known to have been dedicated in 1380, and this date agrees with the appearance of the workmanship, although the base of the tower, like the first example, is probably of much older date. A paper was then read by Mr. Macmichael on "Ancient Horn Books," and several specimens were exhibited, some of which were lent for the purpose by Mr. John Evans, F.R.S. The proceedings terminated with a description of a Roman column and its base, of large dimensions, which has just been found in Water-gate-street, Chester, by Mr. Alderman Brown, who, with great public spirit, has preserved the remains *in situ*. The base is on the level of the street, showing that the latter must have existed at the same time, without regard to the levels of the Mediaeval "rows," which are much above it.

The New Montpellier Baths, Harrogate.—On Wednesday night a special meeting of the Harrogate Town Council was held in the Council Chamber, for the purpose of receiving the assessor's (Mr. Corson's) report on the final Montpellier Baths plans competition. Mr. Corson recommended that the set of plans No. 13 be awarded the first premium, set No. 12 second, set No. 26 third, and set No. 17 fourth. The names of the competitors having been kept a strict secret, the Mayor announced that the winners of the first premium, 150*l.*, were Messrs. Baggallay & Bristowe, of London; second, 100*l.*, Messrs. Thomas & Frank T. Verity, London, and Mr. W. Phipson, engineer, London; third, 75*l.*, Messrs. C. O. Ellison & Co., Liverpool; fourth, 50*l.*, Messrs. Morley & Woodhouse, Bradford.—*Leads Mercury.*

Artesian Well-Boring.—Messrs. C. Isler & Co., of Southwark, have recently completed artesian bore tube wells for the following among other breweries:—Mr. J. A. Chadwick, Burton Brewery, Wrexham, where the depth reached is 331 ft., and the water rises 10 ft. above the surface; Mr. J. W. Wright's Brewery, Leeds, where what appears to be an inexhaustible supply has been tapped a few yards deeper than the depth of the original well (formerly the supply could be exhausted after a few hours' running).

Fox Hill, Berkshire.—This pleasantly-situated property, in White Knight's Park, near to Reading, is placed in the market by the late Mr. A. E. Phillips's executors. The house, standing in a small park, was built *circa* 1870, after the Gothic style, by Mr. Alfred Waterhouse, R.A., for his own occupation, and there he lived for some time. Nearly all the estate is leasehold, with sixty-eight years still to run.

International Congress of Hygiene and Demography, 1891.—The seventh International Congress of Hygiene is to be held in London next year. The Congress has been held (biennially as a rule) in each of the following cities:—Brussels, Paris, Turin, Geneva, The Hague, and Vienna. The last Congress was held at Vienna in 1887. Before the close of that Congress a Permanent International Committee was appointed to decide on time and place of meeting of the next Congress of the series. On account of the fact that it had been decided to hold a Hygienic Congress in connection with the Paris Exhibition in 1889, it was resolved that the next International Congress of the series should be held in 1891, and London was chosen as its place of meeting. As England has taken the lead in sanitary science and administration, it may be expected that her Colonies and that Foreign Countries will send numerous representatives, both official and unofficial, and that the Congress will be of great magnitude and importance. The aim of the Congress is to awaken public interest in the progress of hygienic and demography, by which latter term is understood the study of the life conditions of communities from a statistical point of view; to afford persons interested in these subjects an opportunity of meeting, with the object of advancing their progress; and, by conferences and debates, to elucidate questions relating to hygiene, demography, and public health. The Governments of all countries, Municipalities, County Councils, and other provincial administrations, Public Health Authorities, Universities, Colleges, and all Societies which are occupied in the study of the sciences more or less immediately connected with hygiene are invited to co-operate and appoint delegates to represent them at the Congress. An exhibition of articles of hygienic interest will be held in connection with the Congress. A meeting in support of the objects of the Congress will be held at the Mansion House on Thursday next.

Properties for Sale.—(1) Lord Waterpark's Doveridge Hall Estate, of about 2,000 acres, Derbyshire, close to Uttoxeter Station, and near to Derby and Burton-on-Trent, and having a net rental of about 6,000*l.* a year. The finely-situated mansion was built in 1763, and is at present rented by Lord Hindlip. (2) The late Sir William Heatcote's agricultural estates, covering about 10,000 acres, lying between Winchester and Romney, together with two farms, of 1,720 acres, at Stoke Charity, Micheldever, and the sporting estate of Fullerton, Andover (600 acres), with fishing in the rivers Anton and Test. These will be offered in thirty-three lots at the Mart on July 9. (3) Furze Caundle Manor, Dorsetshire, a freehold of nearly 500 acres in all, and including a good fifteenth-century manor-house, with banqueting-hall, minstrel's gallery, and principal apartments panelled and roofed with oak. (4) Rawdon House, Hoddesdon, Hertfordshire, a Jacobean mansion built in 1622, and since restored. The conduit mead and conduit house will be included in the sale. The conduit was given to the town by one Marmaduke Rawdon in 1679,—it is mentioned in no very complimentary terms by Matthew Prior in his ballad "Down Hall." Hoddesdon was long famous for its old houses and inns; one of the former, known as Champion House, was for a long time a residence of the Dymock family. (5) The Marlborough Rooms, Regent-street, adjoining the Polytechnic Institute, held on lease, and licensed for music, dancing, &c. (6) The Albert Palace, Battersea, is still in the market, no bid having been made when it was put up at auction on the 12th inst.

The Carpenters' Strike in Dublin.—On Tuesday morning a deputation from the joint committee of the carpenters on strike had an interview with Mr. Wardrop, the secretary of the Employers' Committee, with reference to a settlement. Mr. Wardrop expressed the opinion that if the men were to him that they would be willing to fix October 1 instead of September 1 as the date when the shorter hours should begin he would summon a meeting of his committee. The joint committee of the men held a meeting on Tuesday night at their rooms near the Metal-bridge. Bachelor's walk, to discuss the matter, but no definite result was arrived at, according to the *Arbman's Journal*. According to the same authority, it appears that a large number of men have already resumed work on the terms that the shorter hours should begin on September 1.

The Liverpool Engineering Society at Thirlmere.—The Liverpool Engineering Society made a visit of inspection to the Thirlmere works on Saturday last. The party, numbering about twenty-five, reached Keswick the previous evening, and on arrival visited the works of the Keswick Electric Lighting Company. (These works were described in the *Builder* for May 31 last, p. 397.) On Saturday morning the visitors made an early start for Thirlmere, where they were met by Mr. E. P. Hill, the resident engineer, who conducted them over the works. The dam, like that of Lake Vyrnwy, will, according to the *Liverpool Post*, be founded upon the solid rock, which is now being excavated and prepared for that purpose. The discharge tunnel is being bored through massive rock, which occupies the middle of the valley, and which will itself form a substantial part of the dam. The lake is to be raised about 50 ft. in level, and the effect of this will be to nearly double the water area of Thirlmere. The basin or watershed area is about one-half that at Vyrnwy, but the rainfall, and consequently, the available water per acre of ground, is somewhat greater. On the other hand, the Thirlmere aqueduct will be nearly half as long again as that of Vyrnwy. A very considerable part of the aqueduct consists of tunnelled conduit, the longest tunnel passing under Dunmail Raise, and being very nearly completed. This tunnel is nearly four miles in length, and it is expected that the miners, who can already hear one another at work, will meet in a fortnight's time. Inspection of the outlet works showed that very complete arrangements would be made for controlling and regulating the flow down the aqueduct; and strainers, to be placed in a well already built for the purpose, will ensure the clearness of the supply. As most of our readers will know, the Thirlmere scheme is mainly intended for the supply of Manchester with water.

"Expanded" Metal.—On the 18th inst., the formal opening of a new industry took place at West Hartlepool, viz., that of the British Metal Expansion Co., Limited, on the site of the Stranton Steel Works, a concern long since defunct. "A complete industry in one machine" is described as the expression of a visitor on seeing the metal produced. The raw material, consisting of strips of mild steel, is transformed into the finished article (which somewhat resembles diamond netting or lattice work) by the single operation of slitting the metal into strands, leaving uncut connecting spans, and expanding or opening the metal at the incisions; the cut edges thus become the surface of the finished sheet, which is many times the superficial area of the original strip. A strip of steel 6 in. in width of any desired length is fed into a powerful automatic machine, which with great rapidity and accuracy performs this operation and produces a sheet of expanded metal 4 ft. wide or eight times larger than the strip. The works of the Company have three of these machines in operation, which produce fencing of 2½ and 4 in. mesh, designed for railways, farms, parks, lawns, &c.; and 1½ in. mesh, designed for an almost innumerable variety of purposes, such as guards for windows, skylights, doors, arbours, and in fact the whole range of horticultural trellis work. This last machine also produces expanded metal lathing of various sized mesh in sheets about 8 ft. long by 2 ft. wide. Expanded metal lathing possessing the essential features of flatness, rigidity, and quickness of application, is one of the most important products of these machines. By its use for walls and ceilings a building is rendered to that extent fireproof; it is in fact a builders' material, as both the outer and inner finish of a building may be made fireproof with this lathing, nailed upon proper studding and covered with cement or plaster.

Argyllshire.—The sporting estate of Melfort, in Argyllshire, lying at the head of Loch Melfort, near to Oban and westwards of Loch Awe, is offered for sale by private tender. It extends over 3,600 acres, yielding an estimated rental of 1,355*l.* per annum. King James II. gave grant of the Barony of Melfort, with Duhal, to John Drummond, son to James, third Earl of Perth, who was advanced Earl of Melfort in 1686. Attainted in 1695 by the Scots Parliament "for having been seen, at St. Germain's," whether he had accompanied his sovereign, Lord Melfort died in Paris in 1744. The titular honours were restored, on reversal of the attainder, to his descendant about forty years ago.

The Manganese Bronze and Brass Company's Works, Deptford.—Manganese bronze (Parsons's patent) has for some years taken a most important place amongst materials for the manufacture of screw propellers and other purposes requiring a combination of strength, toughness, and hardness. The premises originally built for the Company in 1883 at St. George's Wharf, Deptford, have recently been nearly doubled in extent, and now, it is said, form the largest alloy foundry in Britain. The works now consist of a foundry 200 ft. in length; the width between the large stanchions carrying the gantry girders and roofs is 29 ft. 6 in., and the gantry girders are calculated to carry 25 tons in addition to the weight of the traveller. There are in addition rolling mills 128 ft. by 60 ft., ingot foundry, drying shed, engine sheds, ingot stores, pattern shop, offices, &c., the whole having a river frontage of 232 ft., where two jetties have been constructed in connection with the works. These buildings, for which Mr. Thomas Arnold acted as architect, presented some special difficulties in construction, the most important arising from the nature of the foundation. The site being little more than alluvial deposit quite unfit to carry the concentrated weights of the various stanchions, chimneys, &c., it became absolutely necessary to carry down all important bearings in cement concrete to the firm bed of gravel which was found generally at about a depth of 22 ft. below the surface. The main portion of these works has been carried out by Messrs. Kirk & Randall, of Woolwich; the jetties and one of the large chimneys were built by Mr. Samuel Chafin, of Rotherhithe.

Baths, Newport (Mon.).—The new baths here were officially opened by the Mayor of Newport (Mon.), on Thursday, the 19th inst. These baths were designed by the Borough Engineer, Mr. Conyers Kirby, and the building contains two plunge baths (first and second class), eighteen slipper baths (first and second—male and female), and a complete suite of Turkish baths, together with laundry plant for towel washing, &c. The whole of the engineering work was carried out by Messrs. Bradford & Co., London and Manchester. The plunge baths are heated by steam, as are also the dressing-boxes and corridors to the various baths. The Turkish baths are heated by an improved furnace specially designed by the above firm, the temperature in the hot rooms ranging from 300 deg. in the first room to 180 deg. in the third. Special attention has been paid to the admission of fresh air and the extraction of the vitiated atmosphere. A supplementary boiler is provided for hot-water supply to Turkish and slipper baths and laundry, and a gas-engine is also provided in the latter; so that in the event of the plunge baths being closed during the winter months, the remaining baths and the laundry could be worked independently of the steam boiler.

The Sanitary Institute's Examinations for Local Surveyors.—At an examination for Local Surveyors, held by the Sanitary Institute on June 19 and 20, eighteen candidates presented themselves. Questions were set to be answered in writing on the 19th, and the candidates were examined *visu voce* on the 20th. The following candidates were certified to be competent, as regards their sanitary knowledge, to discharge the duties of Local Surveyor:—Thompson Clothier; George Alexander Craig; Neville Brooke Davis; Arthur Charles James; George Percival Milnes; Elsie John Poggio; James Thorpe; and Arthur Gray Wallis.

New Premises at Holloway.—In our description of Mr. Benles' new premises at Holloway, in our issue of the 14th inst., it was stated that the whole of the ironwork was supplied by Messrs. Homan & Rodgers. Messrs. W. H. Lindsay & Co., of South Wharf, Paddington, write to say that they supplied the constructional ironwork and the fireproof flooring to the main building, together with the balcony railing and the cresting over the shops.

The Royal South London Ophthalmic Hospital.—The Prince of Wales has fixed Thursday, the 24th of July, for laying the foundation-stone of the new building for the Royal South London Ophthalmic Hospital, St. George's Circus, Southwark.

Vicarage, St. Arvans, Monmouthshire.—A new vicarage has just been completed at St. Arvans, near Chepstow. The architects were Messrs. Osborn & Reading, Birmingham, and Mr. James Morgan, of Rockfield, Monmouth, was the contractor.

The Condition of the River Lea.—No question of sanitation has a more vital importance than that which deals with the purity and cleanliness of the rivers in this country, and more especially with those in the immediate neighbourhood of vast cities. The subject is continually being rudely brought before the public either by outbreaks of epidemic diseases or through means of the susceptibilities of the organs of special sense. For some years a sanitary war has been waging between the various parties to whom the interests of what concerns the River Lea and the inhabitants on its banks respectively have been entrusted. The latest phase of the conflict is the appearance of the Tottenham Local Board of Health at the Edmonton Petty Sessions before the local justices, in answer to a summons issued at the instance of the Lea Conservancy Board. After bearing as much of the case as to leave but little doubt of the insanitary condition of the river below the Tottenham outfall, technical objections as to the non-responsibility of the Tottenham Board of Health were urged, and the Bench decided that the responsibility rested with the Joint Drainage Committee of the Tottenham and Wood-green Local Boards. Having, then, this assurance, we hope speedily to see this joint committee spontaneously concerting measures to amend a state of matters which cannot but be a source of danger.—*Lancet.*

Surveyorship, Hertford.—Mr. T. R. Dickinson, A.M.I.C.E., Deputy City Surveyor of York, has been appointed Borough Surveyor, Waterworks Engineer, and Inspector of Nuisances to the Corporation of Hertford. Eighty-eight applications for the post were received.

PRICES CURRENT OF MATERIALS.

TIMBER.		£ s. d.	£ s. d.
Greenheart, B.G.	ton	6 10 0	7 10 0
Teak, E.I.	load	11 0 0	14 0 0
Sequoia, U.S.	foot cube	0 2 3	0 3 0
Asa, Canada.	load	3 0 0	4 10 0
Birch "	"	3 0 0	5 0 0
Elm "	"	3 10 0	4 15 0
Fir, Danstie, &c.	"	1 15 0	3 10 0
Oak "	"	2 10 0	4 10 0
Canada "	"	5 10 0	6 10 0
Pine, Canada red "	"	2 10 0	3 10 0
" "	"	2 0 0	3 0 0
Lath, Danstie "	"	5 0 0	5 5 0
St. Petersburg "	"	5 0 0	7 0 0
Wainscot, Riga, &c.	log	8 0 0	0 0 0
Deals, Finland, 2nd and 1st std.	"	7 15 0	10 0 0
" "	"	7 0 0	7 10 0
" "	"	6 0 0	8 10 0
Riga "	"	7 10 0	14 10 0
St. Petersburg, 1st yellow "	"	7 10 0	9 0 0
" "	"	7 0 0	10 0 0
" "	"	7 0 0	15 0 0
Swedish "	"	7 0 0	15 0 0
White Birch "	"	8 0 0	17 0 0
Canada, Pine, 1st "	"	15 0 0	22 0 0
" "	"	10 0 0	16 10 0
" "	"	7 0 0	10 0 0
" "	"	8 0 0	10 0 0
" "	"	6 10 0	8 10 0
New Brunswick, &c.	"	6 0 0	8 0 0
Baltens, all kinds "	"	5 0 0	16 0 0
Flooring Boards, sq. ft. in. pre-	"	0 10 0	0 14 0
pared, first "	"	0 8 0	0 10 6
Other qualities "	"	0 6 0	0 7 9
Cedar, Cuba, 1st "	foot	0 4 0	0 4 4
Honduras, &c.	"	0 4 0	0 4 4
Mahogany, Cuba "	"	0 4 0	0 6 4
St. Domingo, cargo average "	"	0 5 0	0 6 4
Mexico "	"	0 5 0	0 5 4
Tobacco "	"	0 5 0	0 6 4
Honduras "	"	0 5 0	0 6 4
Box, Turkey "	ton	5 0 0	13 0 0
Rose, Rio "	"	14 0 0	19 0 0
Bahia "	"	13 0 0	18 0 0
Satin, St. Domingo "	foot	0 6 0	0 1 3
Porto Rico "	"	0 9 0	0 1 3
Walnut, Italian "	"	0 4 0	0 7 0
METALS.			
IRON—Bar, Welsh, in London tn	6 17 6	8 0 0	
" "	6 10 0	7 0 0	
" Staffordshire, in London "	8 0 0	8 10 0	
COPPER—British, cake and ingot	63 0 0	6 10 0	
Best selected "	65 0 0	66 0 0	
Sheets, strong "	71 0 0	72 0 0	
Chill, bars "	58 0 0	60 0 0	
YELLOW METAL—In lb.	0 5 4	0 0 0	
LEAD—Pig, Spanish "	13 6 0	13 6 0	
English, com. brands "	13 7 6	13 10 0	
Sheet, English, 3 lbs. per	15 0 0	0 0 0	
square foot and upwards "	15 10 0	0 0 0	
Pipe "	15 10 0	0 0 0	
TIN—			
Straits "	94 10 0	9 0 0	
Australian "	95 0 0	9 0 0	
English Ingots "	94 0 0	9 0 0	
OILS.			
Lluseed "	24 7 6	24 15 0	
Cocunut, Cochin "	33 0 0	34 0 0	
Cocunut, Ceylon "	27 0 0	27 0 0	
Palm, Lagos "	26 0 0	0 0 0	
Rapeseed, English pale "	31 0 0	31 5 0	
" brown "	29 10 0	29 15 0	
Cottonseed refined "	22 10 0	0 0 0	
Tallow and Oleine "	21 0 0	40 0 0	
Lubricating, U.S. "	5 10 0	8 0 0	
" refined "	7 0 0	12 0 0	
TAR—Stockholm 4 barrel	0 15 0	0 0 0	
Archangel "	0 15 0	0 0 0	

TENDERS.

[Communications for insertion under this heading must reach us not later than 12 noon on Thursdays.]

BELFAST.—For the completion of the pumping-station in Dunree-street, Belfast. Mr. Bretland, City Surveyor.—
H. & J. Martin, Limited, Ulster Building Works, Ormeau £6,395 0 0
*Accepted, this being the lowest tender.

BRISTOL.—For additions to the Manor House, Whitechurch, near Bristol, for Mr. Geo. Lindrea. Mr. Herbert J. Jones, architect:—
Eastbrook & Sons £484 0 0
W. Church 478 0 0
G. Humphreys 438 0 0
J. Bastow 408 0 0
T. R. Lewis 395 0 0
J. Perrot (accepted) 359 0 0
[All of Bristol.]

BRISTOL.—For certain alterations and improvements at "Hebron Chapel," Bedminster. Mr. Herbert J. Jones, architect, Bristol:—
Thos. R. Lewis £670 0 0
G. Humphreys 666 0 0
T. W. Aspinall 619 0 0
H. W. & E. J. Neale 549 0 0
R. & F. Dennis & Son 525 0 0
Cowlin & Son (accepted) 530 0 0
[All of Bristol.]

CROYDON.—For alterations and additions to Board Schools, Priests-road, Croydon. Mr. Robert Ridge, Surveyor to the Board, architect. Quantities by the architect:—
Smith & Buller, Croydon £1,039 0 0
Bryan, South Norwood 994 0 0
Bowler, Upper Norwood 945 0 0
Smith Bros., South Norwood 929 0 0
Akers & Co., South Norwood 875 0 0
Caple & Redgrave, Croydon 847 0 0
Bullock, Croydon 839 0 0
Bennett, Croydon 837 0 0
Pearson & Co., Croydon 795 0 0

DOVER.—For building new offices at Ca tile-street, Dover, for Messrs. A. Leney & Co., Dover:—
Taylor Bros. £3,141 0 0
Martin, Wells, & Co. 2,675 0 0
Denne & Son 2,674 0 0
Austin & Lewis 2,646 0 0
W. J. Adcock 2,645 0 0
R. & F. Dennis & Son 2,635 0 0
H. Richardson 2,602 12 9
W. Brooks 2,567 0 0
Hayward & Paramor 2,549 0 0
G. Lewis & Son 2,438 10 0
Herbert Stiff 2,400 0 0

ELSTREE (Herts).—For alterations and additions to "The Oaks," Boreham Wood, Elstree, for the Misses Edgway. Mr. John E. Still, surveyor, 50 Finbury-square, E.C.:—
A. J. Batchelor, Harrow £1,250 0 0
W. H. Lascelles, City 1,249 0 0
W. H. Kelland, Stocks Newington 1,170 0 0
E. A. Roope, Clapton 1,145 0 0
Puzey & Lumley, Newman-street 1,139 0 0
Joseph Holland, Poplar 1,067 0 0
H. Rofley, Putney 1,050 0 0

HENDON.—For alterations and improvements at the Hendon Branch of the London and South-Western Bank, Hendon. Mr. E. A. L. L. architect, 42, Old Broad-street, E.C. Quantities by Mr. G. R. Tasker, 38, John-street, Bedford-row, W.C.:—
Basterbrook £2,348 17 2
Balaam 1,929 0 0
Young & Lousdale 1,818 0 0
Allen 1,798 10 0
Dodd 1,751 17 0
Shepherd 1,711 0 0
Scott 1,711 0 0

HUNDON (Suffolk).—For the erection of a new barn and granaries at Hundon Hall Farm, for the Right Hon. W. H. Smith, M.P. Mr. C. P. Ayres, architect, Watford:—
Jarvis, Clare £1,235 0 0
Mason, Haverhill (accepted) 1,207 0 0

LEYTON.—For alterations and additions to the Church-road Schools for the Leyton School Board. No quantities supplied. Mr. J. T. Newman, architect, 2, Fen-court, Finch-hatch-street, E.C.:—
J. Catley, Leytonstone £2,790 0 0
J. Morter, Stratford 2,750 0 0
W. Grear, Stratford 2,574 0 0
Coxhead, Leytonstone 2,569 0 0
Lamb & Son, Leytonstone 1,690 0 0
D. Sayer, Leyton (accepted) 1,659 0 0
[Architect's estimate £2,200.]

LONDON.—For proposed new public baths and wash-houses, St. Mary Stratford, Bow, E. Messrs. Edwd. Harner & Fredk. Fincher, joint architects, 38, John-street, Adelphi, W.C. Quantities by Mr. A. J. Turner, 1, Tudor-street, E.C.:—
W. Downs £27,956 0 0
Stimpson & Co. 27,400 0 0
J. R. Hunt 27,473 0 0
Kirk & Randall 27,442 0 0
Kilby & Gayford 27,389 0 0
J. Holland 27,383 0 0
B. E. Nightingale 27,225 0 0
Pattinson 27,100 0 0
Brass & Robt. 26,855 0 0
Perry & Co. 26,479 0 0
M. Calnan & Co. 26,406 0 0
Patman & Potheringham 25,953 0 0
Allen & Sons (accepted) 25,665 0 0

LONDON.—For alterations and mahogany office-fittings at No. 19 and 11, Minchingham-lane, E.C., for Messrs. Drake & Co.:—
Snewin Bros. & Co., Upper Clapton * £218 0 0
Accepted.

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.
Roadmaking Works	Bromley Local Board..	Official	July 1st	ii.
Sewer Extension	do.	do.	do.	ii.
Guernsey Gravel	Brentford Union	do.	do.	ii.
Firewood	do.	do.	do.	ii.
Cottage Homes	Pontypool Union	Seward & Thomas	do.	xiv.
Parting Concrete	do.	Official	July 2nd	ii.
Venetian Blinds	Illovo Commissioners	do.	do.	ii.
Woolwich Union Infr.	do.	do.	do.	ii.
Making-up Roads, &c.	Horsley Local Board..	T. de Courcy Mesde, C.E.	do.	ii.
Re-covering Coal Bays, &c.	M. E. Co.	A. A. Langley	July 4th	xiii.
Repairs, Fainting, &c.	St. George-in-the-East Guardians	Wilson, Son & Aldwinckle	do.	xiii.
Hot Water Heating, Shire Hall, Carmarthen	John S'anding Com.	Panel Phillips	July 5th	ii.
Shire Hall, Air Valves, Hydrants, &c.	Tadcaster U.R.S.A.	Brundell, Simmons, & Co	do.	ii.
Repair of Groyne, Culvert, &c. Denze Marsh Level	The Committee	Official	do.	ii.
Manholes, Flushing Tanks, &c. Haverst'k Hill	Met. Asylum Board	do.	July 7th	xiii.
Collection and Disposal of House Refuse	Richmond U.S.A.	W. Brookes	do.	xiii.
Kerbing, Tar-paving, Metalling, &c., Work	Lewisham Bd. of Wks.	Official	do.	xiv.
Repairing Vestry Hall	St. George-the-Martyr (Southward) Vestry	do.	do.	xiii.
Eppo Sewers, &c.	Willenden Local Board	O. Claude Kobson	do.	xiii.
Roadmaking and Paving Works	Fulham Vestry.	W. Sykes	July 9th	xiii.
Painting Works, Albert Embankment	London County Council	Official	July 10th	xiii.
Broken Granite and Tiles	Barking Town Lab. Bd.	C. J. Dawson	do.	xiii.
Kerbing, Tar-paving, Metalling, &c., Work	London County Council	Official	July 14th	ii.
Repair of Tar and Asphalt Paving	Tottenham Local Board	J. E. Worth	July 15th	xiii.
Sewers, &c.	West Ham Council	Lewis Angell	July 16th	xiv.
Engine House, &c.	Haylake & West Kirby Gas, &c. Co.	C. H. Beloe	do.	xiv.
Enlargement of S.E. District Post-office	Com. of H. M. Works	Official	July 21st	xiii.
Extension of Sewers and House Connections	River Medway Conserv.	do.	do.	xiii.
Tar-paving, &c.	Dorking Local Board	G. Somers Mathews	July 29th	xiv.
Painting, Whitewashing, &c.	Mile End Guardians	Official	Not stated	xiii.
	do.	do.	do.	xiii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Inspector of Nuisances and Surveyor	Godstone U.R.S.A.	£120	July 3rd	xviii.
Two Assistants in Boro' and Water Engrs's Office	Cheltenham	£130 & £100 respect.	July 5th	xviii.
Clerk of the Works	Horsley Local Board..	23 per week	July 7th	xviii.
Clerk of the Works	Dewbury Union	Not stated	July 8th	xviii.
Surveyor and Chief Sanitary Officer	Chelmsford Corporation	£229	July 17th	xviii.
Professorship of Mechanical Engineering	King's College	Not stated	Not stated	xviii.

LONDON.—For the erection and completion of Nos 455, 460, and 462, Holloway-road, and 1, Seven Sisters road, N. Mr. W. Jacobm Gibbon, architect, 36, Great James-street, Bedford-row, W.C. :—
 Thos. Heath .. £10,629 0 0
 Ward & Lamble .. 9,959 0 0
 Turley & Appleton .. 9,850 0 0
 Brass & Sons .. 9,453 0 0
 Killy & Gayford .. 9,435 0 0
 Thos Taylor & Son .. 9,377 0 0
 E. W. Mallett .. 8,283 0 0
 Patman & Fotheringham .. 8,073 0 0
 Macfarlane (accepted) .. 5,882 0 0

LONDON.—For alteration and repairs to be executed at the "Angel" Hotel, Islington, N., for Messrs. Baker Bros., Limited, Messrs. Saville & Martin, architects, 85 and 87, Strand:—
 G. A. B. Bywaters .. £2,190 0 0
 Spencer & Co. .. 2,075 0 0
 J. T. Chappell .. 1,958 0 0
 S. Rowland .. 1,958 0 0
 Gould & Brand (accepted) .. 1,912 0 0

LONDON.—For erecting new chemical laboratory at the Merchant Taylors' School, Charterhouse-square. Quantities by Mr. T. Fabian Russell, Mr. W. Hilton Nash, architect, 5, Adelaide-place, E.C. 4:—
 Messrs. Colls & Sons .. £3,799 0 0
 T. Rider & Son .. 3,778 0 0
 Chappell .. 3,533 0 0
 Greenwood .. 3,530 0 0
 Morter .. 3,511 0 0
 Patman & Fotheringham .. 3,253 0 0

LONDON.—For the erection of artisans' dwellings, Ann's-place, Boundary-street, E.C., for Dr. Feilbeman. Mr. W. H. Crossland, architect, 46, Upper Bedford-place, W.C. :—
 J. R. Thompson .. £3,909 0 0
 J. Beutley .. 3,948 0 0
 W. Downs .. 3,602 0 0
 A. & C. Smith .. 3,529 0 0
 Sabey & Son .. 3,497 0 0

LONDON.—For erecting model dwellings, Duke's-road, St. Pancras. Mr. Geo. Waymouth, architect. Quantities by Messrs. J. E. Goodchild & Son:—
 Grist .. £3,540 0 0
 Onthwaite .. 3,740 0 0
 Higgs .. 3,680 0 0
 Richardson .. 3,450 0 0
 Shurmer (accepted) .. 3,259 0 0

LONDON.—For erecting additional road to factory, London-road for Messrs. Yates & Co. Mr. W. A. Browne, architect:—
 Wm. Shurmer .. £177 0 0
 Wm. Shurmer .. 171 0 0
 Cowdell .. 161 0 0

LONDON.—For alterations to the premises of the London Co-operative Supply Stores (Limited), Fonthill-road, Finsbury Park. Mr. F. Borcham, architect:—
 Wilkinson .. £2,270 0 0
 Macfarlane Bros. .. 2,220 0 0
 Anley .. 1,899 0 0
 Co-operative Builders (Limited) .. 1,676 0 0
 Bendon (accepted) .. 1,178 0 0

LONDON.—For the erection of stabling and dwelling-house, King's-cross, for Messrs. Charrington, Sells, Dale, & Co., at their depot, King's-cross, under the superintendance of Mr. W. Eve, 10, Union-court, E.C. 4:—
 Lascelles .. £1,760 0 0
 Harris & Wardrop .. 1,729 0 0
 Salt .. 1,712 0 0
 Kirk & Randall .. 1,686 0 0
 Holland .. 1,684 0 0
 Johnson .. 1,549 0 0
 Godfrey & Son, Evering Works, Clapton, N.E. (accepted) .. 1,527 0 0

LONDON.—For erecting warehouse, Playhouse-yard, E.C. Mr. C. J. C. Pawley, architect, 66, Victoria-street, Westminster, S.W. Quantities by Mr. W. Walter Browns, 1, Boxworth-grove, N.:—
 C. Blyton, 13, Garlick-hill, E.C. .. £1,039 0 0
 C. Simmons, Shepherd's-bush, W. .. 975 0 0
 Osborne & Co., East Grinstead .. 936 0 0
 W. Nell, Burvart-road, E. .. 925 10 0
 E. & E. Evans, Peckham, S.E. .. 898 0 0
 C. Dearing & Son, Islington, N. .. 864 0 0
 G. W. Ford, Vauxhall, S.W. .. 845 0 0
 Turtle & Appleton, Wandsworth, S.W. .. 844 0 0
 Scharen & Co., Chelsea, S.W. .. 833 0 0
 R. G. Battley, 21, Old Kent-road, S.E. .. 833 0 0
 J. E. Manbridge, West Hamstead .. 819 16 0
 T. H. Mallett, New North-road, N. .. 808 0 0
 E. Gill, Minors, E.C. .. 677 0 0

LONDON.—For rebuilding No. 905, Bathnal-green-road, E., for Mr. J. Steadman. Mr. G. E. Niblett, architect, Hackney:—
 Jarvis & Sons .. £933 0 0
 Oliver & Richardson .. 897 0 0
 Burman & Co. .. 850 0 0
 Walker Bros. .. 830 0 0
 Hawkins .. 786 0 0
 Hood .. 737 10 0

LONDON.—For decorations and repairs at 14, Trebovir-road, Earl's-court, for the National Freehold Land Society:—
 Cordell .. £284 12 0
 Bane Bros. .. 258 0 0
 Young & Lomax .. 237 0 0
 Hamilton .. 235 16 6
 Wyatt (accepted) .. 178 0 0

LONDON.—For sanitary works at Dyers' Hall, Dows-gate-hill, for the Dyers' Company. Mr. John Slater, architect:—
 Holloway .. £125 0 0
 Shurmer (accepted) .. 117 0 0

LONDON.—For rebuilding No. 27, Whetstone-park, Lincoln's Inn-fields, W.C. Mr. Huntly-Gordon, architect:—
 Perry & Co. .. £1,458 0 0
 Faulkner .. 1,367 0 0
 F. & H. F. Higgs .. 1,362 0 0
 Brass .. 1,346 0 0
 Charteris .. 1,326 0 0
 E. Toms .. 1,299 0 0
 Shurmer .. 1,296 0 0
 Croker .. 1,259 0 0
 Laurence .. 1,235 0 0

LONDON.—For building new front wall and party-wall, No. 26, Whetstone-park, Lincoln's Inn-fields. Mr. Huntly-Gordon, architect:—
 Perry & Co. .. £496 0 0
 F. & H. F. Higgs .. 498 0 0
 Brass .. 460 0 0
 Shurmer .. 450 0 0
 E. Toms .. 439 0 0
 Faulkner .. 437 0 0
 Charteris .. 426 0 0
 Laurence & Son .. 417 0 0
 Croker .. 393 0 0

LONDON.—For alterations and repairs at 72, Lancaster-gate, W. Mr. W. Jacobm Gibbon, architect, 36, Great James-street, W.C. :—
 Nunn .. £692 0 0
 Vero Bros. .. 628 0 0
 Foxley .. 526 18 0
 Brass & Sons .. 577 0 0
 Chapman .. 467 0 0
 Oldrey & Co. .. 440 0 0
 Macfarlane (accepted) .. 347 0 0

LONDON.—For alterations and repairs to No. 49, Cleveland-square, W. Mr. W. Jacobm Gibbon, architect, 36, Great James-street, Bedford-row, W.C. :—
 H. Chapman .. £1,063 0 0
 W. Oldrey & Co. .. 914 0 0
 Macfarlane .. 892 0 0
 E. L. Nunn (accepted) .. 794 0 0

LONDON.—For alterations and additions to No. 92, Cleveland-square, W. Mr. W. Jacobm Gibbon, architect, 36, Great James-street, Bedford-row:—
 Brass & Sons .. £637 0 0
 Macfarlane .. 599 0 0
 E. L. Nunn .. 526 18 0
 H. Chapman .. 574 0 0
 W. Oldrey & Co. (accepted) .. 497 0 0

LONDON.—For alterations and repairs at the "Duke of Cornwall" public-house, Stewart's-road, Battersea, S.W., for Messrs. W. & A. Purchas. Messrs. Saville & Martin, architects, 85 and 87, Strand:—
 Walker Bros. .. £720 0 0
 Spencer & Co. .. 685 0 0
 Lathey Bros. .. 620 0 0
 C. H. Bates .. 598 0 0
 W. T. Smith .. 553 0 0

LONDON.—For repairs to stable buildings, Howie-street, Battersea, S.W., for Mr. C. Purchase. Messrs. Saville & Martin, architects, 85 and 87, Strand:—
 Lathey Bros. .. £149 0 0
 G. Jeffrey .. 105 15 0
 G. F. Williams .. 105 0 0
 F. Bowles .. 86 0 0
 W. Rhodes .. 50 0 0
 W. Byford (accepted) .. 50 0 0

LONDON.—For alterations and repairs at the "White Lion" public-house, High-street, Islington, N., for Mr. C. H. Belsey. Messrs. Saville & Martin, architects, 85 and 87, Strand:—
 W. L. Kellaway .. £257 0 0
 Gould & Brand .. 635 0 0
 S. Goodall .. 615 0 0
 J. Anley .. 607 0 0
 Spencer & Co. (accepted) .. 525 0 0

LONDON.—For painting and sundries at the "Load of Hay" public-house, Praed-street, Paddington, W., for Mr. R. Baker. Messrs. Saville & Martin, architects, 85 and 87, Strand:—
 T. Hawkins .. £200 15 0
 Vears & Co. .. 168 5 0
 Burlett & Sons .. 160 0 0
 Gould & Brand .. 157 6 0
 Langridge & Sons (accepted) .. 150 0 0

LONDON.—For painting and sundries at the "Old Cook" tavern, Highbury, N., for Mr. R. Baker. Messrs. Saville & Martin, architects, 85 and 87, Strand:—
 Spencer & Co. (accepted) .. £180 0 0

LONDON.—For rebuilding Nos. 61 and 66, High-street, Kingsland. Mr. J. Douglas Mathews, architect:—
 Goodall .. £1,142 0 0
 Yardley .. 979 0 0
 Killy & Gayford .. 962 0 0
 Shurmer .. 923 0 0
 Hayworth (accepted) .. 917 0 0

LONDON.—For the formation of Kenloe-road, Clapham, and laying sewer for Messrs. Williams & Rowe, under the superintendance of Mr. W. Eve, 10, Union-court, E.C. :—
 Mayo .. £373 0 0
 Pizzev .. 331 0 0
 Harris .. 323 0 0
 Bell .. 261 0 0
 Blackmore .. 230 0 0

PRINCES RISBOROUGH (Bucks).—For the erection of an Institute and cottage, High-street, Princes Risborough, Bucks, for the Right Honourable Lord Rothschild. Mr. W. T. Taylor, architect, Aylesbury:—
 Holland, Wenderover .. £1,190 0 0
 S. Grist, Burton .. 1,139 0 0
 Crook & Holland, Waddesdon .. 1,065 0 0
 Webster & Cannon, Aylesbury .. 1,048 0 0
 G. Green, Aylesbury (accepted) .. 988 0 0

RAMSGATE.—For pulling down and rebuilding No. 15, Harhour-street. Quantities supplied by the architects Messrs. Langham & Cole, of Ramsgate and Broadstairs:—
 J. Paramor & Son, Margate £1,370 0 0
 E. Collins, Ramsgate 1,307 0 0
 H. Miller, Ramsgate 1,240 0 0
 H. Bowman, Ramsgate 1,200 0 0
 G. H. Denne & Son, Deal 1,187 0 0
 Newby Bros., Ramsgate 1,183 0 0
 J. H. Forwalk, Ramsgate 1,160 0 0
 W. W. Martin, Ramsgate 1,159 0 0
 C. Horne, Ramsgate (accepted) 999 0 0

SHEFFIELD.—For erecting cabmen's rest and urinal, Glassop-road, Sheffield, for the Corporation. Mr. C. F. Wike, Borough Surveyor:—
 J. Robertson, Sheffield £210 0 0
 Albert Smith, Sheffield 198 4 0
 Dutton & Evans, Sheffield 170 10 0
 E. & W. Oxley, Sheffield 170 0 0
 C. Skelton, Sheffield 165 0 0
 Arnistead & Vassey, Sheffield 163 0 0
 J. H. Lillicker, Sheffield 153 15 0
 W. & A. Forsdike, Sheffield 146 10 0
 John Bahelly, Sheffield 140 0 0
 Grantham & Wheelam, Sheffield (accepted) 135 10 0

SHEFFIELD.—For erecting shelter, water-closets, &c., Carbrook Recreation Ground, Sheffield, for the Corporation. Mr. C. F. Wike, Borough Surveyor:—
 John Morton, Sheffield £203 16 6
 John Bahelly, Sheffield 203 10 0
 Longdon & Son, Sheffield 200 0 0
 Dutton & Evans, Sheffield 193 0 0
 J. Cuthbert, Nottingham 166 10 0
 * Accepted.

SUTTON (Surrey).—For building volunteers' drill-hall, at Sutton, Surrey, for the commander. Mr. J. L. Cole, architect:—
 Bernard, Wallington £487 0 0
 Harris, Sutton 425 0 0
 Humphris, Sutton 400 0 0
 Potter, Sutton 345 0 0
 Adams (accepted) 314 0 0

TOTTENHAM.—For alterations to ice cellar, Grove House, Tottenham, for the Lager Beer Brewery Company. Mr. C. C. Dunch, architect:—
 Laurence & Son £1,200 0 0
 Chappell 1,064 0 0
 Shurmar 984 0 0

WARESIDE (Herts).—For erecting a Wesleyan Chapel, Wareside, Herts. Mr. F. Borcham, architect:—
 Goodman £565 0 0
 Wickham 519 0 0
 Hitch 518 0 0
 Pocock 483 0 0
 Lawrence (accepted) 463 0 0

WOODBIDGE.—For alterations and additions to "The Grange," Woodbridge, for Major J. E. W. Howey. No quantities supplied. Mr. J. T. Newman, architect, 2, Fen-court, Fenchurch-street, E.C.:—
 H. B. Smith, Ipswich £2,200 0 0
 Edward Adams, Woodbridge 2,174 0 0
 G. T. Gibbons, Ipswich 1,540 0 0
 F. Bennett, Ipswich (accepted) 1,750 0 0
 [Architect's estimate £1,800.]

Warehouses, Golden-lane.—Messrs. Dearing & Son, of Islington, write to say that in last week's issue of the *Builder*, in the list of tenders for building warehouses, Golden-lane—Mr. G. C. Pawley, architect—their name was omitted from the list. The amount of their tender was £1,900.

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TO CORRESPONDENTS.

J. A. (shall have attention).—R. M.—W. O. (letter forwarded).—H. W. P.—H. D. (write to Messrs. Legrand & Sutcliffe, 109, Bunhill-row, E.C., who make that class of pump).
 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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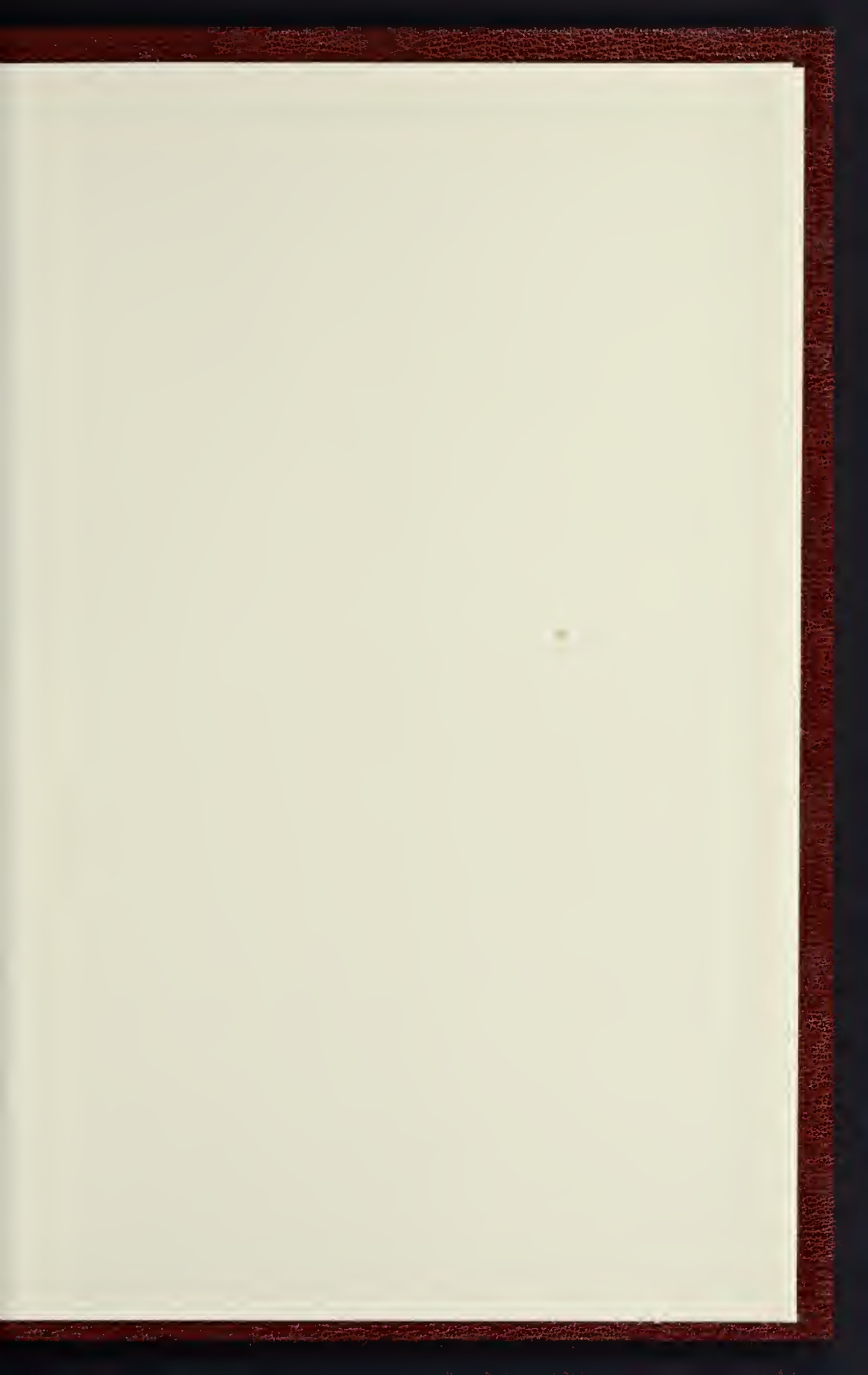
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