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CONTENTS.

SUMMARY:—

The Philadelphia Public Buildings. — The Case of Gendell vs. Orr — An Architect's Copyright. — The Amelioration of Elevator Accidents. — The Mississippi Improvement Convention. — The Edinburgh Trades-Union Congress. — Anecdote of Viollet-le-Duc. — The Sanitary Engineer's School-House Competition	129
HYGIENE AND PUBLIC HEALTH. II.	130
TANAGRA FIGURINES	131
THE ILLUSTRATIONS:—	
House in Belmont, Mass. — Country House in New York. — Design for a Slow-Burning Cotton-Mill	132
THE HYPETHRAL QUESTION	132
CORRESPONDENCE:—	
Letter from Paris	134
CLEOPATRA'S NEEDLE	135
COMMUNICATIONS:—	
The Detroit Competition. — A Millionaire's Cathedral	135
NOTES AND CLIPPINGS	136

THE season having arrived for the annual appropriations, with it has arrived the annual — unpleasantness, shall we say? — between the City Councils of Philadelphia and the Public Buildings Commission. The Commission, as our readers remember, serves under the act of the State Legislature which took the control of the new city building out of the hands of the Councils to vest it in a special commission, and requires them to vote money for the building on the annual requisition of the Commission, — an act which the city has of late striven vigorously to disregard or set aside, but which the courts have enforced against it. The struggle of each of the last two or three years has ended in the Commission having to reduce its requisition, and get along with twenty or twenty-five per cent less than its first demand. Thus two years ago it demanded seven hundred and fifty thousand dollars for the year's expenditures, while the city vindicated its dignity and lightened its taxes by granting only six hundred thousand. Last year the Commission called for a million and a quarter, and got three quarters of a million. This year it has made its requisition, as before, for a million and a quarter, but is again met with obstruction, and is called upon once more to reduce its estimate. It has therefore sent a communication to the Councils, saying that to do the work which it thinks should be done this year, that is, to carry up the fronts of the building to the level of the cornice, and to make the southern half of the building ready for the roof, will require not less than the amount called for. It suggests, however, that by leaving out a large part of the interior work which it was intended to include, and in particular, the communication takes opportunity to say, by omitting to finish the rooms which it has been expected that the Councils would presently occupy while waiting for the rest of the building to be finished, the expenditure may be reduced, as it was last year, to three quarters of a million. This the Commission puts forward as its ultimatum, and in the light of past history we may suppose that to this it will come.

WE mentioned three weeks ago the trouble of Mr. Gendell, an architect and builder of Philadelphia, who, having built himself a porch in which he took pleasure, found that a fellow-builder had surreptitiously made drawings of it, and was copying it in one of his own houses; and who therefore had appealed to court for an injunction against his plunderer. The injunction has been dissolved by the court, the judge ruling, in his opinion, that the essential point in the case was the question whether the plaintiff, who had taken out no copyright, had actually published his design, in which case he was entitled to no protection. Upon this question the court said: "To publish is to divulge, to utter, to make known to the public, that which was before private or unknown. To say that placing or erecting a design or work upon the highway, with an unrestricted view, without notice of any privacy, for a period of three years, was not a publishing of it would be a singular and unwarrantable denial of the legal meaning of such a term. Any free exhibition of a work of art has been determined a publication as well as the printing and circulating of a book. A dedication by the author to public use is not required to make the design public. Any way by which the novelty or design is communicated or made known is a publication."

This decision would probably be generally sustained; and although a distinction in intention may be drawn between simply placing a product of invention for the sake of its necessary use when it is impossible to conceal it, and issuing or exhibiting it for the sake of the advantage to be derived from laying it before the public, the publicity being in one case the invariable incident of its use, and in the other case the purpose of the display, this point is fairly met by the remark of the judge that "three years upon the highway must certainly be regarded as an abandonment of any right, else the copyright law, which confers the remedy and the protection that the plaintiff seeks, would become useless." That is, copyright, the only protection known to the law, would be superfluous if the law held the architect to be secure without availing himself of it. There is no question that architects, if they were called upon to choose between keeping their work out of sight and receiving the advantages of publicity with the risk to which they are exposed of being defrauded by copying, would choose the publicity. These appear, in the present condition of jurisprudence, to be the only alternatives open to them, and it is not likely that any other will be provided, — except so far as they may avail themselves of the copyright, which they are not likely ever to do to any great extent. The only other defence to which they can look is in public opinion, and the growth of a common delicacy about appropriating the fruits of other men's labor, which we cannot expect to see advance very rapidly, if it comes at all. There is besides for the cleverer men the consolation, so far as it goes, of knowing that the better worth copying their work is the more difficult it is to copy, and the more flattering will be the difference between the copy and the original.

WE have more than once called attention to the dangers of elevators, and to the certainty that as they are now used a great many serious accidents must from time to time happen to them. An efficient contrivance for diminishing the danger of the worst of these accidents seems to be that of Mr. Ellithorpe, who has hit upon the device of putting an air-cushion at the bottom of the well to check the blow in case the car falls. A tight box is provided at the bottom; into this the falling car plunges, and the air that is compressed beneath forms the cushion which breaks the fall. The principle is familiar, and indeed has been applied to the same use in Gray's safety attachment for elevators. An experiment was safely tried the other day at the Biddle House in Detroit. An elevator car containing seven persons was dropped sixty feet by cutting the rope from which it hung. The car fell with frightful swiftness, but brought up safely at the bottom. A bench, which seems to have been overloaded, broke, but the passengers were unhurt, and a dozen eggs with which heroic hardihood had strewn the bottom of the car escaped unbroken. A previous experiment at the Parker House in Boston had not been so lucky, and showed the danger which is common to inventors of overlooking, while their attention is fixed on the main feature of their invention, the collateral conditions on which its success may depend. The well in the lower story was closed by a door. This with its casement was blown out of the wall by the compressed air, which, escaping, let the car down abruptly enough to shake and bruise the passengers in a way that sent them to their beds, though without permanent injury, we believe. The car and the passengers in this case weighed some four thousand pounds, and fell through a height of about eighty feet. It was certainly a naïve confidence that expected any ordinary door-casing to withstand the shock of this tremendous impact; nor is it quite easy not to smile at the innocence of the passengers, who prepared themselves to meet the worst by seating themselves upon the floor of the car, thus carefully presenting the end of the spinal column to meet the apprehended shock and transmit it directly to the brain. We would remind all our friends who may venture on similar experiments that boys, when they jump from sheds, with a safe and native instinct take pains to light upon their feet, with loosened knees, which break the jar by a natural spring.

A CONVENTION of persons interested in the improvement of the Mississippi and its tributaries has been held at Quincy, Illinois. The President of the convention was directed to appoint an executive committee, who should memorialize Congress and urge legislation for the improvement of the river. Two sets

of resolutions were laid before it by the committee appointed for that purpose. The majority recommended that the main river and its tributaries be provided for together by establishing a series of reservoirs on the upper waters, which should equalize the flow of wet and dry seasons. They also proposed that cities and inhabitants upon the banks of the rivers should be forbidden to use the water-power created by the improvement of the streams, or to obstruct them by wharves or by throwing rubbish into them, and that a permanent commission of three members from each State that borders on the Mississippi should be appointed to act as conservators. The minority report urged that it was undesirable to spend large sums on the tributaries, but that the recommendations of the convention should be confined to the improvement of the three main rivers, the Mississippi, the Missouri, and the Ohio. The majority report was adopted.

THE Trades-Unions of Great Britain have lately held a congress in Edinburgh, in which societies which together numbered more than half a million members were represented. Among these the building trades were most largely represented, the aggregate of the societies which sent delegates being near a hundred thousand. The masons' and the carpenters' societies each counted upwards of thirty-five thousand members, the bricklayers' and plasterers' each about eight thousand, while the largest single association was that of the Amalgamated Engineers, numbering forty-five thousand members. These figures cannot, of course, include more than a considerable fraction of the whole number of British workmen, and it is probable that many societies were unrepresented among them; but they are large enough to show that the workingmen are a great factor in the British community, and that if they were as influential as they are numerous and well organized, their political weight would be formidable. There are not, we suspect, any non-legislative assemblies in Great Britain, and none in the United States except the national conventions of the two great political parties, which stand for such large constituencies, and they indicate a tendency to bring a new class element into politics which is likely to become a very serious difficulty. The speeches made seem, so far as we see them reported, to have been of a more moderate kind than we sometimes hear; there is, fortunately, an influence in public deliberation and a great assembly which tends to moderate the transports of partisan utterance. The subjects which chiefly occupied the congress were, as usual, the benefits of trades-unions, and the means of extending their organizations. Accordingly we find speeches and resolutions in favor of increasing the representation of workingmen in Parliament, of uniting all the trade societies in the kingdom into a Federative Union, and a proposal to carry on "constant correspondence with the labor associations of other countries for the purpose of establishing friendly relations, and by that means to prepare for the holding of an International Labor Congress at the earliest opportunity." In matters of less general scope, we notice resolutions supporting the system of arbitration in trade disputes, against convict labor, and in behalf of coöperative societies, and of making masters responsible for injuries to their men. On this last subject a bill is now before Parliament which proposes to put workmen on the same footing as outside persons in regard to injuries which they may receive in the course of their work, from their fellow-workmen or otherwise.

THE following story is told of the late M. Viollet-le-Duc in an obituary notice of him in *La Lanterne*. "During one of his Alpine excursions, he was walking, tied by a rope to the guide, as is usual where glaciers have to be crossed. In traversing one, his foot slipped as he was jumping over a crevasse, and he fell in, but hung suspended by the rope, which was still attached to the waist of the guide. The guide tried to pull him up, but in vain. Then Viollet-le-Duc coolly took out his knife, and without hesitation cut the cord. By chance, he fell upon a small block of ice, which had lodged between the walls of the crevasse, and managed to seat himself upon it. Then he turned to the terrified guide, and said in a calm voice, 'Go now for help, but don't hurry, for fear you might meet with some accident.' The guide departed, and by and by returned with others, and they succeeded in pulling him out. Meanwhile," *La Lanterne* says, "he had pulled out paper and pencil, and was profiting by his exceptional situation to observe new phenomena of congelation." It is a pity that this story could not have ap-

peared in a more trustworthy journal than *La Lanterne*, but we give it for what it is worth.

THE enterprising *Sanitary Engineer*, more familiarly known as *The Plumber*, is encouraged by the success and usefulness of its last winter's tenement-house competition to propose to architects a new competition. This time it is a model school-house for which plans are asked, the requirements most insisted on being light, heating, ventilation, and security against fire. Five hundred dollars are offered, to be divided among four premiums for the best designs, the decision being made, as in the last competition, by a jury of experts. The conditions for competitors and the names of the jury are not yet made known.

HYGIENE AND PUBLIC HEALTH.¹ II.

PASSING over the excellent little papers which follow Professor Nichol's essay, we come to Part II., on Habitations, which opens with an ambitious treatise, long enough to make a large octavo volume, on "Soil and Water." There is evidence of reading enough and good sense enough on the part of the author to fill even this space profitably; but it is to be regretted that his matter could not have been digested with the help of a more extended experience. Very many illustrations and descriptions are borrowed from the books of Latham, Denton, and Eassie, of appliances and methods of work which are unknown or rejected in this country, and some of the best features of our own practice are passed over. For example, he illustrates Molesworth's "excellent provision" for disconnecting house wastes, which would freeze and burst twenty times over in one of our average winters, and, in the same way, cuts and descriptions are given of Jennings's English latrines, to the exclusion of Mott's New York pattern, which is at least as good; and, strangest of all, while hollow walls are highly recommended for preventing dampness, the "manner of constructing them" is asserted to be "as shown in the illustration," which is copied from Eassie, and represents such a wall tied with Jennings's patent bonding bricks, a kind of building appliance which is used to a very small extent even in England, while in this country it is, and will probably always be, completely unknown. The ordinary methods of hollow wall building, which are in constant use everywhere, the writer seems never to have heard of. So the Germans get the credit (page 407) of "a suggestion which has been made," to prevent the ingress of ground-air into dwellings. This suggestion is, to have a coat of concrete on the surface of the ground, and a wooden basement floor a foot or so above, the space between being connected with a chimney flue. Surely the president of a board of health ought to know enough of the practice of the larger cities to have heard that the Boston building law requires just such a concrete coating, air-space, and flue connection in the greater part of the houses erected in that city.

But it is in the descriptions of plumbing and sanitary appliances that the inexperienced architect or health officer will find himself most disappointed in this paper. Of drain-pipes several English patterns are given, such as the "opercular" and other access pipes, some varieties of combined sewers and subsoil drains, segmental stone-sewers, etc., none of which, nor anything similar to them, are known in this market, while the Stanford patent joint, the only English device of any importance which has become domiciled in this country, is omitted, and the pipes made of cement concrete, now so widely used, are entirely ignored.

In laying drains, the joints are directed to be "caulked with tarred gasket, and afterward finished with cement or clay in the usual manner." It is to be regretted that any countenance should be given to the miserable practice of jointing with clay. Nothing less than the best fresh Portland cement should be allowed, at least for branch drains. We ourselves do not much approve of gaskets for small pipes. By a little care the pipes can be held in position while the socket is filled with cement, and if this is carefully wiped out with a semi-cylindrical piece of wood, the joint is completely and smoothly made, and there is no fear of subsequent obstruction or leakage from the rotting of the gasket.

The author, although he does not approve of drains under houses, advises, where this is necessary, that they should be of glazed stoneware, with access pipes at intervals, for inspection. This is far inferior to the common practice of American plumbers, to make all drains inside a house of cast-iron with lead joints, hung to the ceiling or to the side walls; and the American mode of access, which consists in the insertion of a V branch once in ten or fifteen feet, with the free end closed by a brass trap screw, is much safer than the best jointed earthen pipe.

The descriptions of the various forms of plumbing apparatus which are or should be used are similarly defective. The author's opinion, in which all experts will agree, is that "very few of the many kinds of water-closets combine all the necessary requirements;" but we get from him little help to the knowledge of those "very few." He describes the well-known defects of the pan-closet, mentioning some of the ventilating attachments which mitigate its offensiveness, but omitting the greatest improvement of all, the enamelling of the re-

¹ A Treatise on Hygiene and Public Health. Edited by Albert H. Buck, M. D. Vols. I. and II. New York: William Wood & Co. 1879.

ceiver. The hopper he considers "cheap," which it certainly is not in use if properly flushed, but the Jennings closet is taken as the type of the better class of apparatus. Unfortunately, the primitive form of Jennings closet is chosen for illustration, with all its imperfections. The defect of the hollow plug overflow is noted, with the remark that this has been "recently" remedied by means of an inverted cup over it, the author apparently not being acquainted with the far better forms of overflow now applied to this closet.

Of traps, various English forms are copied from Eassie, all of them much inferior to the round trap, or ventilated siphon, or Adee's patent lead traps, which our plumbers habitually use, and a particularly bad closet trap is also illustrated, with commendation in Eassie's own words, in which a pipe purporting to ventilate the "pan" (container or basin?) of the closet leaves the trap just inside the sealing water and joins the vent-pipe which connects with the soil-pipe below the water seal, thus opening a clear passage around the trapping water, which might as well be dispensed with altogether.

But if Dr. Ford neglects some good things, he devotes what we think undue attention to some doubtful ones, such as the Rand system of house-drain ventilation, which we cannot but consider as being still in the experimental stage.

Every one knows what this consists in: a wrought-iron pipe, one and a quarter to two inches in diameter, taps the horizontal soil-pipe in the basement, and extends to the kitchen range, where it ends in a cast-iron box having gills inside, and exposed to the fire like the ordinary water-back. From this another pipe, also one and a quarter inch, or larger, for "purified air," ascends to the top of the chimney. "This," says one author, "will insure complete ventilation of the entire house drainage system." That would be important if it could be proved. The advantage of roasting the sewer air in the "cremator," as the inventor calls it, cannot be very great. If the heating kills the "bacteria," it must leave their charred remains, with the products of their combustion, in the air, while sulphuretted hydrogen and hydro-carbon gases would not be changed, and in the present state of uncertainty as to the nature of the deleterious components of sewer vapor, we should say that the risk of leakage into the kitchen cooking-apparatus through joints exposed to such violent alternations of temperature, with an additional possibility of explosion in case the air in the pipe were very highly charged with gas, would counterbalance the advantage gained, so that a different mode of applying the heat used to excite a current, if less economical, would be desirable. That the application of heat of some kind to induce a current is advantageous, seems probable. It is said, with great show of reason, that the mode now commonly used among our best plumbers of setting up a circulation in the drainage system by extending all the waste-pipes to the roof, with another large pipe carried from the roof to the foot of the horizontal soil-pipe, just inside the street trap, to supply air at the bottom of the system, while it would maintain a constant movement in one direction or the other if the pipes were filled with fresh air, is liable to be made inoperative by the gradual accumulation of carbonic acid and other heavy gases in the horizontal pipe, and the lower ends of the vertical ones, which trap the system like so much water, and can with difficulty be removed. This trapping must depend on the activity of the circulation in the inverted air siphon formed by the pipes, but in summer some such action is quite conceivable.

The Rand apparatus, though indicating the practice which may often be desirable, is in its ordinary form plainly inadequate. With the size of extraction pipe which the inventor proposes to use for ordinary dwellings, one and a quarter inch, it is evident that to produce a current in even one four-inch soil-pipe of three feet per second, which cannot be considered excessive, the air must pass through the small pipe at the rate of twenty-three and one half feet per second, or seventeen miles per hour. It is needless to say that no such blast could possibly be made to rush through a small and tortuous pipe sixty to eighty feet long, by any method like the one proposed.

What is the actual rate of flow through the small pipe, as measured by the anemometer, we have been unable to learn, and the inventor very frankly replies to our question by saying that his business is to "sell 'cremators,' not to apply anemometers," but an approximate idea may be gained from the temperature of the air in the pipe, which Dr. Ford informs us is, "with a slow fire, at a distance of four feet from the range, 300° F.; with a hot fire the temperature has risen to 500°." To our mind this is conclusive proof that the movement of the air in the tube is far too slow to be of much service, and it is rather rash in the author to talk about the "suction power of the hot-air box," and the "active circulation" kept up by such feeble means. However, the principle is commendable enough; if the aspiration pipe could be made four inches in diameter for the whole of its length, except the short portions which were connected with the "cremator," the flow would be enormously increased by the comparative elimination of friction, in the same way that a large water-pipe contracted in the middle to a small diameter will convey some four times as much water as a plain pipe of the same diameter as the contracted portion of the larger one.

This four-inch pipe might be made of cast-iron, at little greater expense than the one and a quarter inch wrought-iron; the only difficulty would be to make a satisfactory joint between the large and small pipes. The heating might also be accomplished with less obstruction to the flow than in Mr. Rand's present pattern of "cremator," and the efficiency of the ventilation thereby increased, but the improved current will involve expenditure of fuel, so that the adap-

tation of the apparatus to house use will probably be a work of time. Meanwhile, it would not have been amiss for Dr. Ford to mention the common mode of aeration of the soil-pipe by an opening at its foot, connected by a second pipe with the outside air, which in the majority of cases is sufficient without further assistance.

There are many interesting quotations and statistics scattered through the paper, part of whose faults are, perhaps, due to the great range of subjects which it is made to cover, and the consequent necessity of sacrificing some of the time which would otherwise have been spent in collecting practical information to the laborious collation of authorities on the multifarious points of theory which it was necessary to refer to.

TANAGRA FIGURINES.¹

WE mentioned some time ago the good fortune of the Boston Museum of Fine Arts in receiving from Mr. T. G. Appleton the gift of twenty-two of the little terra-cotta statuettes which have lately been found in the Boeotian tombs, and which are known as the Tanagra Figurines. This, which is the only collection of the kind that has ever been brought to our country, has given occasion for a small descriptive volume, of anonymous authorship, published by Houghton, Osgood & Co., and illustrated with heliotypes. These cleverly executed statuettes are, next to Dr. Schliemann's discoveries in the tombs of Mycenæ, the most remarkable and the most provocative of curiosity, as they are the most commonly attractive of the archaeological findings of the day.

The Tanagra Figurines are little statuettes in terra-cotta, from six to twelve inches high, mostly single, though occasionally grouped. Some two or three thousand of them have been found during the last half dozen years, and have been distributed among various museums and private collections in Europe, while a very few have been brought to this country. They differ from the clay images found elsewhere, in Sicily, Cyprus, and Mycenæ, for instance, in being at once more advanced in execution and more familiar, or we might say more domestic, in subject. They are for the most part female figures, draped in a variety of what we may suppose to have been the every-day costumes of the people who made them, or of their neighbors. With these are a smaller number of male figures, warriors, slaves, or other every-day subjects, and a number of statuettes of more heroic intention. The costumed figures are or have been painted in lively tints, sometimes enforced with gold, even the hair and flesh being colored, as is shown by many traces of the original pigments, and even by some statuettes in which the whole coloring is tolerably well preserved.

As to what archaeological deductions are to be drawn from these remains, and what sequence can be established between them and the analogous images found elsewhere in tombs, scholars are not yet agreed. Some have argued that being found in tombs they must have a religious intention; but the majority have come to reject this theory, and accept them rather as intended simply for ornaments. They seem, in fact, to rank with the Dresden china figures or Paris bronzes of our day, and might fairly be called the *genre* of classic sculpture. The greater part of them seem to be figures from ordinary life, in ordinary costume, representing actions and attitudes familiar rather than heroic or statuesque. The costumes are in the main those to which we are used in more serious classical sculpture and in vase painting, but with a certain every-day air and unheroic adjuncts of dress — fans, mirrors, hats, and the like — which we have not before seen commonly represented. We may also assume that we here see indications of local and provincial habits and dress which we have not been used to find in the more ambitious or more conventional types of classic art to which we have been accustomed. There are among these little figures some which are evidently modelled on the higher statuary of their day, perhaps actual copies or imitations more or less remote of famous works, popularized, as it were, by the clever but carelessly independent treatment of skilled workmen.

Their execution, in fact, is very analogous to what we get from the ordinary Italian or French modeller of the present day. They show facile handling influenced by the example of the better classic sculpture, which appears in the poise of figure and the management of drapery, and in a certain broad effectiveness of treatment. They suggest the productions of knowing craftsmen, guided by the traditions of better sculptors, able to give a certain style and vivacity to their work, but working in haste for a popular market, careless of proportion and of detail, and with a looseness of modelling which sometimes becomes lumpish, or almost shapeless. They are indeed an interesting parallel to the remains of classic mural decoration that have come down to us, and we may naturally imagine that the wall paintings of Pompeii, the trade work of the professional decorators of their time, have something the same relation to the lost works of the great Greek painters that these knowing little statuettes do to the preserved works of Greek sculptors. They may very well have held among the works of art of their day an artistic rank and a popular use analogous to those of the chromos of our generation, with the advantage of coming from an age of far higher artistic attainment than ours.

The figures that we have seen look generally as if they had been

¹ Tanagra Figurines. Boston: Houghton, Osgood & Co.; The Riverside Press, Cambridge. 1879.

cast in rather rough face-moulds and finished with more or less care by hand, — the backs often hardly finished at all, and showing in many cases a square opening into the hollow within the figure. There is sometimes a visible mould-crease around the sides of the cast, which is of a form to free itself easily from the mould, the undercutting (of which there is not much) and the parts that would not *draw*, as the phrase is, showing that they were added by hand. In every way, therefore, like the gold ornaments found in the tombs of Mycenæ, they bear evidence of being the common marketable product of the people who made them, the supply for a large popular demand. In attitude and expression likewise, they affect the cheerful, natural, and familiar character that suits the every-day taste of all people, seeming carefully to avoid the serious and heroic. So that perhaps only a conscientious desire to attach solemnity of purpose to all the works of the classic Greeks, or a theory that everything which by primitive culture people have carried with them to their tombs must have had originally a religious origin, would have induced critics to ascribe a sacred purpose to these relics. Whether they were a production peculiar to the Bœotians, which there is no just reason to assume, we suppose, and how far they represent characteristics of manners and costume which were peculiar to them, will not be shown, if it appears at all, till we have other familiar relics of Greek life to compare with them.

The small octavo which we have before us tells with a pleasant vivacity, though with little method, the most of what is known about the Tanagra figurines, and a good many things beside, containing a variety of facts and speculations, historical or archæological, of a kind that would naturally present themselves to a lively mind as the fruit rather of a miscellaneous classical reading than of special scholarship. Some of the speculations will hardly hold water, we should say, and there are now and then questionable statements of fact, with occasionally a downright slip, — as when the author includes the Jews among the Aryan peoples, or gives the battle of Tanagra the date of 426 B. C., instead of thirty-one years later. The four heliotype plates, containing a dozen or more figures, give as good an idea as can be got of them without seeing the figures themselves. They are not all, however, from those in the Boston collection.

THE ILLUSTRATIONS.

HOUSE OF WILLIAM E. STOWE, ESQ., BELMONT, MASS. MESSRS. HARTWELL & TILDEN, ARCHITECTS, BOSTON.

DESIGN FOR A COUNTRY HOUSE. MR. THOMAS HASTINGS, ARCHITECT, NEW YORK.

DESIGN FOR A SLOW-BURNING COTTON-MILL. BY MR. RICHARD S. ATKINSON, BOSTON.

The accompanying factory plan is submitted as an example of an attempt to give architectural effect strictly subordinated to the conditions of safety or slow-burning construction, utility, strength, and freedom from vibration.

The buildings are planned with reference to the requirements of a cotton factory of 16,000 spindles and about 400 looms. The carding and spinning to be in the three-story structure, the looms in the one-story building adjacent. This arrangement of machinery is the one usually adopted in England, where the saw-tooth roof is commonly used on the weaving sheds in place of the monitor. The latter, however, is much more suitable to our climate.

The buildings would be equally well adapted to various other purposes, subject, of course, to such modifications as the special branch of industry required. For instance, for a woollen-mill. For a paper-mill, the dusting and sorting rooms in the separate buildings in the rear, the Fourdrinier machines in the one-story building, other work in the three-story part. For a machine-shop, the heaviest work in the one-story part. For a large establishment for printing books, the type-setting, binding, etc., in the three-story and the presses in the one-story part. For this purpose the three-story structure would be narrower, and should have monitors on the roof to light the composing room.

For a cotton or woollen mill, the walls should be 16 inches thick for basement and first story, and 12 inches above, hollow or solid, according to the preference of the owners.

In case more space were required for looms, the weave-shed might be widened and not lengthened, as the monitors prove in practice to give ample light and ventilation without regard to the width of the building, and it is desirable to avoid very long lines of shafting.

The proportions of the buildings could of course be changed according to the number of spindles or looms, or the kind and quality of other machinery to be provided for.

The beams of the one story building should be in two parts, each part 6 by 12, equivalent to single timbers 12 by 12, sustained by piers eight feet apart each way. Basement, 7 feet high in the clear, to contain shafting.

The beams of the three-story structure would be for the first floor the same as above. For the second floor, in two parts each 7 by 14; for the third floor, 6 by 12; for the roof, 6 by 10. Floors of 3-inch plank, with 1½-inch top floor, mortar or tarred paper between. Roof 3-inch plank, covered with approved material. The cornice to project two feet, the ends of the roof beams forming the brackets. No boxing, as it is useless and dangerous. No gutters.

Posts of oak bored lengthwise with half-inch holes for ventilation near the top and bottom.

Walls to be painted or whitened on the brickwork, no sheathing, casing, furring, ceiling or plastering, or other method to be used in any part of the building behind which fire can be protected from water, under any circumstances.

The stock-houses, picker-house, and other auxiliary buildings, to have concrete floors. The boiler-house to be 24 feet high, of one story if upright boilers are used, two stories if horizontal boilers are used. In the latter case, the second story to be made a fire-proof oven for drying purposes, when such a room is wanted.

It is proposed to use two independent engines, so adjusted that the machinery in each room can be operated without working the shafting in any other room.

The premises to be heated by the exhaust steam from the boilers, carried through overhead pipes hung from the beams in each room, as indicated in the section.

All portions of the building, in which the material worked is in a combustible form, to be protected by the Parmelee Automatic Sprinkler.

Full specifications and working plans would be required suitable to the specific use to which the buildings were to be adapted. They are being prepared for the buildings shown on this plan, with reference to their use for the manufacture of cotton fabrics.

The floor spaces proposed to be used in this building, if constructed for a cotton mill, have been computed substantially in accordance with the following table, assigning to each department one half the space designated therein.

COMPUTATION FOR A COTTON MILL OF 32,000 SPINDLES.

No. 24 Yarn.

	Pounds, about.	Total.	Stock.	Shafting.	Operatives.	Total Weight.	Floor Space.	Average Weights.
6 Lappers.	12,000	72,000	280	13,000	300	85,580	In sep. build'g.	
240 36-inch Cards.	1,600	384,000	4,800	11,920	275	400,995	} 17,806	23.30
2 Doublers.	800	1,920	40	1,100	190	3,100		
12 R. W. Heads.	800	9,600	80	1,100	190	10,880	} 5,184	8.52
21 Drawing.	2,000	42,000	850	1,250	180	44,280		
36 Roving Frames.	9,000	32,000	2,000	14,500	4,300	344,800	} 12,528	27.52
90 Spinning Frames, 176 Spindles each.	4,000	330,000	15,540	125,000	1,830	502,160		
24 Mules, 672 Sps. each.	10,000	240,000	16,000	24,000	2,800	282,800	} 21,192	31.42
8 Spoolers.	2,000	20,000	800	5,000	825	27,515		
6 Warpers.	450	2,700	700	410	500	4,370	} 5,184	6.15
2 Slashers.	400	4,000	5,600	2,200	480	12,280		
8 Drawing-in Frames.	60	480	1,600	1,000	1,000	3,080	} 5,760	26.06
800 Looms.	800	640,000	128,000	140,000	16,000	924,000		
		2,022,540	175,880	326,420	28,300	2,550,200	123,532	30.72
						512,032		
						3,072,232		24.86

Add for contingencies 20 per cent.

The greatest concentration of weight is immediately under the slashers, and as the floor reserved around the slashers is used to pile headed yarn-beams upon, the weight at this point is relatively much more than the figures show.

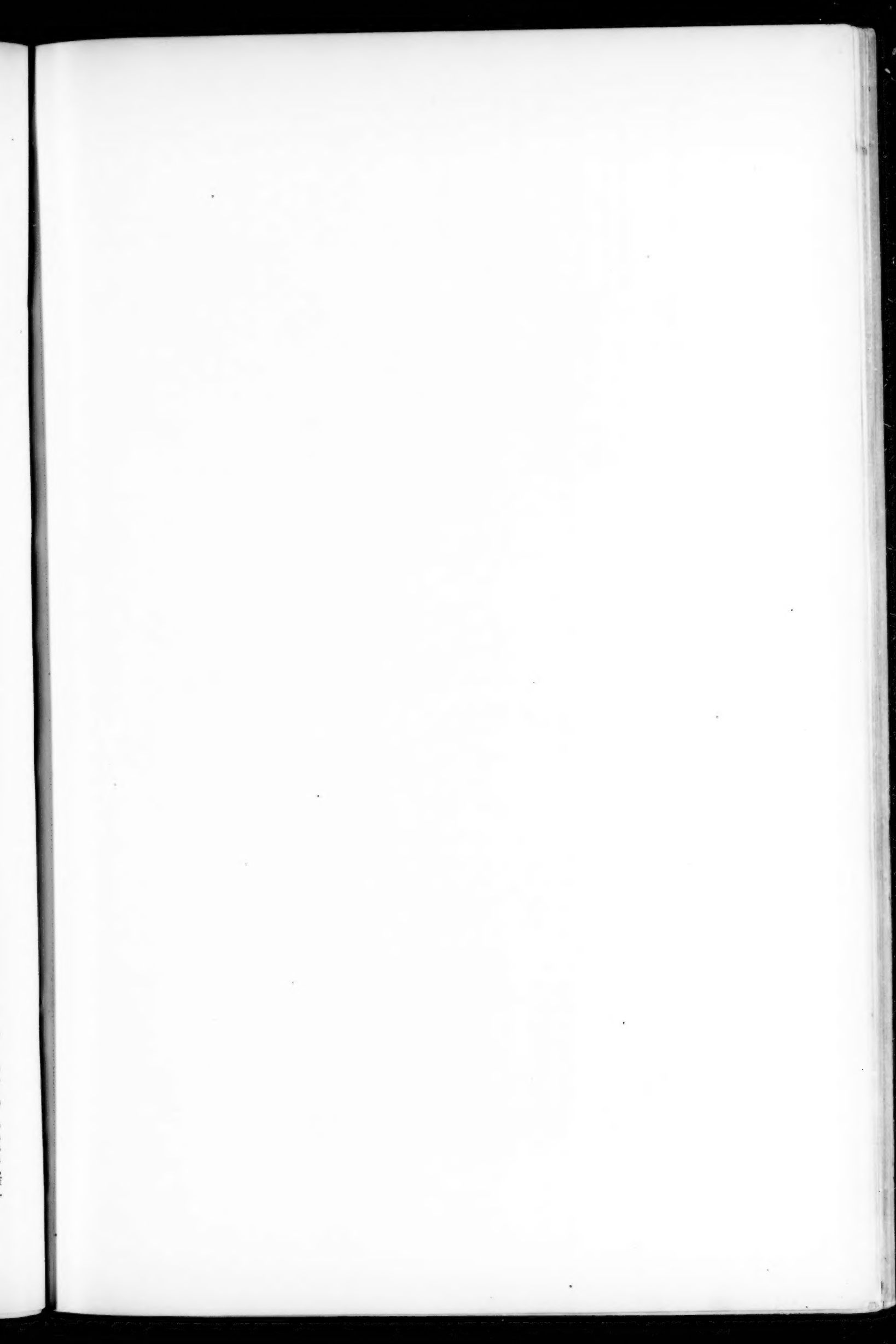
The motive of this plan has been to indicate the architectural effect that may be permitted, consistent with due regard to economy, safety, strength, and utility.

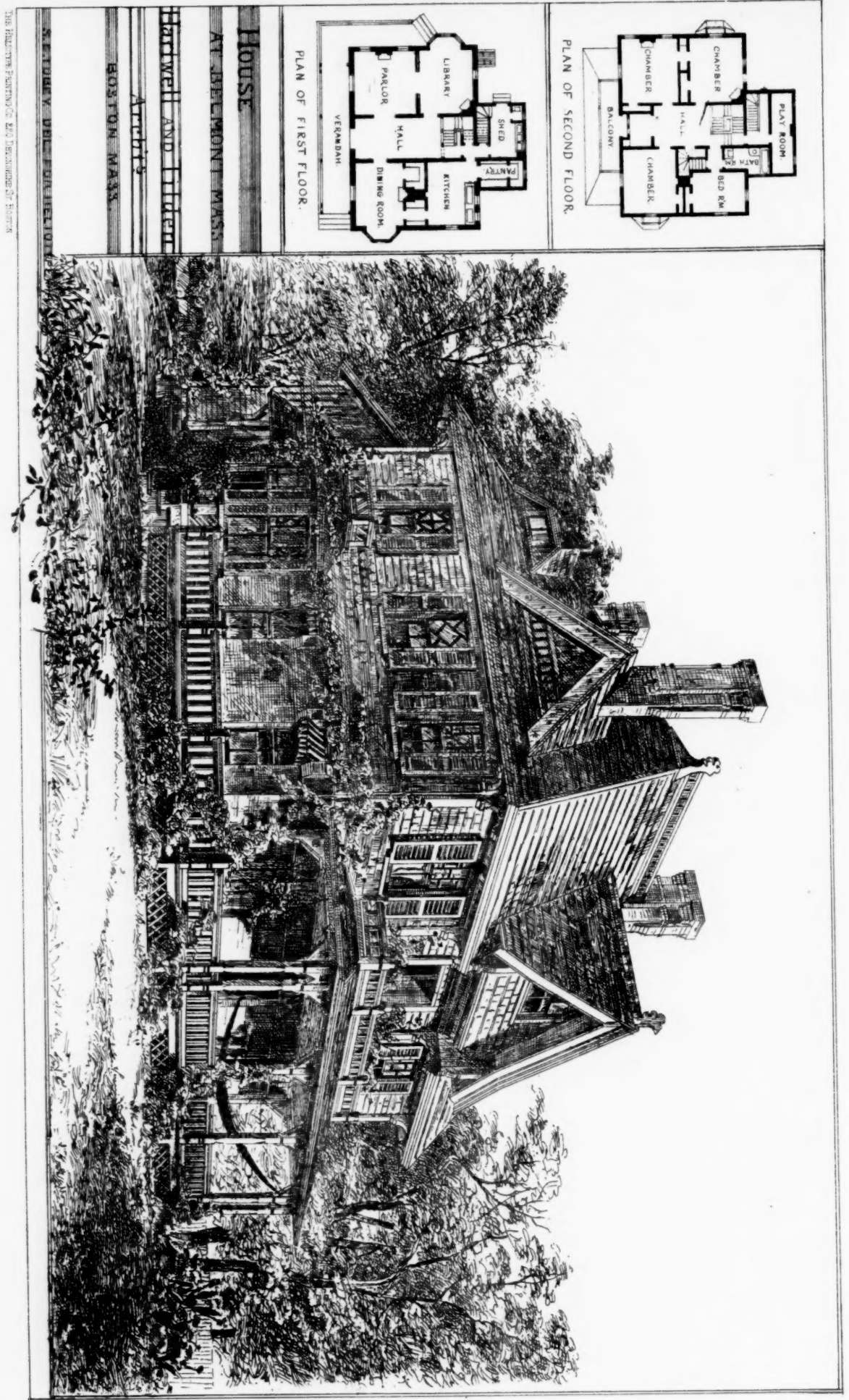
THE HYPÆTRAL QUESTION.

MUNYCHIA HARBOR, September, 1879.

Mr. Editor, — You will allow one reply to Mr. Davidson's attack upon my paper, for his polemic, if accepted, as it naturally may be by readers not familiar with the somewhat unprofessional points involved, would lessen the confidence and interest of many whose esteem I most highly value. The Parthenon, the great temples of Olympia, Pæstum, and Delphi, prominent monuments of Greek Doric architecture, are, with many others, held to have been hypæthral. This, upon the testimony of Vitruvius, whose words are generally directly referred to two of these by the advocates of the theory. By hypæthral I understand, as is always understood in architectural usage, lighted from above through a horizontal opening in roof and ceiling. Only one writer has ever questioned the belief that this was the manner of lighting these buildings, — Dr. Ross, whose most excellent essay is referred to, whose position is defined at the outset of my argument, and from whom I differ fundamentally as concerns the illumination. Since the first assumption of the hypæthron, some hundred years ago, artificial light within the temples has, to my knowledge, — and I believe I am reasonably familiar with the literature of the subject, — not once been maintained. Such being the case I felt a little surprised at some of the statements of the review.

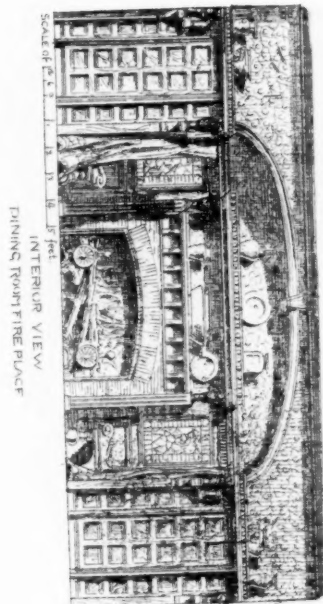
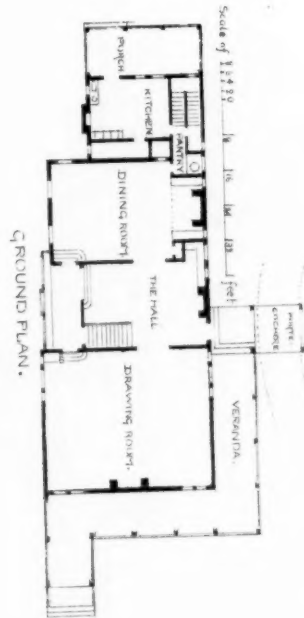
Whether the arguments urged throughout my paper were or were not merely subjective, whether they concerned or did not concern the hypæthral question, I am, at least, positive that my standpoint was neither "adopted" nor "selected" from that of others. I will not here adduce additional literary testimony touching the subject, nor publish some little architectural insight gained from study of the remains, but will follow Mr. Davidson's objections step by step.



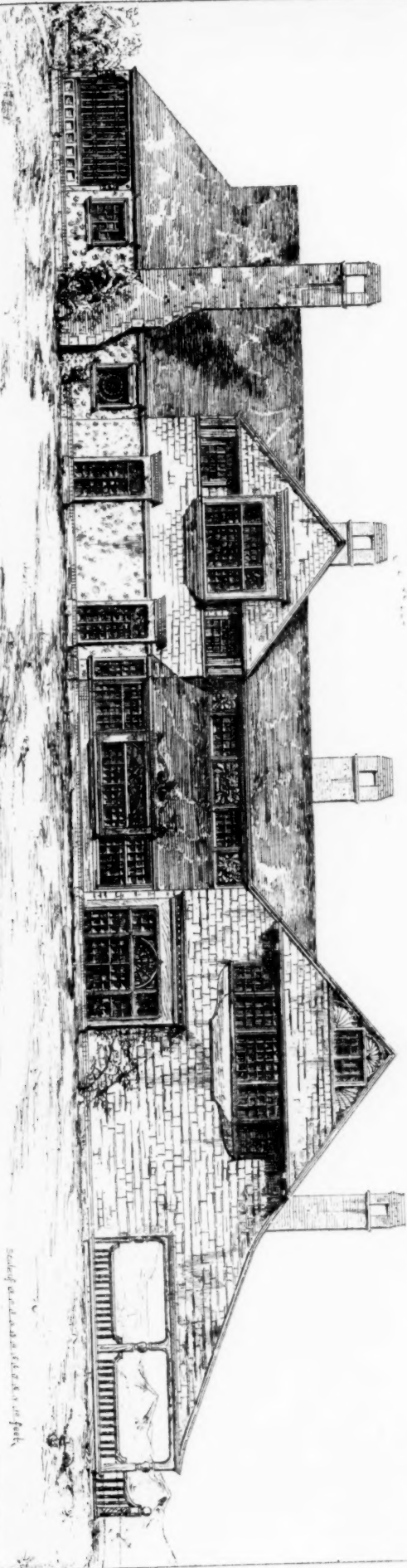


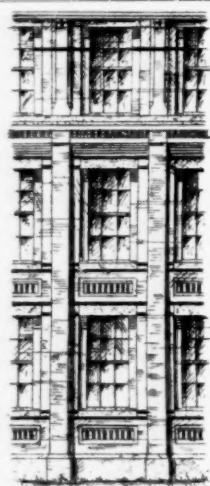
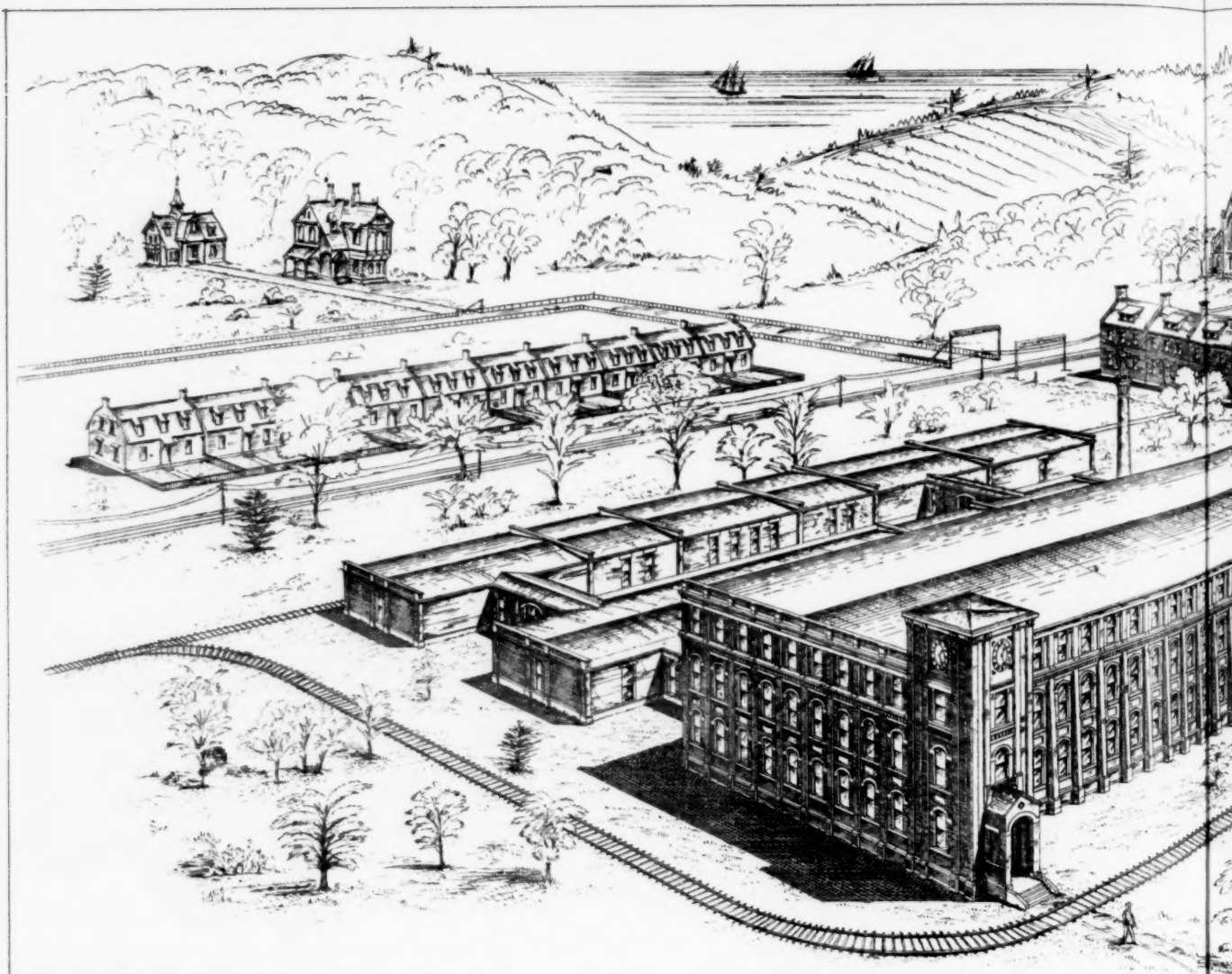
THE HOUSE DRAWING BY E. D. DICKINSON OF BOSTON

House
AT BILMONT MASS.
Hartwell and Hiden
Archts.
BOSTON MASS.

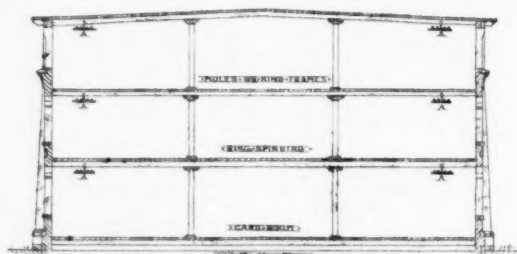
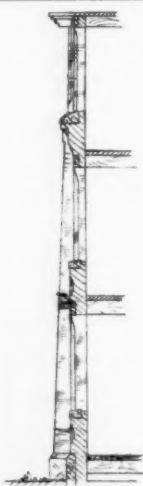


SKETCHES FOR A COUNTRY HOUSE.
THOS. HASTINGS, DEL.
27 WEST 46TH ST.
NEW YORK.





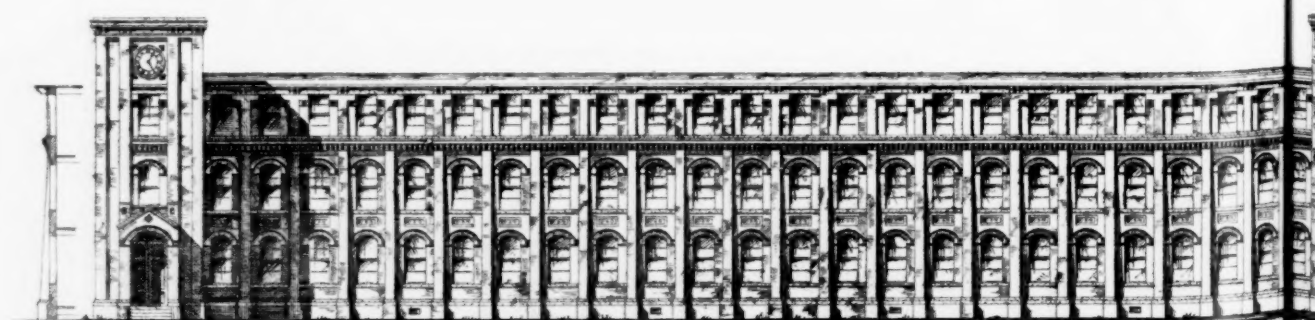
ALTERNATIVE ARRANGEMENT FOR WINDOWS

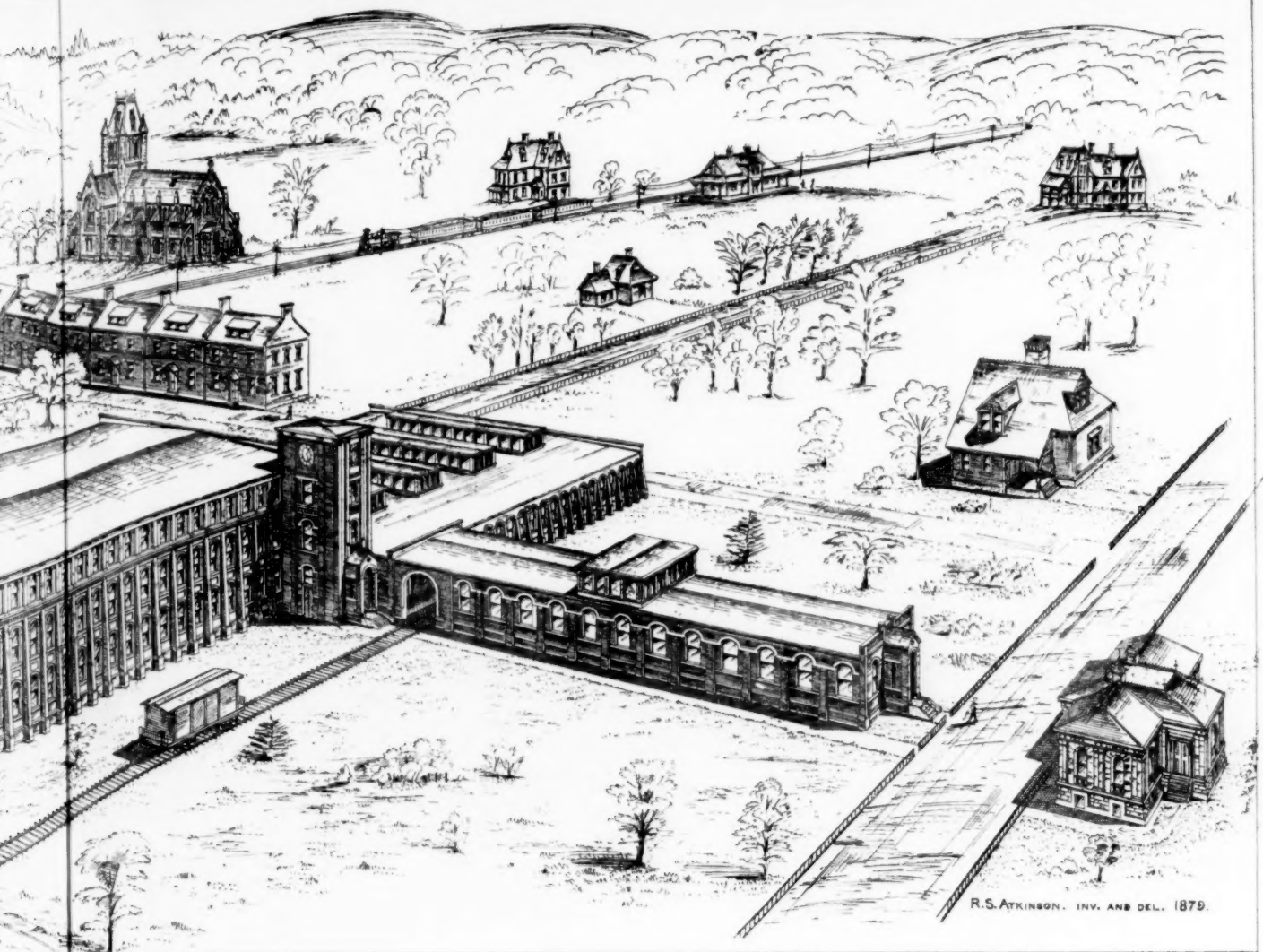


SECTION OF MAIN BUILDING



DESIGN FOR
ON THE SLOW BUILDING
APPROVED
BOSTON MANUFACTURERS' ASSOCIATION

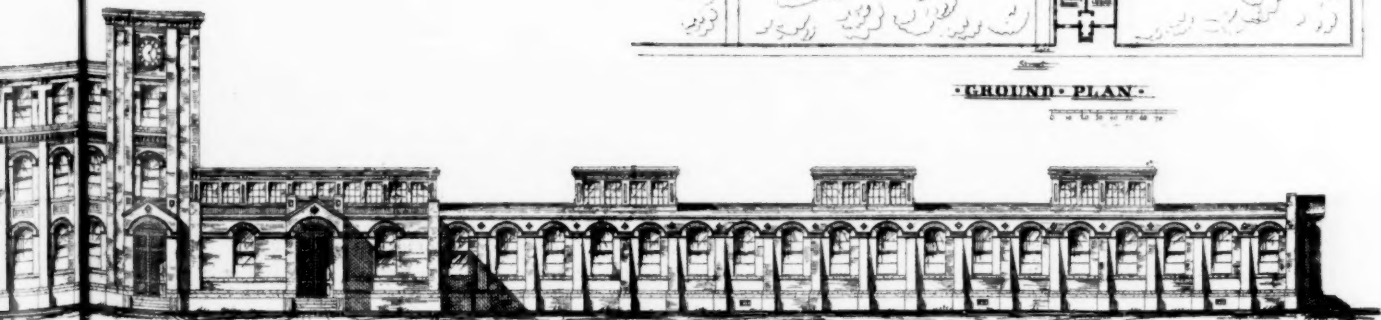




DESIGN FOR A MILL

E · SLOW · BURNING · PRINCIPLE ·

APPROVED BY THE
ACTUERS' MUTUAL FIRE INSURANCE CO.



• GROUND PLAN •

R.S. ATKINSON. INV. AND DEL. 1879.

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7 P

And first to the hinge. Though stated that "it is not true, in any sense, that the passage from Vitruvius is obscure," those self-contradictory lines, at variance with that to which they are made to refer, are still subjected to the interpolations and questionable emendations which they have called forth from so many commentators. To the formidable array of these latter Mr. Davidson is himself now added, he altering the Latin text, notwithstanding that its sense was already to his mind "explicit, clear, and unequivocal," so that it may refer alone to the temple of Olympian Zeus, at Athens.¹ But the example given by Vitruvius has eight columns upon its front, and this temple unfortunately had ten. And here we have an explanation of the unequivocal text which is truly unparalleled among previous attempts to fit the passage to an individual theory. The *octastylus*, the exception to the *decastylus*, which here, as in the foregoing description of the dipteros, refers to the exterior front of the temple, he holds suddenly, and without a word of justification, to apply to the interior, to the columns of the hyperoön, columns which in Greek architecture seldom existed upon either of the "ends," — never upon both. Not a thought is given to the explicit *in prona et postica*. Moreover, the supposition that the flight of shafts which would be seen within the naos in a transverse section of the temple of Olympian Zeus, in Athens, could have been eight is an impossibility. The number would be six at the most, more probably only four. To consider an hypæthron — that is to say, simply nothing, the open air — as being built into a permanent temple, thus leaving an opening in the roof of the structure when this "ran all the way around it," is, indeed, a curious architectural conjecture. This, I believe, is the only new fact or testimony brought to bear upon the subject by Mr. Davidson. Considering that the degeneration of the styles of Greek architecture, the gradual substitution of formalism for thought, began in the third quarter of the fifth century B. C., and it may be said that Vitruvius, who wrote very near the advent of the Christian era, was about as far from Ictinus as we are from Jeanne d'Arc; that the subordinate Roman government builder had never been in Greece is a conviction gained from the interior evidence of his book, and was advanced as nothing more. If my critic finds the suggestion of the possibility of error in the manuscripts so "very amusing," he certainly has occasion for amusement in the absolute contradictions, the proposed impossibilities, the misstatements of every kind which follow each other from page to page of the ten books. Concerning the statement that the temple of Olympian Zeus, at Athens, was without a roof in the time of Augustus, Mr. Davidson says: "We know nothing whatever about the matter. This is another baseless assumption." Now it so happens that Livy,² who saw the temple nearly at the time when Vitruvius wrote, speaks of it as *inchoatum*, as does also the contemporary Velleius Paterculus.³ Strabo⁴ calls it *ἡμιτελές* at this period. And that Vitruvius himself well knew its condition is clearly seen from VII. *præf.*, "*cella magnitudinem et columnarum circa dipteron collocationem, epistylorumque ceterorum et ornamentorum ad symmetriam distributionem*," etc. This is a most exact description of the advance of the building; cella walls, the columns with the entablatures, stood and bore the coffered stone ceiling, *ceterorum ornamentorum* of the pteroma. That is to say, the temple was without a roof, stood, as so many did, for some time without wood-work, the naos was uncovered, *medium autem sub deo est sine tecto*, as our author appears to have expressed it. Why, in this respect, it was not an example of an hypæthral temple in the literal sense of these words, will not be easily explained. That Mr. Davidson should take the passage to refer to this incomplete building is a gratifying support of my assumption, which the retranslation of the text into Greek only strengthens. To conclude this consideration of the Roman writer's testimony I would remark that the two other passages in which the word *hypæthrus* or its derivatives are employed⁵ also do not refer to any half-roofed scuttles or to any structure whatever, but mean simply and only out-of-doors, not under roof at all. Why then should I "venture to dispute" the first of these, the well-known fact that the Roman gods of the sky, lightning Jupiter, Sun, Moon, and Heaven, were conventionally worshipped in the open air? No more need be said concerning the passages from Justin and Strabo than was in my paper, to which I would refer for much Mr. Davidson has overlooked or ignored. He states, "we have no proof that there were galleries in any Greek temple save one, and existing remains rather discourage than countenance the notion of their having been at all common." Now to speak of Doric temples alone, there is direct literary evidence to the existence of the hyperoön in the Delphian⁶ as well as the Olympian⁷ temples. It actually is to be seen and measured in Paestum, and he who can study so many of the Sicilian temples, and can attempt to picture to himself the antique arrangement of the Parthenon interior, without becoming aware of the galleries, must advance to the question with prejudice or with insufficient architectural understanding. It is not a weighty argument against those in the Parthenon, that "they are not mentioned by Pausanias," who says not a word concerning the building itself, and disposes of the gable groups, the chryselephantine statue, and all the other wonders, in three or four short sentences.⁸

The illustration of the Acropolis, published in the German *Mittheilungen*, is one of those to which I especially referred. Of all contemporary views it alone shows the manner in which the steepness of the roof was increased. (Compare page 31.) If "it is true that what little evidence we have goes against the notion of an hypæthron," an admission, certainly, how can it "yet be in favor of lighting from above"? If "no doubt, the Parthenon was covered with the original tiles," covered completely, as we know from Tavernier, I cannot see why "this fact has no bearing upon the lighting of Greek temples." But it is grievous to see that so long, and, as I hoped, so clear an explanation of the origin of the peculiar opening in the Pantheon dome has been in vain. As for "the small, very old temple, possibly of Hera, near Karystos," there are many good reasons to exclude it from the argument. The best authorities⁹ conclude that it was naught else than a goat-house. Nothing characterizes the hut as a temple. Whether the gap between the projecting blocks which partly cover it was intentional, and thus to remain, is doubtful. Apart from all this the fane, if such it was, could only be considered with the open metopes of the pre-historical period, Doric cellas which existed before the introduction of the Egyptian peripteros and the hieratic changes which this form involved in the earliest ages of Greek architectural history. My paper was but the single chapter of a projected work, and a consideration of these points would not there have been in place. They were omitted neither from ignorance nor from neglect. To the right "facts steadily to be borne in mind to ease future discussions," the following remarks may be offered. 1. The two examples given by Vitruvius were in Greece. There never was an octastyle Corinthian temple in Athens. The famous passage must then, after all, have bearing upon the lighting of Doric and Ionic, or, as it is elsewhere stated, of the larger Greek temples. 2. If the buildings are not assumed to have been either unfinished or dismantled, this second "fact" is an unqualified reassertion of the hypæthral theory, and as no proofs are adduced can only be denied.¹⁰ 3. The supposition that Greek constructors "who could rear a Parthenon" were unable to roof temples like those of Zeus, at Ilion and Athens, by means of a trussed roof which could have bearings upon cella walls, and hyperoön columns, need not be discussed before architects. This Athenian temple, with a maximum span of 14 metres, stood opposite the vast cedar roof of the Odeon of Regilla, which had a clear span of 72 metres between the walls, over 240 feet, five times that offered by the temple. 4. The Telesterion of Eleusis was not a temple, but a house of assemblage. Enclosing thirty-five times the area of such temples as the so-called Theseion or that of Ægina, the extent would compare favorably with our largest halls and churches. For such a building natural light is necessitated by its destination. (Compare the standpoint of my paper, page 27.) It was a basilica, was completed story by story. Plutarch says "Xenokles of Cholarge crowned [that is, finished] the clerestory upon the palace-like hall."¹¹ 5. To satisfy a curious religious conception, for an understanding of which I quote below two passages,¹² several tiles were removed from the slanting side, *prona pars tecti*, of the roof of the temple of Jupiter Capitolinus, at Rome, thus giving the appearance that its continuity was perforated, *perforatum tectum*, by a diminutive *exiguum*, hole; and causing the remarks of the five authors who mention it, and who, fortunately definite, use these terms as something queer. That this has no bearing upon the question otherwise, perhaps, than as demonstrating that the roof was not cut into by an hypæthron, is evident; and it is not necessary to apply to it the unequivocal statement of Vitruvius, then certainly speaking of that with which he was well acquainted, that no hypæthral, no roofless temples stood in flourishing and well-repaired Augustan Rome. 6. The question of ventilating a lamp-lit naos is far from a difficult one. But, were it absolutely impossible, the almost imperceptible smoke of naphtha flames would hardly have done as much damage to chryselephantine statues, to thin plates of ivory secured by isinglass to a core of many-jointed pieces of wood, as an occasional shower of rain. Though "ancient wall paintings were almost weather-proof," ancient silk tapestries, ancient

¹ Paus. i. 24.

² K. F. Hermann, *Ztschr. f. Alterth.* 1849, 19, and L. Ross, *Griech. Königsreisen*, ii., p. 31.

³ Pausanias uses the words *οὐκ ἔχων ὀροφον* (to Mr. Davidson "seemingly his expression for 'hypæthral,'" though often given *οὐκ ἔχων ἐπὶ ὀροφον*, effectually precluding such an understanding), as well as the synonymous *ἔχων οὐτὲ ὀροφον*, for temples uncompleted, with roofs fallen in from disrepair or fire, and dedicated not alone to Zeus or Metros Theos, but to Apollo, Athene, Aphrodite, etc. Compare i. 1, ii. 12, viii. 41, iii. 21, ii. 36, iii. 22, ii. 18, and many more. The last "neither states that the roof was destroyed or decayed," and was not dedicated to Zeus, but to Demeter.

⁴ This is the exact architectural sense of *τὸ δ' ὀραῖον ἐπὶ τοῦ ἀνακτόρου Ἐλευσίνης ὁ Χοάργης ἐκρόφιστος*. It is plain that a mere opening, an hypæthron, could neither be built up (*κορυφῶν*), nor placed upon (*ἐπὶ*) the hall. Hesiychius defines *ὀραῖα* = *θύραι*, window or doorway, a vertical opening; *ὀραῖος* is that which is therewith provided. This is made still clearer by the verb, which is derived from *κόρυς*, helmet. In English we call such a superposed clerestory as was upon the Eleusinian hall a "lantern;" other languages still term it a "helmet." Both these technical expressions are figurative; the building was, indeed, helmeted by the small upper story. I sincerely regret having to publish this apart from its connection and illustrations, apart from much that explains and supports it.

⁵ *Quid, nova cum fierent Capitolia? nempe decorum*

Cuncta Iovi cessat turba, locumque dedit.
Terminus, ut veteres memorant, inventus in aede
Restit, et magno cum Iove templum tenet.
Nunc quoque, ne supra ne quid nisi sidera cernat,
Æneïdum templi tectis foramina habent. Ovid, *Fastorum*, ii. 667, 673.

Again:—

"Unde in Capitolio prona pars tecti patet, quae lapidem ipsum Terminus spectat; nam Terminus non nisi divo sacrificabatur." (Servius ad Aen. ix. 448.)

This is certainly clear. Terminus was found in the temple, would not give up his place, and must see the sky.

¹ For the text, fixed with diplomatic precision, compare K. F. Hermann, *Einleitungsschrift*, Göttingen, 1844, and Boetticher, op. cit. No manuscript gives *est* for *et*.

² Livius, xiv. 20.

³ V. Patere, i. 10.

⁴ Strabo, ix. 336.

⁵ Vitruvius, i. 2, and v. 9.

⁶ Pindar in Paus. x. 5.

⁷ Paus. v. 11.

musical instruments, ancient inlaid shrines, and all the manifold contents of the naos hardly were.¹ 7. If "the presence of burning lamps in temples does not prove that they were used for illumination," we may at least feel reasonably safe in assuming that they illuminated. 8. For the opening and closing of an hypæthral orifice in the Parthenon we will say, for instance, some 7 by 17 metres, or 23 by 57 feet, I would refer to page 16 of my paper, allowing full play for the reader's imagination to picture the means. 9. The eternal principles of constructive truth and rhythmic beauty, "aesthetic notions" to Mr. Davidson, are not of to-day nor yesterday, but are and ever will be the same as when so eloquently expressed in the architecture of Greece, twenty-four centuries ago. 10. The arrangement of the Erechtheion cannot be here discussed. I hasten and will only refer to the almost endless literature upon the subject. In the Pandrosion, where Mr. Davidson supposes the olive-tree to have stood, the usual western portico is omitted, and we see three large windows, the only ones among the remains of Greek hieratic architecture. The Erechtheion was thus hardly "a building from which the sun was excluded."

In conclusion, I humbly acknowledge the misapplication of my note "uppermost ceiling" to the passage of Strabo, and the misprint *ἑνάλθηα* for *ἑνάλθηα*. I appreciate the delicacy which published the former as "a worse than school-boy blunder."² Perhaps these two oversights, for they are in reality no more, and have long ago been corrected in my manuscript, may be forgiven me. I am unwilling to enter into controversy with an adversary whose spirit and aim I conceive to be other than my own, and definitely close the argument upon my side with this rudimentary consideration of the charges he has brought against the subject, none of which have been ignored.

Most truly yours,

JOSEPH THACHER CLARKE.

CORRESPONDENCE.

[From an Occasional Correspondent.]

THE PARIS INDUSTRIAL EXHIBITION.

PARIS, October 1, 1879.

LAST month a competition was held to obtain designs for a series of ten stained-glass windows to be placed in the Cathedral of Orleans, illustrating the story of Joan of Arc. The drawings were exhibited at the École des Beaux-Arts. Eleven thousand five hundred francs were given in prizes. The jury awarded the first prize of four thousand francs and the execution of the work to Lorin of Chartres. It was interesting to notice the amount of provincial talent represented, only five designs having been offered by Paris firms, whereas the provinces sent eight, one taking the first prize and four others taking prizes to the value of three thousand five hundred francs together. Most of the designs were very carefully studied, and especially in the first two showed a nice appreciation of the requirements of stained-glass decoration as used in church architecture, breadth and quietness of tone being carefully preserved, even in representing such stormy scenes as the capture of the Maid of Orleans by the English, while nothing like pictorial effect was sought for. But two of the windows were required to be indicated in color. The uncolored designs belonging to the first set were executed in pencil on greenish-brown paper, slightly touched up with white, and were very well indicated, little shading being used, but every pencil stroke being made to count.

The Annual Industrial Exhibition has been for some time in progress in the Palais de l'Industrie. It claims to be an international affair, but with a few exceptions the exhibitors are Frenchmen, Parisians. It has as much the air of a grand bazaar as an exhibition. Everything is for sale, and one can buy a cog-wheel or a diamond ring, a glass of soda or a pair of boots; but although there is so much that is commonplace, there are many individual exhibitions that are quite interesting and well worth study from an artistic point of view. And by opposition the display of safes might be mentioned as presenting very poor work in design. It might be supposed that the French, who as a rule succeed so well in giving character to their work, would have something really excellent to show in this respect; but the safes exhibited are either bare iron boxes, or else imitations of articles of furniture, adorned with colonnettes, fanciful frieze bands, painted ornaments, etc. There is nothing about the best of them to suggest the idea of security from fire and thieves.

But in handling of faience the French show a great deal of taste. Ch. Poyard has a very interesting exhibit in this line which contains some absolute gems of ceramic art, not showing, perhaps, the classic beauty of Sèvres ware, but bolder in design and in the use of color. Particularly noticeable is a pair of exquisite vases purchased by Prince Leopold. The general design is in the Persian spirit. The colors are light blue and white combined in a net-work of interlacing ornaments, Indian figs and conventional plant-forms running over the body of the vase, while on the edges of the handles and

down each side are vivid streaks of deep blue, enforcing and giving a pronounced character to the whole design. The effect is charming. Royalty has made several purchases in this exhibit. Queen Victoria, the Princess Louise, and the Princess Beatrix have their names attached to smaller vases of no less beautiful design. Another striking piece is a large circular platter. The ground is a very deep strong yellow, upon which is represented a quaint Japanese figure in a strong purple robe, with just a few touches of gold, forming a very rich, complete harmony in color.

Leon Pavillée exhibits some very fair faience for architectural decoration, including those exhibited last year at the Champ de Mars. Most of his work is Moresque in style, and is very well handled; still it seems a question whether such strong colors and exuberant ornamentation would be appropriate for anything but a palace for a world's fair, like that of last year.

Among some cloisonné ware exhibited is one large plate upon which is produced a strikingly beautiful effect with but few colors and a simple design. It represents a swallow flying over the sea. The sky is a mottled gold. The water is a deep blue, with lines of gold indicating the wave crests. The bird is blue, with bits of black and white and brown. The whole effect is exquisite. And in an adjoining exhibit is an even more remarkable example of charming effect with simple means, — a vase of elegant outline, colored a very light blue and enforced by patches of a rich brown sepia, the two colors being separated by narrow threads of yellow. Again, a few steps farther, a very elegant effect is produced on a vase, the body of which is of a delicate ash color, with light running ornaments in pale blue, set off at top and bottom by rich browns, with just a trifle of yellow. In the same exhibit with this last are several fine pieces which have been purchased by the *Musée des Arts décoratifs*.

There is a very good exhibit of Bohemian glass-ware. In one quite prominent set a good result is obtained by uniting clear and colored glass, the red glass being used as panels around the sides of the ware, while the whole piece is covered with a pretty net-work of gold plant-forms. Bohemian ware seems easily to take to itself a chaste, fresh appearance that is very engaging. This shows itself in another set in the same exhibit made with iridescent glass, the ornamentation being in fine lines of black.

With a few exceptions the furniture exhibits are not very interesting, most of them showing but little variety in arrangement or excellence in design. One firm alone, Fleck Frères, shows anything more than a mere assemblage of individual pieces. This establishment exposes a very neat arrangement for a bedroom, including hangings, carpet, etc. The furniture consists of bed, dressing-case with mirror, *chiffonnière*, two chairs, and table, the cost being three thousand three hundred francs. The set has been sold twice, as the exhibitor takes pains to announce. It is made of a very black wood, possibly ebony, enriched with graceful, delicate carvings and ornamented with beautiful paintings on plaques of enamel set into the wood. These enamels make a difference of cost for the bed alone of three hundred francs. They fit very nicely into the general design, producing an exquisite effect by their clear tones and bright colors, in contrast with the plain black of the wood. The hangings and the upholstery are of a very pale blue, edged with maroon, and the carpet is of an undecided drab or ash color, with a delicate flower pattern. The mantel and fire-place are of a light rose-colored variegated marble, with gilded fire-screen, andirons, etc. In the same lot, though not included in the price above named, are several pieces, adding considerably to the attractive appearance of the whole, — a graceful flower-stand by the window, a very neat *liseuse* with marble top and convenient little shelves below, and a working-table with a pretty faience plaque set in the top.

The principal stairway by the north entrance of the building is given up to a display of Oriental carpets and rugs. The walls are completely covered by them. They hang in long folds from the pillars and the railings, and are festooned along the lines of the landings, so that the stairway is completely transformed, and though the general appearance is rather dark, the idea is a good one, and might well be carried out in some of the public buildings, to relieve the coldness of the stone-work. A temporary staircase has also been erected at the west end of the central hall, forming quite a feature in the general aspect of the Exposition. It is very conveniently arranged, with easy ascents and six broad landings, on each of which are very comfortable cushioned chairs and sofas placed to command good views down the long hall; the newel-posts are adorned with bronzes, while at the head of the upper flight is the statue of France which received a medal at the last *salon*. There are a few interesting exhibits in the gallery. Braun & Co. send samples of their fine carbon photographs; there are some neat bronzes and one interesting exhibit of art furniture. There are also some examples of the common school furniture. The French do not excel in this last line. Their school furniture, as a rule, is such as no Boston school committee would even look at. Last year one of the Paris papers, in speaking of the American exhibit of school furniture, said that it was altogether too elegant for children to use; that it was calculated to make them despise their humbler surroundings at home. Perhaps this is true as regards French urchins; but such furniture as this exhibited to-day is not even comfortable, and if clerical educators can provide nothing better we would call for Jules Ferry and Article 7.

The ruined palace of the Conseil d'État, destroyed during the

¹ As I write I experience a long day of drenching Attic rain, and am exceedingly uncomfortable, protected by shelter which was more effective against thunder-storms of the North Sea and snow-flurries of the Austrian mountains.

² Fortunately the mistaken note had no bearing upon any argument or question involved. Yet Mr. Davidson sarcastically proceeds, "Mr. Clarke finds in this passage confirmation for a theory," etc., though the quotation was held to bear upon nothing further than the existence of a ceiling, and though hyperbolic galleries existed in this temple of Olympia, according to the testimony of Pausanias, which he quotes in the same breath. The words *ἐκ σκοτεινῶν πυλῶν* were not translated "out of dark temples."

Commune, is, if practicable, to be restored and transformed into a Hôtel des Postes, to replace the present restricted quarters in the Rue J. J. Rousseau. M. Guadet, of the École des Beaux-Arts, has begun studies for the work, and is now visiting Berlin and London to investigate the post-office departments of those cities. It may be regarded as one of the fruits of the international expositions that the French are willing to hunt for an idea anywhere outside of France or Italy.

The sudden death of Viollet-le-Duc has caused a profound feeling among all cultivated people, and all, even his opponents, can unite in honoring his memory. Several of the papers have had extended notices of his life and works. The Republicans mourn him as a leader in the new party. The Bonapartists speak of him as a personal friend of the Empress, to whom he owed many favors and for whom he made the restoration of the château of Pierrefonds. The *Siccle* of the 28th ult. devotes a long article to the work of Viollet-le-Duc as lieutenant-colonel of engineers during the siege of Paris. For the past fifty years, it is said, he has worked at least twelve hours every day; and single-handed, without prestige obtained from long studies at the Beaux-Arts, and almost in the face of public opinions on art, he has worked his way up to the very top of his profession. He was an avowed free-thinker, and, according to his expressed will, his burial was purely civil. The town counsel of Lausanne, learning that his wish had been to be interred where he should die, opened for his body a cemetery long since closed, fulfilling a desire he had once uttered, that there might be his resting-place; and the *Siccle* continues: "On his tomb, according to his wish, will be placed simply a stone with the inscription, '*Viollet-le-Duc, né en 1813, mort en 1879.*' That will be all, but those who have known him, passing by, can say, — and it is the best and truest *éloge*, — 'That was a man!'"

C. H. B.

CLEOPATRA'S NEEDLE.

THE MACHINERY FOR TRANSPORTING IT.

THE gigantic framework which is to be used to raise the Obelisk of Alexandria from its present vertical position, throw it into a horizontal position, and carry it down to the vessel which is to bring it to its new site, was yesterday shipped for Liverpool on board the Guion steamer Nevada. The total weight of the whole construction is 128,000 pounds, but it is in such heavy parcels that great trouble was met with in the efforts to ship it. When the Nevada reaches Liverpool the construction will be transhipped to Alexandria, in Egypt, where work will be begun under the supervision of Lieutenant-Commander Gorringer, U. S. N., for the removal of the monolith.

The machinery has been constructed at the works of John Roebling Sons' Company, manufacturers of wire rope, and bridge and general contractors, in Trenton. The plan of removal is entirely original, and as Mr. Roebling says, himself, "there has been nothing like it constructed before." It is a "special structure contrived to shift the position of obelisks from vertical to horizontal."

The first thing to be done will be to encase the monolith in a casing made of 2-inch oak planking, which will be bound at intervals of 3 feet with strong iron bands. This done, the obelisk will be guyed at the top from four points, like the mast of a vessel, so that there will be no possibility of its falling over.

The centre of gravity has been calculated to be at a point 26 feet above the base. Here will be placed trunnions on either side, which will be bolted across the sides by eight 1½-inch iron and four 2-inch steel bolts. The trunnions are historical in their way. They are cast from cannon-metal only, and many of the cannon used were captured from the Confederates during the war, besides which they are the heaviest castings of their kind ever made. The trunnion-plates are 4 inches thick, 9 feet wide, and 6 feet high. At the centre is the turned trunnion, which is 33 inches long and 18 inches in diameter. The weight of each trunnion and plate is 1,250 pounds, making them together 1½ tons. The metal used in the casting is of the best quality, a sample taken from the same heat having broken at a tensile strength of 2,900 pounds to the square inch. It is seldom that such excellent metal has been obtained.

The next operation will be to quarry out four 6-inch channel-ways through the base of the obelisk, and to insert beams which are to assist in raising it from the foundation.

The foundations for the towers will next be constructed. They will consist of two platforms, one on each side, of 3-inch oak planking, each 6 feet wide and 24 feet long. On top of these will be set four oak sticks, 12 by 18, firmly bolted together. The iron-work of the towers will then be built on top of the preliminary foundation. This consists of one wrought-iron tower placed on either side of the monolith. Each tower is made of six 12-inch heavy wrought-iron I-beams, spreading out at the base to a distance of 21 feet, and converging at the top to within 5 feet. The beams at their base rest on four heavy I-beams, and are securely riveted to the platform by means of plates and knees. Placed on top of these posts are caps, each 5 feet long and 30 inches wide, which are also secured by means of plates and knees. The posts are braced from top to bottom by angle and channel-irons, making the towers perfectly rigid. Placed on the top of the caps and securely bolted to the tower proper are cast-iron journals which weigh 3,700 pounds each, forming the grooves for the trunnions to work in.

A 6-inch rib is cast on the bottom of each of the trunnions, and in these ribs there are four 2-inch holes. Through each of these holes 1½-inch iron rods are inserted, connecting with similar rods from the 6-inch I-beams running through the base by means of right and left thread turn buckles, which will be used to raise the obelisk from its foundation, and throw the weight on the trunnions. The foundation will then be removed and the obelisk will be left hanging free.

On account of the stone having an unknown factor of safety when supported at its centre of gravity, or at either end (according to some authorities as low as one and one half times), it has been deemed advisable to strengthen the stone by means of 1½-inch (diameter) wire-rope stays, which are run over a frame 9 feet high resting on the trunnion, which is intended to be uppermost when the stone is in a horizontal position, to either end of the obelisk. The stays will relieve each end by some 25 tons, thus preventing any possibility of the stone cracking at its centre of gravity. Having taken every precaution, and got the obelisk into a free position, it can then be easily turned. This will be a matter of very little exertion, provided the structure is perfectly aligned.

When the obelisk is placed in a horizontal position, Lieutenant-Commander Gorringer will next proceed to build two piles of beams placed crosswise. As soon as they reach the height of the stone, jacks will be used to lift the latter out of its trunnion bearings and block it up. All the construction will then be taken away and foot by foot the obelisk will be lowered to the ground by reducing the piles, first from one side and then from the other.

Once on the ground the obelisk will be encased in an iron cradle, which consists of a parabolic truss on each side, connected by means of heavy channel floor beams and braces. To the floor beams two heavy channel bars will be riveted, and corresponding channels will be laid on the ground to form the train for the obelisk to move on, which will be accomplished by inserting 8-inch cannon balls into the grooves formed by the channel bars. The track will be laid 60 feet ahead of the cradles, so that as the stone is pushed along, the track behind will be taken up and placed in the front.

The castings of the iron-work were made by the Phoenix Iron Works Company of Trenton, and the carpentering work will be done abroad.

The description of the obelisk as used by Mr. Roebling to make his calculation is as follows: 67 feet 2 inches high; 8 feet 2½ inches by 7 feet 9¼ inches wide at base; 5 feet 2 inches by 5 feet wide at top. Substance, granite; centre of gravity distant from base, 26 feet; surrounding (character of) soil, sand.

The structure, with very little difference in the manipulation, will be used to erect the obelisk when it is brought to New York. — *The New York World*.

THE DETROIT COMPETITION.

DETROIT, MICH., October 13, 1879.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Sir, — In your editorial remarks in your issue of the 11th instant, on the public market question of this place, occur the words: "One only wonders at those who keep such competitions alive by contributing to them," which is constructively (though probably unintentionally) a reflection on myself. Being desirous to be not considered one who would wilfully take a course in opposition to a correct professional tone, allow me a word of explanation. In general, I wish to see built a creditable class of buildings; in this particular I interested myself to that end, being assured by members of the committee that the premium offered was but part of a full commission to be paid. If the design made by myself had been adopted it would have been on that premise. In the light of later events, I can but consider myself the victim of false pretences, and to have been seduced by the blandishments of the alderman, whose subsequent vilification needed no treatment but silence.

Respectfully, etc.,

CHARLES H. MARSH.

A MILLIONAIRE'S CATHEDRAL.

GARDEN CITY, LONG ISLAND.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Sir, — Please allow me to correct a few mistakes of your correspondent "M." in his article, "A Millionaire's Cathedral."

First, my name as the modeller of the stucco ornament is Brierley, and not Bradley.

Second, the ornament is certainly not unexampled in profusion in this country, as a visit to the churches of the Immaculate Conception, Lowell, Mass., and St. Patrick's, Norwich, Conn. (both finished in the last four years), will fully convince him.

His criticism of the defects of scale is scarcely fair. At least it would be better to wait and view it in its proper place, and colored, before passing an opinion on it. But I may be grateful for the fact that, after the scathing he has given the Cathedral generally, he found anything at all to admire in the modelling.

Hoping you will make the correction in the name,

I remain, respectfully yours,

JAMES C. BRIERLEY.

NOTES AND CLIPPINGS.

THE INDIANA STATE HOUSE.—The Commissioners for the erection of the new State House at Indianapolis state in their ninth quarterly report, that during the three months ending September 30, \$50,699.74 have been expended, making a total outlay since the commencement of the work of \$153,665.56. Of this amount \$75,805.12 have been spent upon the foundation, and \$40,251.81 for iron-work.

AN OPERA HOUSE FIRE.—The following case is exceptional enough to deserve special mention. The storm on the 22d of August at Munich, Bavaria, was followed next night by a fire at the National Opera House. A series of performances of Wagner's "Nibelungen" operas were to be given in honor of the international art exhibition, and they were inaugurated on Saturday, the 23d, by the performance of "Rheingold." Toward the close a flash of lightning is supposed to cleave the clouds, revealing a sudden change of situation. The clouds were represented by folds of gauze, which hid from view the change of scenery that was being carried out. The artificial lightning set fire to the gauze, and the flames at once sprang up, seized the flies, and spread rapidly through the scenery. The audience behaved with great presence of mind; there was not the slightest disturbance. Two of the chief actors addressed them, and, having explained what had happened, requested them to wait quietly. A fire-proof drop scene, made of thick steel plates, was let down, completely cutting off the stage from the auditorium. Then a powerful fire-extinguishing apparatus, with which the theatre has been lately provided, was applied with such vigor and promptness that the fire was completely extinguished in a very few minutes. The orchestra had continued playing while the extinguishing process was being carried out, and the opera was brought to a conclusion almost as well as if no interruption had happened.

THE PARIS MUSEUM OF DECORATIVE ARTS.—In consequence of the temporary occupation for municipal purposes of the Pavilion of Flora, the Museum of Decorative Arts has been obliged to vacate its late quarters. The Government has assigned it in requital a section of the east side of the Palace of Industry, near the workshops of the scene-painters of the Opera. These new quarters are very large, and can easily receive the necessary alterations. The work of refitting is actively forwarded. In a few weeks, therefore, the Museum of Decorative Arts will be able to reopen its doors to the public. The administration intends to utilize the intervening time in adding to the collections which are to serve as models for artists and artisans. A very important gift in books and engravings has just been made the museum by M. Turquet, Under Secretary of State for the fine arts. — *Le Technologiste.*

TENEMENT LIFE IN DUBLIN.—The Royal Commission inquiring into the sanitary condition of Dublin finds as yet no lack of evidence condemnatory of its state. For example, Mr. Park Neville, city engineer, attributed the high death-rate of Dublin to the state of the Liffey and the wretched nature of the dwellings in the poorer parts of the city. The Liffey he described as an open sewer, into which 200 tons of sewage went every day. An extensive scheme for artisans' dwellings was absolutely necessary, as there were in the city 1,331 houses in a ruinous and unsanitary condition. The chairman (Mr. Rawlinson), Engineering Inspector of the English Local Government Board, remarked that it was impossible for language to describe the wretched state of the tenements he had seen in Dublin, — they were not fit for brute creatures to live in, not to say human beings.

NEW HOTEL IN BERLIN.—A colossal hotel is being completed opposite the new Central Station at Berlin. It will contain immense apartments, luxuriously furnished and tastefully decorated, and 500 bedrooms, besides a theatre, two chapels, and a synagogue. The court-yards are to be adorned with statues of the most celebrated travellers, and attached to the hotel is a magnificent garden, in which there are several hot-houses.

FIRE APPARATUS IN THE LOUVRE.—A thorough system of water-supply in case of fire is now being completed in the Louvre. This important work was begun in 1876, but has been neglected for some years. Now, however, water-pipes have been carried along most of the galleries, with taps at regular intervals, and a complete apparatus of buckets, etc. The pressure of water from a reservoir at the top of the building is said to be great enough to allow of a complete inundation of any of the galleries in a few seconds.

THE VIA SACRA.—The famous Via Sacra in Rome has recently been repaved with stone from the Arch of Triumph to the Colosseum. This roadway, whose flagstones are still those over which the wheels of triumphal cars used to rumble on their way to the Capitol, had become dangerous to vehicles and needed repairs. The superintendence of "Excavations" accordingly decided upon merely inserting new pavement where necessary, and upon leaving the old historic stones in their places.

ARTESIAN WELLS IN NEW YORK.—A significant feature in connection with the water-supply of this city is the increasing resort to artesian wells by large brewing establishments and other users of much water. Elias & Betz have a well 425 feet deep; Clausen & Price, a well 625 feet deep; David Jones, well 662 feet deep; George Ringler & Co., well 390 feet deep and going deeper; and P. Doelger, whose well in process of construction is intended to be 600 feet deep. As a rule these wells have a bore of 6 1/2 inches and cost from \$6 to \$10 a foot. Their great advantage lies in the cheapness of the water thus secured. The first well named is said to have paid for itself the first year. The Croton water tax paid by the larger breweries rises as high as \$6,000 a year, and an equal outlay will usually sink an artesian well, securing a permanent supply independent of Croton water. The purity of the deep-well water is also an advantage, and the same may be said of its average low temperature—about 52 degrees Fahrenheit. The difference between that and Croton water at summer heat may make a saving of \$20 a day in the ice bill of a large brewery. Artesian wells have also been sunk by manufacturers of mineral waters, that of John Matthews going down 300 feet. The deepest well, 1,001 feet, supplies the Higgins Carpet Factory with pure water for dyeing. — *Scientific American.*

EXCAVATIONS AT PHOCÆA.—Mr. Smith, the American consul at Smyrna, has applied to the Porte for permission to excavate Fokla, the site of the ancient Phocæa.

THE SUTRO TUNNEL, SUTRO, CAL., October 15. — Yesterday about 2 o'clock connection was made by the north lateral branch of the Sutro Tunnel with a drift from the Mint company's shaft. The current of air is a strong downcast, and is of great advantage, for it insures an abundant supply of pure air, whereby the north branch, which is being advanced at the rate of ten feet per day, can be driven with still greater speed. The air goes down to the Mint shaft through the north branch in great volumes, and finds its exit through the Savage and adjacent shafts, greatly benefiting all parties. The prospecting drifts running northerly and southerly on the foot and hanging walls of the large ledge intersected by the main tunnel at eleven thousand seven hundred feet from the entrance are most encouraging, showing assays at from \$8 to \$40 per ton, and when cross-cutting is commenced it is confidently expected from the fair milling rock already met with that a bonanza may be encountered.

JAPANESE PAPER.—Many varieties of paper are made in Japan, and all from the bark of trees. The best, and that most generally in use, is produced from a shrub called there Kozou (*Broussonetia papyrifera*), which grows to a height of about two metres and a half. It was introduced from China, and is now cultivated throughout Japan for this express purpose. It is ordinarily planted as a sort of hedge along the fields, the roots being about two feet apart. After a short time the branches interlace and form a very efficient protection against cattle. Under favorable conditions it sends out shoots three metres long each year, and it is said to produce as much as 1,800 kilos. of bark per hectare annually. The manufacture of the paper is conducted as follows: The stem and branches are laid in water for a fortnight, and if the water is stagnant the bark becomes gradually detached; if running, the outer coating, which is useless, is carried away. The interior layer is then peeled off in strips, combed, washed and dried, and put away if not to be used immediately. This is the raw material, and to convert it into paper it is subjected for three or four hours to the action of hot water and steam, which renders it soft; then it is pounded and vigorously beaten with knotty sticks. A sort of pulp is thus produced, which can be made as fine as is requisite. It is mixed with water in a vat, and taken out in the mould of the paper to be made. The Kozou paper is very strong, particularly in the direction in which the fibre extends. Owing to this property, the Japanese can employ their paper in many ways unknown in Europe. For instance, they use it instead of glass for their windows, bandages for wounds, pocket-handkerchiefs, cords, thread, etc. When a still stronger paper is required, the mould is again dipped in the pulp, but in a direction at right angles with the first operation, so as to have the fibre crossed, when it becomes extremely strong. This process is sometimes repeated three or four times until a product is obtained which is used for covering umbrellas, packing goods, making cloaks for travellers, etc. In these cases the paper is oiled and thus made impermeable to moisture.

OLD HOUSE IN SEABROOK, N. H.—The "old garrison" house in Seabrook has been pulled down, and is to be sold at private sale. This house was built in 1616 for protection against the Indians, of white oak timbers seventeen inches square, which were laid with clam-shell mortar. It was very nearly opposite this old fortress that Caleb Cushing's mother was born and bred.

THE SALE OF MR. WHISTLER'S HOUSE.—"There was one painting, it is true, but as it was done on the drawing-room wall it could not very well be removed, the wall not being for sale separately. The purchaser of the house, therefore, obtains this work of art, which was the only curiosity in the place. It represents a demon, who is sitting on the roof of an old house with a piano balanced in front of him. On the instrument is a piece of music entitled "The Gold Scab, an Eruption, by Filthy Lucre." It is an undoubted Whistler, and the next occupant of the house will perhaps be proud of it, though opinions will differ as to the appropriateness of a drawing-room ornament of a devil sitting on the top of a house and playing the piano. Mr. Whistler is perhaps not sorry to have got rid of his white house, which was also a veritable white elephant."

GLUE.—Glue which will stand damp is a desideratum. Few, however, know how to judge of quality, except by the price they pay for it. But price is no criterion, neither is color, upon which so many depend. Its adhesive and lasting properties depend more upon the material from which it is made, and the method of securing purity in the raw material, for if that is inferior and not well cleansed the product will have to be unduly charged with alum, or some other antiseptic, to make it keep during the drying process. Weathered glue is that which has experienced unfavorable weather while drying, at which time it is rather a delicate substance. To resist damp atmosphere well, it should contain as little saline matter as possible. When buying the article apply the tongue to it, and if it tastes salt or acid reject it for anything but the commonest purpose. The same operation will also bring out any bad smell the glue may have. These are simple and ready tests, and are the ones usually adopted by dealers and large consumers. Another good test is to soak a weighed portion of dry glue in cold water for twenty-four hours, then dry again, and weigh. The nearer it approaches to its original weight, the better glue it is, thereby showing its degree of insolubility. Glue frequently cracks because of the dryness of the air in rooms warmed by stoves. An Austrian paper recommends the addition of a little chloride of calcium to glue to prevent this. — *Capital and Labor.*

THE KNOX MONUMENT.—A monument to John Knox is to be erected near St. Giles's Church, Edinburgh. The monument will be surmounted by a statue of the reformer, and figures of Hamilton, Wishart, Buchanan, and Melville are to be placed on the four corners of the pedestal.

BRIDGE AT GRANDENZ.—One of the longest railway bridges in Germany is now on the point of completion. It crosses the river Vistula near Grandenz, and rests upon twelve piers. The length from the commencement of the first to the end of the last pier is 1,578 yards, or nearly a mile.