

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. LXVI.

Copyright, 1899, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.

No. 1253.

Entered at the Post-Office at Boston as second-class matter.

DECEMBER 30, 1899.

CONTENTS.

SUMMARY:—

A last Word to our "Imperial" Subscribers.—Preventable Fires and the Liability of those who permit them.—Strike on the Metropolitan Museum, New York.—The National Sculpture Society and the Decoration of Certain Public Spaces in New York.—How Individual Citizens embellished Rome.—Application of the Principle to the Treatment of the Back Bay Park, Boston.—Wood Pavement in Ipswich, Eng.—Report on the Disposal of Sewage and Garbage in Foreign Countries.—Chefoo and Montevideo, Extremes of Filth and Neatness.

COMPETITIONS.

FOUNDATIONS OF BUILDINGS. 107
A STEEL ROADWAY IN SPAIN. 113
BOOKS AND PAPERS. 115
AN ARCHITECT'S WEIRD ADVERTISING. 115

ILLUSTRATIONS:—

Extension of the Hotel Renaissance, Fifth Ave. and 43d St., New York, N. Y.—A Competitive Design for the Club-house of the New York Yacht Club, New York, N. Y.: Two Plates.
—St. Philip's Church, Brooklyn, N. Y.
The New York "Box-stoop"—VI: No. 11 East 68th St.
Additional: United States Post-office, Newark, N. J.—The Uenglinger Town-gate, Stendal, Prussian Saxony.—Wrought-iron Fountain on the Kleiner Ring, Prague, Bohemia.—Hornsey Central Library, Hornsey, Eng.—Interior of the Same.

NOTES AND CLIPPINGS.

. 116

WITH this issue we close the career—a useful and meritorious career, we hope—of our "Imperial" edition, and must make a last request to those who have subscribed to it until now to notify us promptly as to whether it is their wish to be transferred to our "International" or to our "Regular" list for the ensuing year. We recognize the possibility that some of those who have not already notified us as to their wishes hesitate to subscribe to the "International" edition through unwillingness to make an immediate remittance for a larger sum than usual, just at the time when annual and quarterly accounts are falling due. To all such old subscribers we are willing to extend all reasonable indulgence. Our immediate desire is to be instructed as to how we are expected to serve them next year. We hope it may not be held unmanly if we point out that the sacrifice we now make is in the interest of our subscribers, and very possibly deserves some similar sacrifice on their part; and that, although sixteen dollars is still a considerable sum to pay for a subscription to a periodical, the only way to assure a further reduction is to give us so hearty a support at the present rate as to make such further reduction a possibility. It is the most elementary principle of manufacturing that the greater the output the less will be the actual and relative cost of each manufactured unit—in our case the fifty-two copies which reach each subscriber.

A LETTER to the New York *Evening Post* repeats a suggestion which we made several years ago, that, in view of the enormous losses which this country suffers from fire, and the necessity for the adoption of some self-enforcing measure for diminishing these losses, it would be well for our States to enact laws similar to those of France, Italy and other Continental countries, by which the owner of a building on which a preventable fire originates shall be held responsible for losses to his neighbors caused by the spread of the fire beyond his own premises. Although this seems to us a radical and dangerous innovation, it is interesting to recall that the English common law held every man liable, as a matter of course, for fires spreading from his own to his neighbor's property, until about the time of the settlement of the American Colonies, when an Act of Parliament expressly relieved house-owners and tenants from this liability. Under the rule that the statute law of England became the common law of this country after the establishment of our independence, the rule in the United States became the same as that of England, although, simply as a matter of theory, the Continental view, that a man is under just as much obligation to protect his neighbors from suffering through his defective flues or wooden ash-barrels as he is to keep his dogs or cattle from injuring people, is certainly more logical than the other. Now, however, the fact that we spend on fires and insurance enough money to build a new navy every year, or to pay all our naval and military expenses, including pensions, or to provide every family in the United States with

eight pairs of shoes annually, or, if preferred, with a barrel of flour every four months, is beginning to attract the attention of other people besides insurance-men and architects, and the sooner the newspaper writers who berate the latter for not compelling every one to build houses as secure against fire as those on the Continent are brought to perceive the connection between the Continental laws of fire-liability and the precautions which are taken to diminish that liability, the more quickly will the discussion of the matter reach a rational basis. As a matter of fact, the liability to neighbors is not felt as a burden on the Continent, for the reason that the insurance policy covers that, as well as the direct loss, at a small additional premium, but it serves as a steady incentive to sound and safe building, and in that way has saved incalculable millions to the countries in which it prevails. We, architects, are continually told that our French, German and Italian brethren understand incombustible building far better than we do, and that, if we would only learn of them, our buildings would be as safe as theirs; whereas the truth is that American architects understand fire-resisting construction better than any others in the world; that nearly every device in use for making buildings more fireproof, at small expense, such as plank flooring, metal lathing, combined concrete and metal construction, and terracotta protection to columns and girders, originated in this country; and that, while American fireproof buildings are far superior to anything of the kind to be found elsewhere, American architects, like all others, must build to suit their clients, and until it is for the interest of their clients to take precautions against fire, architects can do nothing except to make suggestions and recommendations, which, as a rule, they do conscientiously.

THERE is serious delay in the construction of the new wing of the Metropolitan Museum, on account of a strike of the granite-cutters, carpenters, stone-masons and painters, who have left their work because non-union men are employed by the iron contractors, Messrs. J. B. & J. M. Cornell. An attempt was made, some months ago, to compel the Cornell workmen to join a union connected with the Building Trades' Council, and the strike, which extends to several other large buildings on which the Cornell firm has contracts, is said to have been ordered by the managers of the Building Trades' Council. A report, of the truth of which we do not pretend to judge, is current, to the effect that the strike was secretly instigated by certain rival iron contractors, who would like to see the Cornell firm crippled or driven out of business; and the possibility that strikes may be occasionally brought about in this way adds new and great risks to the business of building contractors. Strikes are bad enough, and sympathetic strikes are the worst of their kind, but sympathetic strikes brought about by rich contractors, plotting with the so-called labor leaders to ruin a rival at the expense of the poor workmen who obediently deprive themselves and their families of bread at the order of corrupt and perfidious representatives, would indicate a depth of depravity from which even the consciences of Trusts might recoil.

THE National Sculpture Society has been amusing itself, as well as practising a useful exercise, in considering schemes for beautifying different portions of New York. The suggestions made already include a column in Battery Park, to commemorate anything suitable; an "architectural bas-relief," to be placed at the end of the building at the junction of Clinton Street and Astor Place; a "sort of semicircular coliseum" at the north end of Union Square, and the razing of all the buildings in City-hall Park except the City-hall itself. It is extremely unlikely that any of these plans will be carried out, but the habit of considering open spaces in cities as subjects for artistic treatment is one that it is desirable to cultivate.

HISTORY tells us that the finest architectural compositions of this sort in Rome, that is, in the world, were the work of private individuals, who devoted a part of their enormous wealth to buying land, and laying out, at their own expense, long and wide open spaces, or forums, to facilitate business or traffic, lining them with colonnades, temples, basilicas and other structures for the use of the public. In this way were secured artistic effects, as well as public improvements, which would never have been carried out at the public expense, and

in this way, as it seems to us, similar effects will have to be secured here. While our public treasury is richer, and our citizens less rich, than was the case in Rome, and anything like the destruction, for art's sake, of the buildings in City-hall Park is out of the question, on account of the sacrifice of property involved, we have among us many individuals who could easily spare a million or two for the embellishment of some public place, with which their names might be connected, as those of Trajan, or Augustus, or Julius Cæsar, or Paulus Æmilius, are with the forums or public buildings which they, or their families, presented to the community.

TO suggest a practicable example; the Boston Museum of Fine-Arts has purchased a tract of land bordering for about four hundred feet on the Huntington Entrance to the Back Bay Park. This Huntington Entrance is itself an elongated park, with sides nearly parallel, and two roadways. Between the roadways appears a portion of the river which runs through the Fens, the channel having its sides thickly planted with shrubbery, and being spanned by a handsome bridge at the point where the Entrance meets the Fenway, or main drive encircling the Park. Every architect's knowledge of artistic history will supply him with precedents for a magnificent treatment of these conditions. Supposing the Museum of Fine-Arts, or one of its benefactors, to provide for adorning the front of its new building toward the Huntington Entrance with a colonnade, something like those of the new Fine-Art buildings in Paris, and imagining, also, that some club, or society, or even a group of private owners, should provide for a corresponding colonnade fronting on the other side of the Entrance, the most important part of a splendid architectural composition would have been secured. There should be little difficulty, even under present conditions, in arranging for something of this kind. A colonnaded front for the new Museum of Fine-Arts would commend itself to every one interested in the building, and no one is more likely than the average citizen of Boston to be willing to submit, for the common benefit, to restrictions such as those which have made the block of houses on the corner of the Place de la Concorde and the Rue Royale, balancing the Ministère de la Marine, one of the most imposing constructions in Europe. With the sides of the Huntington Entrance thus provided for, the middle portion could be devoted to the highest class of art. For example, the centre would afford a position of unrivalled dignity for a great obelisk, or column, standing on a plinth ornamented with statuary; or the sides of the roadways opposite the buildings might be lined with groups of sculpture on plinths of the same general character; or one or more monumental fountains might be arranged, overflowing into the river beneath. It has been shown many times that where suitable places, which, so to speak, invite decoration, are provided in our cities, there are plenty of people who are ready to contribute money for their adornment; and, if the matter is taken up in time, those who take pleasure in beautiful cities may, for once, enjoy the satisfaction of seeing a portion of an American town ornamented with works of art which are not dropped in corners behind bushes, or balanced uneasily on a paving-stone in the middle of a street, or lodged on the steps of a Government office, because there is no other place to put them.

AN interesting experiment was recently made with wood pavement in the city of Ipswich, in England. The streets of the town are narrow, and are subjected to heavy traffic, so that a good pavement is necessary. Until recently, a surface of granite macadam was used, but the laying of street-railway tracks in the principal thoroughfares made a change necessary, and it was decided to try wood blocks. It is usual now everywhere in England to lay wood-block pavement on a layer of concrete, thick enough to form a bed which will not yield under any traffic, so that the wood is simply a surface material, but the Ipswich authorities imagined, or were told, that it would be better to make the wood blocks deeper, and lay them on a bed of gravel, so that water soaking through the blocks would drain away, without accumulating and rotting the lower end of the blocks; and, as an experiment, a portion of the pavement was laid in this way. It proved, however, that instead of draining the pavement, the gravel permitted the passage of moist air from below, which soon rotted the lower portion of the blocks, and destroyed the work. Where concrete was used, it was laid about three inches thick, and proved strong enough to support the traffic. A concrete made

with lime was at first tried, but soon abandoned, a very rich Portland-cement concrete being used in all subsequent work. It may be observed that the concrete layer must have a very solid and uniform subsoil to enable it to resist heavy traffic. In London, wood pavement is generally laid over a sheet of concrete about twelve inches thick, and, as the integrity of the pavement is dependent upon that of its concrete foundation, there are few places where six or eight inches, at least, would not be necessary. However, the Ipswich pavement has stood well for about ten years, and creosoted blocks, such as are now used in new pavements, will, it is thought, endure for at least fifteen years.

SANITARIANS will find some amusement, if not instruction, in the consular report, just issued from the Bureau of Foreign Commerce at Washington, on the "Disposal of Sewage and Garbage in Foreign Countries." It is hardly necessary to say that in a large proportion of the towns in which the United States is represented by a consul the system of garbage removal is one dependent entirely on animated agents, and of these there is, it appears, a variety which will surprise the reader. In Maracaibo, Venezuela, a city of fifty thousand inhabitants, we are told that "until lately, swine and goats were the street-cleaners;" in China, "the garbage collector is the dog or the starving beggar," and in many places, particularly in South and Central America and the West Indies, "crows, vultures and buzzards" are the only creatures that take any interest in the removal of decomposing animal matter. There is, however, it seems, something to be learned in stimulating the activity of these agents, and a hint from Santiago de Cuba may be useful. In that delightful town, as it existed, we must remember, before the American occupation, it was the custom to drag dead cattle, horses, mules and large dogs to the suburbs, and leave them by the roadside. Small animals, such as cats, and dogs of lesser size, and other garbage, were "thrown into the streets, or on a neighbor's roof, to be devoured by buzzards;" but, as "neighbors" seem occasionally to have objected to the deposit of such objects on their roofs, and as the sight of the buzzards devouring their pet kitty beside the front door is not agreeable to all persons, the more squeamish inhabitants devised a very ingenious plan. Before placing the deceased Ponto or Minette on the sidewalk, it is "customary," as we are told, "to tie a cord to the tail of the animal." The average sanitarian would be puzzled to understand how this would promote its proper disposition; but it seems that the children of the neighborhood, seeing such tempting facilities ready to their hand, "play horse" with the corpse, by dragging it around the streets, and, as they "seldom deliver it again to the owners," the latter have no further trouble with it.

CHINA, however, stands first for the incredible foulness of its cities and their inhabitants. The consul at Chefoo, Mr. Fowler, writes that in the centre of the two cities reputed to be the cleanest in China he had himself seen cholera corpses decomposing, dogs eating the bodies of babies, and snakes crawling about among the masses of filth of every kind. In Pekin, with a population of at least a million, a "combined system," as the consul sarcastically observes, is employed for disposing of wastes; that is, everything combines in the streets. The liquid portions are collected in pools at the sides, from which they are thrown at intervals, with long-handled ladles, on the streets, including the passers-by. As the mud formed in this way has a high fertilizing value, it is collected by men and boys, made into cakes of the size of an orange, dried in the sun in some open place, preferably, it seems, the neighborhood of the foreign legations, and sold to farmers. An annual appropriation of three hundred thousand dollars in gold is made for removing refuse, but, as Consul Ragsdale observes, "This sum about covers the office expenses." It is a pleasure to turn from these horrible places to Montevideo, in Uruguay, which, although it has a population of two hundred and fifty thousand, is said to have the lowest death-rate of any city of its size in the world. The greater part of the town is drained by a modern system of sewerage into the River Plate; the streets are well paved, and are swept every night, and all garbage and household refuse is carried away at night, or early in the morning, and dumped about five miles from the city. No use has yet been made of this refuse, but a French company has made a proposal for the erection of modern utilization works.

COMPETITIONS.¹

IT is generally agreed that whenever it is practicable to appoint the architect of any building, public or private, outright, it is best to do so. For this is not practicable unless there is a consensus of opinion on the part of the owners or their representatives upon some one practitioner, and such unanimity affords fair presumptive evidence of the fitness of the appointment. Direct appointment, moreover, insures an intelligent understanding between architects and their clients from the very beginning of the work, the time when such relations are most important. In competitions a great gulf is fixed between an architect and his client, such understandings are impossible, and misunderstandings are likely to occur. Even the most elaborate programme must leave many questions unanswered, and the most carefully prepared instructions will admit of more than one interpretation. Moreover they necessarily leave the prejudices and preferences of the owners unexplained. The competitor must proceed in ignorance of the determining conditions of success, and work blindly and at haphazard. What is still more distasteful is this, that it must be his chief care, as a matter of business, to present not so much the best solution of the problem in hand as the one that will best meet the predilections of his clients or of a jury, or what he fancies to be such, his immediate object being not to do the best thing, but to secure the work, not to do what he thinks best but what he thinks other people will think best. This puts him into false and uncomfortable relations both to the work and to his clients, and he hates it. Add to this the knowledge that his work will probably all be thrown away and the job be given to somebody else, more skilful or more fortunate than himself, and we need not wonder that men go into competitions in a half-hearted way, and are disposed to put into them only half their mind. It naturally happens accordingly that the problem often fails to engage the eager attention and serious study needed for its successful solution, and that the work is turned over to draughtsmen to make out of it what they can. Under these circumstances, a false start is likely to be made through failure really to understand and grasp the problem, and a poor result is apt to ensue through indifference or preoccupation of mind.

Competitions also in their very nature involve a great waste of time and money, since the labor of all the competitors but one is without practical results. The waste is the same whether, as in paid competitions, the loss falls upon the owners, or, as in an unpaid competition, upon the profession. Every competition, if at all extensive, costs the profession hundreds and thousands of dollars, most of which falls upon men who can ill afford the loss. It is cruel and heart-breaking, when fifty or a hundred sets of drawings are submitted for judgment, to consider that in all but one the laborers have labored in vain, and that out of all the schemes only half a dozen can possibly receive any serious consideration. Even in paid competitions, in the absence of anything to keep the expenses within the limit of the payment, the waste is sometimes equally appalling. Thus the profession groans and travails night and day, year in and year out, under the strain of sacrifices it can ill afford to make. No wonder that the system has come to be regarded as a sort of nightmare, as an incubus or vampire, stifling the breath of professional life, and draining its blood. No wonder that architects extol the system of direct appointment, under which they can set to work promptly, without spending time and money in ill-advised endeavors, and can address themselves at once, intelligently and sincerely, to the real task to be performed.

But the conditions which make a direct appointment possible cannot always be fulfilled. They are indeed seldom to be met with, except in purely private undertakings. A single owner may presumably have a distinct personal preference for a particular practitioner, an arbitrary and unintelligent preference perhaps, but still a preference. But among half a dozen proprietors there is very little chance of all having the same. The probability is that they will not be able to agree whom to employ. In the case of public work also it may be considered impolitic or improper, as having a color of favoritism, to appoint an architect outright. A competition of some sort is then inevitable, and it must be accepted with all its disadvantages.

Much may be done, however, to diminish the gravity of these disadvantages. The work done in drawing up the instructions for a competition, involving, as it must, a tentative study of the problem in hand, will often largely take the place of the preliminary consultations between the architect of a building and its owners. Limiting the number of competitors and paying them properly, even handsomely, for their work, will encourage them to do their best. The enormous waste of money and time and labor that competitions often involve can in a large measure be avoided by excluding splendor of draughtsmanship and limiting the size and number of the drawings asked for. It is not necessary for the purpose in hand that these drawings should make a complete exposition of the several schemes submitted. It suffices if they indicate the distinctive points in each, so that an intelligent choice may be made among them.

Since, then, competitions cannot be entirely got rid of, it is worth while to point out not only that the evils attending them may thus be greatly alleviated, as experience has shown, but that the method of getting the building one wants by comparison and selection among a number of possibilities is not without positive advantages. Choice and selection are habitually employed in the sale and purchase of all other works of taste and skill, whether in the decorative or in the

fine arts, and they may well be equally serviceable in architecture, both to the community and the profession.

In the first place, competitions naturally tend to reduce to a minimum the evils which are inherent in the other system. For the custom of appointing the architect of a building outright is not without its own disadvantages, as may be witnessed in the undesirable structures which architects constantly erect in the freedom of private practice, unchecked by the wholesome hindrances that a competition imposes. It must not be supposed that the owner is always to blame for the unhappy things that not infrequently meet the eye in town and country. Sometimes, indeed, owners distinctly prefer ugly things. But quite as often they are helpless victims, and patiently submit to the caprices of their professional adviser, under the impression that he doubtless knows his business and is conducting it in accordance with the rules of his art. This would seem to betray an unexpected and almost scriptural meekness in the men who inherit the earth.

It is sometimes indeed assumed that all that is needed to secure a good building is the employment of a reputable practitioner. But this is not so. Even the best and the best esteemed of men are likely to do most ill-advised things. Such is the intrinsic difficulty of the architect's task, and so impossible is it for even the best trained and the best endowed men to be always at the height of their powers, that there is no telling what they will not do when entrusted with an open commission. When one wants to have a landscape by a painter of note, he generally waits until it is done before he buys it. If he is so rash as to order it in advance, he takes the risk of having to put up with what the dealers call an inferior work of the master. But he is not obliged to hang his picture. The owners of real estate have no such resource. They have to order their building beforehand, and when it is done it cannot be hid. The only choice a client has lies among the various suggestions of his chosen adviser, and these he is not generally in a position materially to influence. He does not find out what he really wants until it is too late to say. This consideration may well make him cautious, and dispose him to assume all the trouble and expense of a competition, rather than enter blindly upon a course which he can neither direct at the beginning nor control at the end. A competition will at least give him some choice of advisers, and prevent his committing himself to any of them until he knows what they are proposing to give him. It may then happen, and sometimes does, that the happy inspiration of a young or little-known architect will be more to his purpose, and be really better than the suggestions of older and even abler men. A competition enables him to secure the good and escape the bad.

In theory, of course, it is the duty of an architect, and his delight, to discover all the practicable solutions of his problem, and if there is more than one of real promise, to let his client choose among them. But, in fact, no man can command the time for this, even if he has the energy and personal resources. Days are not long enough to do business in this fashion. What generally happens is that, among the two or three solutions that first occur to him, the architect selects the one that best suits his own turn of mind and imposes it upon his client. The only way his client can really get a choice between different schemes is by employing different men to get them up. At any rate, this is the only way of making sure that they shall be really different, not merely variations of one theme, or different airs pitched to the same key, as the varying suggestions of the same mind can hardly fail to be.

From these risks and uncertainties competitions are a great protection. There is, of course, an element of precariousness in all enterprises, but there is no undertaking in which the results of a mistake is more serious, or in general more irremediable, than in building, or in which they involve a greater misappropriation of capital. There is nowhere greater need of using every known precaution.

The discussions and comparisons which a competition involves would also seem to offer the only chance of efficient and serviceable criticism that the design for a building can obtain. For they come at the moment when the scheme is substantially completed and before it is put in execution. After a building is up, discussion of its merits and defects, however edifying, is of but little practical service. It is only indirectly and remotely applicable to any future work, so much do conditions differ, and for the service of the work in hand, pointing out radical errors in a design is merely obstructive unless there are alternative designs to which to turn. These, a competition provides, and it subjects all the designs to an examination that is both reasonable and effective. The successful one is tested by the most exacting and pertinent of tests, a comparison with other designs of exactly its own kind. The unsuccessful designs suffer no reproach, or suffer it in good company, even though many of them are consigned to a not undeserved oblivion. It has often been said that in every Department of Public Works there might well be a sort of Censor, or Aedile, or a Committee, to pass upon the designs of buildings proposed for erection, and in fact the Department of Public Works in New York has sometimes taken this course, inviting experts to pass upon the designs made for city buildings. Buildings erected from designs submitted in competition hardly require such an imprimatur.

Architects generally dislike competitions and deprecate the system. For the pangs of disappointed expectation are more poignant and are longer remembered than the satisfactions of success, and they

¹ A paper by Prof. William R. Ware, read at the Thirty-third Annual Convention of the American Institute of Architects at Pittsburgh, November 16, 1899.

seem more uncalled for. Indeed success always appears to the winner to come quite in the order of nature. That the general voice of the profession should be raised against them is indeed inevitable, by the mere doctrine of chances. Just as, after an election, there are always more people gratified than disappointed, so after a competition there are necessarily many more people disappointed than gratified. Only the winner is satisfied with the way the system works, and even he is not eager to risk it again. This is part of the situation, and of course, except for the joy of contention, which does not count for much, one would always rather have work given into his hands outright, in recognition of his deserts, than to have to prove his claims every time. It seems a more satisfactory system. All this is natural enough. The fact that nobody likes competitions may accordingly be discounted. It signifies nothing. It is no proof that they are not a good thing for the client, for the community, and even for architects themselves.

But the reasons given for this antipathy will not always bear examination. It is sometimes said, for instance, that men work better in the calm and serenity of a sure thing than under the anxiety and restraint of these contentions. But this is not always so. They certainly work more comfortably, for, as was said at the beginning, nothing is so uncomfortable as to work in the dark, as in competition work one is in great part obliged to do. But it is to be noticed that this is only a temporary evil, and so to speak, a superfluous one. It only defers more satisfactory relations; it does not replace them. When the competition is over, the way is clear to establish more intimate and more personal intercourse. The competition has done no harm. It is at most only a disagreeable episode. Many men, moreover, are so constituted that competition acts upon them as a stimulant, and many architects' best work is accordingly to be seen in buildings that have come to them in this way. This would, indeed, follow naturally from the fact that in their private practice there is, as has been said, hardly anything to prevent their giving a permanent form to any chance creation of their fancy, while in a competition their less happy inspirations never see the light. Thus even if competition does not always spur a man to do his best work, it at any rate effectually prevents him from doing his worst. No one can have much to do with competitions without being impressed by the fact that it would have been a public calamity if many of the rejected designs, even those sent in under notable names, had been carried into execution. But he also perceives that if the friend or patron who obtained for its author a place among the competitors had chanced to be a person of sufficient influence to secure his appointment outright, any one of them might have been selected and erected. Hence, an impartial and competent judge, or jury, is as important for the interests of the owners and of the public as for those of the competitors.

The objection that competitions interrupt the regular course of business, and that they involve a great expenditure of time and money, for which there is very little chance of receiving any equivalent, is better founded, in fact and in reason. But if, as can be done and has been done, the work asked for is restricted to sketches, these evils will, as has been said, for the most part, disappear. Less time is taken up and less money is spent; so little that the owners can afford to make ample requital. Whether they institute an open, closed, or mixed competition, the owners should always spend enough money upon it fully to compensate the competitors, or the chief part of them, for their actual pecuniary outlay.

These objections are also offset by the personal advantage which an architect gains by extending in this way the range of his business acquaintance and professional experience. Even a large practice is apt to run in a narrow channel. Every architect would like to expatiate into untried fields, and thus not only to keep himself in training, but to prepare in advance for other kinds of work, should they ever come to him. But to make studies for a theatre, let us say, or for a large library, would take all his leisure for a twelve-month if he undertook it alone, and would cost more than he might care to spend if he employed his draughtsman upon it. A competition for such a building, however, will give him just what he is wanting, and at other people's expense, with the added advantage of having a real, instead of merely an academic, problem to practise his wits upon. More than one architect has owed his success in important work to the skill and courage acquired in such rehearsals.

The lessons that one draws from his own practical experience are indeed of more value than any such studies can be, since they teach what nothing else will. But practical experience keeps not only a dear school, as Poor Richard has said, but a slow one. Life is too short to learn everything in that way. Most things must be learned not by work, but by study. I think that an architect may well regard competitions in this light, as a sort of post-graduate schooling for the furthering and perfecting of his academic training, and that he need not be too anxious either to win the prize or to be paid for his labor.

The habit of taking part even in public and unpaid competitions is accordingly as helpful a one as a young architect can form, if he can afford to indulge it. It gives him an opportunity not only of enlarging his professional experience, but of keeping up and extending his studies. This consideration alone is a sufficient reason for encouraging the institution of open competitions for the classes of buildings to which they are adapted, for it is in the interests of the community that the younger men in any profession should have every oppor-

tunity of improving their professional status. In them lies the hope of the future. Everything should be done to make public competitions attractive to them, and this is an additional and a conclusive reason for requiring in such competitions only a moderate expenditure of time and money.

But though most architects dream of a time when there shall be a steady demand for all the work they can supply, so that they shall not be obliged to contend in this way for the chance of employment, it is to be noticed that even with many of the best patronized and busiest among them, their aversion to competitions is rather speculative than actual, and that they willingly take part in them when the importance and the engaging character of the proposed work and proper rules for the conduct of the competition itself combine to attract them, and the pressure of other business does not hinder. It all simply comes to this, that architects very properly prefer to have business seek them instead of their having to seek it, and the uncertainties and disappointments that necessarily accompany competitions serve to intensify this preference. When a piece of work dawns upon his horizon an architect naturally hopes that it will come his way, and feels disappointed and somewhat aggrieved if he finds that his neighbors also are being consulted. Still he would rather take his chance with them than lose the opportunity altogether. It has thus sometimes happened that men who had been most conspicuous in decriing competitions in general have been the first to complain when important public work has been given out without their having a chance to take a hand and show how they would treat it. As soon as a new candle is lighted they flutter about it and forget that the longest wings are apt to get most badly singed.

Indeed, so uncertain and capricious is public favor, even towards the favorites of the public, that even the best-established houses cannot afford to neglect any legitimate occasion for enlarging their business connection, however much they might prefer to have things come to them unsought. Still less can the less fortunate and less known afford to neglect the opportunity which competitions offer to make a name or to advance their fortunes. It happens accordingly that in spite of all disclaimers there is always a sufficient number of desirable and trustworthy candidates for every competition that promises to be honestly and intelligently conducted. Indeed, plenty of men are always to be found fairly equipped with ability and character who do not wait for any assurances, either of intelligence or of honesty. Under these circumstances it would seem to be more reasonable and more reasonable for architects to recognize the advantages of the system and attempt to mitigate its evils, rather than to decri it altogether, in the vain hope altogether to do away with it.

Of the advantages to the profession which competitions offer, the opportunities which they thus afford for extending the range of an architect's personal experience, and for giving capable but little-known men the chance to show what they can do, is the most conspicuous. It is illustrated in the whole history and biography of the profession. This is also, of course, of equal advantage to the community. It widens the range of practicable and justifiable choice. Committees will gladly, as the result of a competition, employ practitioners whom it would have been unreasonable or improper for them to take under their patronage in advance. The validity of this argument is attested by many notable examples. But it is naturally made light of by men who have already attained eminence, and a disposition to destroy the ladder by which one has himself climbed is too common and too natural a weakness to be made a matter of serious animadversion. People very properly wish to enjoy the fruits of their success without being disturbed at the repast.

Yet young men do not thus leap into fortune so often as is sometimes supposed, or as might perhaps be expected. At any rate, it seldom happens that the prize goes to incompetent hands. The fears sometimes expressed, that competitions will ruin the rising generation, whose heads will be turned by easily won successes, have little warrant in experience.

Competitions also tend to serve the profession by alleviating another disadvantage of the system of direct appointment; that is to say, of the system of personal patronage. Under this system, the architect must always be looking out for a patron, some one who will do him the favor to employ him, for this is the kind of work that naturally goes by favor. He is always haunted with the question how to secure his next job, a question which is a more serious one for the architect than for most men. For it is to be observed that an architect's emoluments always come in large parcels. His money comes, when it comes at all, not by fives and tens, as is largely the case with even the most prosperous lawyers and doctors, but by hundreds and thousands. To get or lose a single piece of work may make the difference between ease and penury for a year to come. In this strait the temptation to curry favor, to intrigue for patronage, to underbid the market, to regard every case as an exceptional one—and no two cases are exactly alike—so that slightly unprofessional conduct seems quite justifiable, is constantly before him. If, then, he has no special gifts for securing business, as is often the case with men admirably equipped for doing it, and if he has neither friends nor family to procure it for him, that is to say, if he has neither *push* nor *pull*, he may well find satisfaction in the system of competitions. It is a system which invites him into the open market, where he and his wares shall be judged upon their merits, and where, whether he disposes of them for a price or finds them left on his hands, he has nobody to thank or to complain of but himself.

It is often said that competitions are merely a device to bring matters to a practical issue, and that selecting the best design is only a roundabout way of selecting the best architect, or at any rate the one who is the best for the purpose in hand. After that, it is said, matters should go on just as if he had been appointed in the first place without making any drawings at all, for that the real object at this stage of proceedings is not to secure a practicable design, which a competition is ill-calculated to furnish, but to secure a capable and trustworthy adviser, who should then by good rights begin *de novo*, under these more favorable circumstances for doing his best, and should be implicitly trusted.

But this is not really so. The successful design is not only a guarantee of its author's strength, but as has been said, it is a safeguard against his weaknesses. This might be illustrated by conspicuous examples where a change of site or some other alteration in the conditions has caused a premiated design to be set aside and an entirely new one to be made, with lamentable results. The first success is no guarantee of a second. Besides, a successful competitor is tempted to rest on his laurels. He is hardly likely to take up the problem a second time and give it a radically different treatment, when the first solution has once proved acceptable. The most that can be expected of him, except under compulsion, is that he will modify the details.

In attempting thus to hold the balance between the *pros* and *cons*, one is somewhat surprised to find the most weighty arguments all piling themselves up in the same scale. Competitions seem to be desirable for almost everybody. Besides the expense and delay, the main objections to them on the part of the owners seem to be that they restrict freedom of intercourse between the client and his architect in the early stages of the work, and that they tend to bring into his service, on merely technical grounds, a stranger whom he would not otherwise think of employing. These evils are real, but they can be greatly lightened. Experience has shown that they are largely offset by the better understanding of the work in hand, which a well-considered competition secures, and the greater range of choice in the selection both of an architect and of a design. To the community at large, competitions are an almost unmixed good, for they tend to bring into use all the talents that are at hand, and thus to improve the world in which the community has to live, while they bring to bear the only efficient restraint that seems to be practicable upon the vagaries and infelicities of architectural enterprise. It would be well if some equally efficient agency were at hand to prevent works of civil engineering from defacing and disfiguring both town and country.

To architects themselves they are seen to offer a legitimate opportunity for extending their business connections, increasing their professional experience, continuing their disciplinary studies, and bringing their names into favorable notice, while they tend to release them from dependence upon personal patronage and from the temptation to intrigue for the chance of employment. The chief objection to them, from the architect's point of view, is that they expose men who are already successful to an unwelcome rivalry, thus, in a measure, depriving them of their legitimate reward, and that they necessarily involve a large amount of disappointment and vexation to the defeated competitors; that they disturb the ordinary course of business, and that the gambling element which often infects them, lowers the tone of the profession and involves a serious loss of time and money. But so far as these damages are not purely sentimental, they can be greatly diminished, if not entirely removed, by judicious forms of procedure, as has of late years been abundantly demonstrated.

It is customary, indeed, in the profession, to speak of competitions as a necessary evil, the only other opinion that finds frequent expression being that they are an unnecessary one. Yet a procedure that has survived for two or three thousand years must have some real adaptation to its environment, some great fitness to account for its survival. Without going so far as to say that "whatever is right," one may still believe that no institution could have maintained itself so long unless it had a sufficient *raison d'être*, some valid justification, and met a real want. This consideration may be held to be a sufficient answer to the question which is sometimes somewhat querulously asked, why architects have to compete for employment any more than other professional men, lawyers, doctors, clergymen, or even civil engineers. It is really sufficient to reply that the very prevalence of the distinction shows that there must be some solid reason for it, since there is no effect without a sufficient cause.

What the reason is is another question. But it is a question that admits of an easy answer. Lawyers and doctors are not asked to show beforehand how they propose to treat the cases submitted to them, simply because it is, unfortunately for their clients and patients, impracticable to do so. If it were practicable for a lawyer to prepare his brief and try it on the judge and jury beforehand, so that his client would know whether the point he makes is a good one, and the precedents he quotes are really pertinent, there would be in every important trial a competition of lawyers to see who should be selected to conduct it. If in sickness or accident, it were practicable to try by experiment which medicine or which surgical treatment would work the best, the result would determine which doctor should undertake the case, and all the High Priests of Æsculapius would be found contending for the honor and the fee.

Among the clergy, indeed, this sort of trial is more possible. Men preach as candidates to see whether their style of sermon and their pattern of theology suit the tastes or prejudices of a congregation, and the congregation institute a sort of limited competition, inviting certain men of whom they have heard a good report to take turns in the pulpit. The ministers hate it, but there seems to be no other way, at least in the independent and democratic churches. Any sensible man will use every possible means of ascertaining and testing the quality of anything before he puts his money into it, and of securing to himself a choice among alternatives, if it is practicable to do so. The reason why doctors and lawyers are not chosen by competition is simply that it is not practicable, and the reason why architects are, is that it is, perfectly so.

In civil and mechanical engineering, also, competitions are not infrequently resorted to. Whenever it is a question of engineering design, and not, as in the general practice of that profession, merely a question of applying recognized methods to particular cases, the man is chosen who presents the best scheme.

Stephenson was thus preferred to Ericsson to build the first locomotive, a horizontal cylinder being judged better than a vertical one. In the appointment of civil engineers, it is becoming every day more usual to employ competition, especially in the case of bridges. The engineer of the Washington Bridge over the Harlem River, in New York, was chosen in this way, and the engineer of the new East River Bridge and the President of the Society of Civil Engineers did not consider it beneath their dignity to compete for the Connecticut Avenue Bridge in Washington. At this moment four eminent men of science are preparing designs in competition for the so-called Soldiers' Memorial Bridge over the Potomac. If it is said that bridges belong to architecture quite as much as to engineering, so that this proves nothing, one may answer that at least it shows this, that even engineers find competition necessary as soon as architecture begins to enter into their work.

It is also sometimes said that to ask architects to compete for employment is to put them on the same footing as the contractors. But this is palpably not the case. One contractor is preferred to another, after a comparison of their figures, purely as a matter of business. It is a mercantile transaction—a mere question of buying and selling. It is a Dutch auction, at which the lowest price carries the day. Now it is true that, in the practice of his many-sided calling, an architect needs many of the qualifications of a man of business, as other professional men, and indeed most men, do. But it is not as a man of business that he is asked to compete. On the contrary, it is because he is also an artist. It is because their work is analogous to that of sculptors, not to that of stone-masons, that architects, like sculptors, have, in all ages and countries, been asked to show who could do the best work, before they were allowed to begin, and have not been permitted to waste their own time and other people's money, when, by a comparison of their ideas, the waste could so easily be prevented.

But even though one may believe that competitions have their legitimate place, it does not follow that he will wish to take part in them himself, any more than it follows, because one man does not care to take part in them, that other people should not. A physician may believe in vaccination and a lawyer may have proper respect for the criminal law, without caring in their own persons either to vaccinate children or to be counsel for thieves. It seems desirable that in laying down rules for the conduct of competitions, there should be more discrimination than is always shown between what men are ready to relinquish for themselves and what they shall forbid to others.

Granting then, what cannot well be denied, that competitions are sometimes desirable and are often unavoidable, it remains to consider by what methods they had best be conducted. There is some difference of opinion among architects on this point.

There is indeed a general agreement that Committees should employ professional assistance, since they need it at every step. They need this assistance first in examining the conditions of their problem and ascertaining its capabilities and its limitations, so that they may not ask for what is impossible and may get everything that the circumstances permit. These examinations will also clear their minds, enabling them to see just what they want, and to distinguish between what is necessary and what is only desirable. Secondly, they need assistance in the statement of these requirements, so that there shall be no ambiguity of language and no omissions. Complications also are likely to occur which do not readily suggest themselves to persons inexperienced in these matters and which may be the source of much embarrassment, if not provided for in advance. The programme should provide for every contingency. Finally, professional aid is needed in examining and choosing among the designs, not only because Committees often do not understand drawings very well, and need somebody to explain them, but because, though they may know whether their own taste and convenience are suited, they cannot in general be competent judges of artistic and technical merit, and the interests of the work and of the public require that they should be well advised in these particulars. In these matters of taste also there is likely to be a difference of opinion among members of the Committee, and it is desirable that the men of sound opinions should be backed up. Moreover, competitors are naturally unwilling to submit such questions to the decision of an incompetent tribunal, and should not be asked to do so.

So far, there is little difference of opinion. But there is a considerable variety, both of opinion and of practice in details. How many the jury should consist of, whether it should be named by the Committee or by the competitors, and whether its decision shall be mandatory or only advisory, are questions which may well have different answers in different cases. Important public work may properly be managed somewhat differently from more private undertakings. In regard to the last point especially, the binding authority of an expert judgment, though the decision of a professional jury may in the case of a public building very well be final and conclusive, it is obviously proper that in more private enterprises the personal tastes and preferences of the proprietors should have freer play, and that the report of their professional advisers, while definitively rejecting the unworthy designs, should allow the owners to choose for themselves among the best. People naturally think that they should have some say as to what they will buy with their own money. Experience has shown that this rejection of the least good is a sufficient and effective bar to those evils of patronage, or at least of an unworthy patronage, to which such competitions are particularly exposed, while it protects the owners from a professional dictation which is especially unwelcome in private undertakings. Moreover, although there is a well-authenticated opinion that, in any problem, there is always one good solution, and that all the rest are of no account in comparison with it, in point of fact, it is not so. The difference in excellence among the three or four best designs is often so slight that the personal, and indeed arbitrary, preferences of the owners may properly turn the scales, even when practical considerations of convenience, of which the owners are often better judges than their advisers, do not afford still more legitimate grounds for a final choice. If, on the other hand, any design really has preëminence, it is easy for the jury to say so, thus exercising a moral compulsion which is equally effective and much more acceptable. It may be added that this procedure, in binding the owners to make their choice from a selected list, binds them not only to ask advice, but to take it, as the competitors have the right to require. If Committees proclaim that they are going to ask professional advice, they are bound to give it due consideration. That is part of their contract with the competitors. But just how much should they be governed by it? It is generally a sufficient answer to this difficult question, if they agree to make their choice among those designs that have received a professional approval.

Besides, it is to be remembered that even a jury of architects is not infallible. A limited power of revision may well be reserved to their employers. It is an open question also whether Committees, as responsible agents, have a right to delegate the final choice to an irresponsible adviser. It is said that, as in the civil service, the most they can do is to obtain from him a certified list from which to choose. Indeed the Courts have held that in some cases even this is *ultra vires*.

A provision of this sort is of value not only to the competitors, as preventing favoritism among the Committee. It is of equal value to the Committee in relieving them of the suspicion of favoritism. Nothing can do this effectually except a provision which renders favoritism impossible.

The employment of professional advice at the beginning will afford reasonable security that in the instructions issued to the competitors the requirements will be clearly stated and that they shall be capable of performance. So far as possible, also, a distinction should be made, as has been said, between the things that are desired and recommended, but which a competitor may disregard if he thinks best and is willing to take the risk, and which the jury may waive, and those provisions which are absolutely essential, the neglect of which will cause the rejection of a design. The list of these more important items should be made as brief as possible, for it is in the interests of the work that the competitors should have as much freedom as circumstances shall permit. But it should include everything upon which the owners have really made up their minds or upon which they have invincible prejudices, lest the competitors should be led astray.

In any case the competitors should have the full benefit of all the preliminary study which the owners or their advisers have given to the problem, even to the extent of furnishing for their use any tentative plans that this study may have evolved.

To the list of requirements, the paper of instructions adds a list of the drawings to be furnished, giving their number and the scale and the style of draughtsmanship to be employed. Here again there is naturally and properly a variety of opinion and practice.

In an open competition, to which all who choose to come are invited, there is every reason, as has been said, for having the drawings as few and simple as possible, for it is the interest of all parties that such a competition should cost as little as possible in time and money. Such a competition appeals primarily to the large class of young or little-known practitioners, and it relies for success upon bringing a large number of them into its service. But if they all, or a chief part of them, are to be paid for their work, this involves great expense, unless the sum given to each of them is small, and the work done must in that case be small in proportion. If they are not to be paid, no large number of competitors will present themselves unless the amount of work required is very small indeed, so that in either case, whether paid for or not, the work asked for in a general competition should be a minimum. How little will suffice, some recent experiments have shown, pencil-drawings on tracing-paper

having been found to answer every purpose of comparison and selection. Indeed, the smaller the drawings the easier it is for the jury and for the committee to handle them and to understand them, and to bring together those that need to be brought into comparison.

But it is difficult to keep expenses down unless a very small scale is employed, each competitor being tempted to put in all the work the scale admits of lest the rest should do so. The recent example of the United States Government in asking for drawings at a sixteenth scale even for important buildings cannot be too highly commended for imitation. Limiting the scale of the drawings is all the more important in that it is not always practicable to limit their number. But no more should be asked for than are needed fairly to present the distinctive requirements of the programme. The choice always turns, and ought to turn in the first instance, on these points. For purposes of comparison, full sets of drawings are unnecessary, for the treatment of minor matters has, and ought to have, no influence on the decision. But drawings that are not to influence the decision are, at this stage of proceedings, superfluous, and should not be asked for.

But though such sketches suffice for the major part of a jury's task, which is a work of rejection, so that it is not difficult for them to narrow the choice to a few of the best, it may sometimes happen that they may not present these schemes with sufficient fullness to warrant a final choice among them. With this in view it is well to reserve the privilege of returning these drawings to their authors for further elaboration. If, then, new conditions have meanwhile arisen, or the proprietors have, as the result of the competition itself, obtained a better understanding of what they really want, so that they desire to modify the conditions, a second competition may sometimes be advantageously instituted among the authors of the most successful of the designs.

Such a procedure completely meets the objection often urged against a competition of sketches, that it compels the Committee to make a final choice without knowing what they are really going to get. This second competition may be conducted on a more ample scale without great expense. But though there are notable examples to the contrary, a double competition of this sort seems undesirable, unless the first trial is one of mere sketches. If the first drawings are elaborate, a second set made under substantially the same conditions will be likely to be virtually a mere repetition of the first, and not worth the trouble and delay they involve. But such more highly-finished drawings are needed only for the designs among which choice really lies, and there is a great economy in not requiring them from all the competitors at the outset.

The same considerations apply to the case of Mixed Competitions, as they are called, in which, in order to make sure of a sufficiency of trustworthy competitors, a certain number are specially invited and receive compensation, a general invitation to serve without pay being issued to the rest of the profession. Here also the work demanded should be a minimum, if any real advantage is to be had from this extension.

But in the case of a Closed Competition, among specially invited competitors, there would seem to be no reason why any amount of work should not be asked for which the nature of the problem may suggest and which the owners are willing to pay for. Yet even here it is well to avoid undue interruption of business and unnecessary disturbance of mind by keeping the work within moderate limits. In any case, however, it seems better to have all the competitors paid alike, rather than to have prizes of different values, and one of the advantages of diminishing the requirements to the utmost is that it may then be practicable to offer a considerable number of prizes which though small are large enough to meet the expense involved, so that even in an Open Competition all the best work, at least, may be properly paid for. Architects go into these contests not to make money out of prizes, but in the hope of getting the work to do, and ask neither for a reward of merit nor for a personal compliment, but only for a reimbursement of their expenses. These are presumably the same for all. Moreover, equal compensation puts all the defeated competitors upon the same footing, and nobody has to add to his disappointment the mortification of getting the lowest prize, sometimes a most unenviable distinction. Indeed, even a second prize seems sometimes only to signalize defeat.

Whether many or few, the drawings should be precisely enumerated and no extra or illustrative drawings should be admitted; otherwise the award is likely to go not to the man who has done the best, but to the one who has made the most imposing show, and the longest or most reckless purse will win. Alternatives showing variations in the treatment of details should, I think, not be permitted at this stage of proceedings, unless asked for to illustrate alternative conditions. But competitors should be allowed, if they please, to present different designs embodying different ideas. It is the main object of the competition to obtain a number of schemes to choose from. Here again, if only sketches are asked for, the competitor may well afford to make more than one set. As to the style of rendering, it is more important that it should be the same in all the designs, so that no one of them may have any advantage by reason of draughtsmanship, than that it should be particularly good, or should do full justice to the author's idea. Exquisite draughtsmanship is a snare, deceiving both the architect and the jury. The best way to secure uniformity of style in the draughtsmanship is to furnish a print of some building illustrating the kind of drawing required.

Besides the necessary plans, elevations and sections, drawings in perspective, all made from the same point-of-view, are an invaluable

auxiliary. The objection so often made, that such drawings are deceptive, and are calculated to beguile committees with fictitious effects of color and shadow, is obviated by making them in black-and-white, or merely in outline. They will still answer the principal service which a perspective can perform, and which nothing else will, that of showing the sky-line and the relations of the principal masses as they will really appear. As to unreal and factitious effects, nothing can well be more obnoxious to this objection than a drawing made in geometrical elevation, since it presents the building in an impossible aspect as seen from an inaccessible point, and its parts in factitious relations. Nothing could be more open to the reproach of misrepresentation than the conventional colors and exaggerated light and shade which carefully rendered elevations habitually present.

The other objection, that perspectives seldom honestly correspond to the elevations, but are usually "faked" so as to look right, refutes itself. It implies that an honest perspective showing the design as it would really appear, would look wrong; that is to say, that there are mistakes in the design which had escaped notice until the perspective revealed them. One of the chief advantages of putting buildings into perspective lies in the suggestions which thus arise for the improvement of the design. But of course this advantage is obtained only when the perspective is made under the architect's own eye. The liberties taken by the professional aquarellist are likely to escape notice, and the improvements he makes are not detected.

The Paper of Instructions should, finally, be perfectly explicit in regard to business matters. In the first place, it should be made clear whether the promoters are acting in their own behalf or as agents, and in either case whether they have authority to proceed to build, and the language used should be such as to constitute a valid contract between them and the competitors. Assurance should also be given that the successful competitor shall be paid according to the schedule of charges approved by the American Institute of Architects. This is necessary not only to prevent any possible trading or underbidding on the part of other competitors, if such things can be, but to protect the successful competitor from haggling and beating down on the part of the owner. If any other scheme of payment is in contemplation, the fact should be explicitly stated in advance.

Assurance should also be given, wherever possible, that the successful competitor shall do the work. But this is not always practicable or reasonable. Even in Limited Competitions among invited competitors, it may happen that the Committee find themselves constrained to invite men in whom they have not perfect confidence, and whom they do not wish to employ. This is of course a most undesirable state of affairs. But it sometimes exists, and when it does it should be frankly met by reserving to the owners the right to associate with the successful competitor some person acceptable to himself, with whom he shall divide the labor and the profits. This might seem to be so offensive a proposition as to deter men from taking a hand. But it does not prove so. The more experienced men feel quite sure that it does not point to them, and the men whom it does mean either withdraw, which does no harm, or are glad to take their chance under almost any conditions.

In an Open Competition, of course, such a provision is essential in order to protect the owners. Otherwise there is nothing to prevent any irresponsible person from hiring an equally irresponsible designer and a sufficient number of capable draughtsmen and carrying off the prize. But even in this case if the design is really the best one, it is for the interest of the work that the owners should be able to use it, under such provisions as safety may require, the author having his proper share of the credit and of the profit.

So, also, if there is anything in any of the rejected designs that would contribute to the perfecting of the contemplated work, it is proper both that the owner should have the benefit of the suggestion and that its author should have proper recognition. Here again there is some difference of opinion and of usage. Committees are apt to think that designs for which they have paid something ought to belong to them to use as they will, and that this forms part of their bargain with the competitor. They do not understand that what they pay for is not the right to use it but the right to choose it. If they use it, or any part of it, they must pay in addition accordingly. But when the fee is large, it is sometimes provided that all the designs shall belong to the owner or proprietors to do as they please with, and of course nobody who accepts such conditions can complain if they are carried out. But most people will refuse to accept them unless the pay is very large indeed, and though a provision of this sort seems favorable to the owner, in fact it is not so. For the money spent in the large fees which alone make such a scheme practicable is for the most part thrown away. It seldom happens that different schemes can be incorporated into one. But minor details are sometimes adaptable, and it is customary to make provision for this contingency by a clause in the programme saying that "nothing in any of the rejected designs which is original as to this competition shall be used in the building without the consent of its author, and proper compensation being made to him." This seems perfectly fair, and it is of course an efficient safeguard against the fraudulent trick, said sometimes to be practised, by which a Committee adopts a design out of favoritism, and then fortifies it by adapting or adopting the best points of its rivals. But on the other hand, it puts it in the power of a disappointed and unscrupulous competitor to revenge himself for his disappointment by refusing the

permission asked. This would bring on difficult and delicate questions of originality in authorship which however answered would be most embarrassing. I am disposed to think that the programme should stipulate in behalf of the owner for the right to employ any such features on making proper compensation; that is to say, the right not only to use the whole of one design, taking its author for his architect, but to use any part of any other. The owner institutes the competition in order to solve the various problems which the case presents, and it seems reasonable that he should profit by the solutions given to any of them, on making proper payment. If, as is generally the case, it is stipulated that the rejected designs shall not be shown to the successful competitor, this provision is hardly liable to abuse.

There is one case, however, in which uniting two designs in one is sometimes perfectly practicable. One of the many ill-considered dogmas which cloud the minds of architects, maxims lightly given out and lightly accepted, but without real basis in fact or in reason, is the saying that in the nature of things a good plan and a good elevation must always go together, that a good arrangement of rooms suggests a good façade, and that an exterior composition is not a good one unless it suggests and corresponds to a good distribution within. Nothing could be further from the facts. It constantly happens, as everybody who has had to examine a series of competition drawings will testify, that these two kinds of merit may exist, and constantly do, in entire independence one of the other. It constantly happens that an admirable plan is accompanied by an intolerable elevation. It might have had a good one, but it doesn't. A noble exterior may be set up from a wretched plan. In this case the obvious thing to do, in the interest of all parties, is to roll the two into one, to couple the good plan with the good elevation, and then to arrange if possible that the two architects shall form a temporary partnership, *ad hoc*, and carry them both into execution. Personal antipathies and susceptibilities, of course, stand in the way of such a consummation, but from an architectural point of view, it is often perfectly feasible and reasonable.

When this case presents itself, that is to say, when such a combination will really effect the best solution of the problem, and yet the two architects in question cannot agree to work together, it ought to be practicable to have one of them act as architect of the building, and to have the other dispose of the right to use his ideas for a price. Which should do which would depend upon who was who. But in general, one may suppose that in spite of all that is said, and so justly said, of the paramount importance of the plan, the author of the elevation would be the architect. This would almost necessarily happen, for he would presumably be nearly as competent to execute the plan as its author, and if he could not do it himself, he could find assistants who would, while as to the elevation, the author of the plan would presumably be as incompetent to carry it out as he was unable to conceive it in the first place. In fact, of course, nobody except its author could carry it out successfully in detail.

Another open question is whether competition drawings should be signed or not. Here also there is some difference of opinion and practice. The question is, whether the merits of the designs and the merits of the designers shall be considered separately or together. I cannot help thinking that reason and experience are both in favor of considering these two things separately. They are totally different questions, and are best taken up one at a time. Whether men may safely be entrusted with the proposed work is a question which may often be considered in advance and the competition restricted to trustworthy persons. If this for any reason cannot be done, then this question may well be left to the last, when personal considerations of age and experience may properly come in to turn a scale evenly balanced between two nearly equal schemes. This, moreover, restricts these somewhat awkward questions as to personal responsibility to two or three of the competitors.

It is sometimes considered advantageous that, before the decision is reached, the competitors should meet the committee to answer questions and make explanations. This can be secured, as it often is, by a phrase in the programme saying that the committee, if they find occasion to do so, will "open the envelopes containing the names of the competitors before they make a final decision, so that personal and business considerations may have due weight." In Open Competitions, a provision of this sort is, as has been said, absolutely necessary for the protection of the owners. But it is obviously in the interests of truth and justice, and equally to the advantage of the committee and of the competitors, and for the convenience of the jury, that in the first instance the study of the designs should be made without prejudice, and the task of investigation and selection be guided by their merits alone. This is also the only way in which the jury can themselves hope to render an unbiased and impartial verdict, or to be thought to have done so. Indeed, when juries have to deal with signed drawings, it is very much the custom with them, in order to protect themselves from cavil, and for the sake of their own peace of mind, to have the names covered up before their examination of the drawings begins.

It is true that competitors sometimes unite in asking permission to sign their drawings. But it may be surmised that this suggestion comes from the better known men, who naturally think that they ought to reap a legitimate advantage from their professional standing and reputation, and that the rest of the competitors acquiesce, with such grace as they can command, in what they feel to be prejudicial, but do not see their way to oppose. Something of the same sort may

be said in regard to appearing personally before the committee. If they can do that, it is all that some men need want.

What the programme should say about the cost of a proposed building is another vexed question. My own impression is that it should say without reservation how much money the owners intend to spend, and should ask for approximate estimates on the basis of the designs submitted. These estimates had better be itemized, — so much for the building itself, so much for the foundations, so much for sculpture, decoration, heating, etc. If it is added that the owners "will not reject any design on account of its apparent cost, without first giving its author an opportunity of justifying or modifying his figures," it seems to me that all interests are guarded, and the question of cost answered as nearly as it is practicable to answer it at this stage of the proceedings. Moreover, it is to be said that if the cost of the more variable items is thus subtracted, the cost of the structure alone will presumably be about the same per cubic foot for the different designs. It ought to be. At any rate, this figure is entirely within the control of the owner. He can build for fifteen cents a cubic foot, or for fifty, according to the materials and style of construction and decoration that he prefers to adopt, and with the assistance of an experienced contractor, and of his professional advisers, he can satisfy himself as to the relative cost of the designs among which his choice is found to lie with as much precision as he cares for. The cost will indeed thus resolve itself into a question of the relative dimensions in cubic feet of the designs submitted, and the design which wastes least space will cost the least.

It is worth while to add that it is perfectly practicable in many cases to reduce the cost of a building, simply by applying a larger scale to the drawings. A shrinkage in lineal dimensions of one-eighth will reduce the cubic contents of a building nearly one-half, and the square feet, that is to say, the surface of the floors, roofs, walls and partitions, nearly a quarter. Rooms forty feet long will be reduced to thirty-five, and doors four feet wide to three and a half. Many designs, especially for the more monumental buildings, will suffer this reduction without palpable loss. This device has more than once been applied to competitive drawings with excellent results. Even a reduction in linear dimensions by one-sixteenth, which would hardly be noticed, setting, say, thirty feet in place of thirty-two, and three feet nine inches for four feet, will reduce the cubic contents by nearly twenty per cent and the square measures by nearly ten per cent.

These considerations do not, of course, touch upon the objections to competitions which are based upon the bad faith and unbusinesslike methods of building committees. But though it is not easy to overstate this evil in many cases, I think these cases are less common than is supposed and I am sure that it is an evil which can be greatly abated. I have generally found that when things were explained to them, committees were as punctilious as one could desire. In the twenty-five or thirty cases that have come under my own hand there have been only four in which the committees at all misbehaved themselves, and in each case some of the competitors were equally to blame, or even more so.

For the history of competitions shows that the unbusinesslike and discreditable performances with which this history is disfigured are by no means confined to building committees. The efforts on the part of competitors to obtain unfair advantages by means of superior and captivating draughtsmanship, by superfluous drawings, or by bringing personal influences to bear upon committee-men before the decision is made, and attempts to discredit the award afterwards by disputing the fairness or the competence of the committee, or of the jury whose verdict they have agreed to accept, in the hope of securing a more satisfactory finish by making a fresh start, are equally to be deplored. Still more so are the personal recriminations which occasionally come to one's ears, though happily they seldom come before the public, competitors roundly accusing each other, sometimes apparently not without reason, of unprofessional and dishonorable behavior.

But all these things belong to the domain of personal and professional morality, an important field, but a field which lies quite outside the ground covered by this paper. They relate to the standards of conduct in these matters which obtain in the community and in the profession, standards which are much lower than they might be. Business-men, when put upon Building Committees, sometimes seem to find it difficult, or to consider it unnecessary, to employ the business methods and the maxims of honorable dealing which in their private affairs they would never dream of disregarding. Architects are, as I have said, under unusual temptation to step over the narrow limits of scrupulous procedure. It is one of the main objects of this Institute to raise the tone of both. But it is not the object of this paper to offer any suggestions to this end. Its aim is, on the contrary, taking things as they are, to show that the evils resulting from such misconduct, misconduct which competitions have often seemed to invite, may be greatly discouraged by methods which shall afford little inducement and little occasion, on any one's part, for discreditable practices.

For a well-devised procedure will, in the hands of independent and competent persons, offer little opportunity for unfairness, either in committees or competitors, and keeping the number, size and style of execution down to a minimum will not only prevent waste of

labor and money, but by limiting the amount of time and thought that can be put into the work, prevent the exalted hopes and cruel disappointments that are the chief bane of the system and which chiefly prompt men to intrigue.

What is here of prime importance is that measures should be taken to keep the expenses, whether large or small, strictly within the sums paid to the competitors, thus shielding them from the temptation to spend more than they are to get, in the hope of capturing the prize. "But," it may be said, "if architects are foolish enough to throw away their time and money on a mere possibility, why is it any of other people's business to prevent them?" The answer is easy. Because it is gambling. The State makes laws to shield its citizens from this temptation and danger, and the constituted authorities of any profession may well take measures of like nature to secure a similar end. Competitions do not indeed, like cards and dice, enrich one man to another's loss, nor do they, like speculating in stocks, tempt men to ruin themselves by incurring obligations they cannot fulfil. But they tempt architects to expend upon them more than they can afford to lose, both of time and money, and they are disturbing and demoralizing just in proportion to the amount of anxiety they awaken.

These disadvantages cannot be entirely got rid of, since it is in the very nature of competitions to excite the imagination and to introduce into a business which is at best somewhat precarious an added measure of uncertainty. But to place one's dependence on uncertainties is as unbusinesslike as it is dangerous, for it is good business to count only upon what one is reasonably sure of, allowing such margins of safety that ill-luck can do no harm. An architect who allows competitions to play an engrossing part in his affairs is relying not on certainties, nor even on probabilities, but on possibilities, and on only one of them. The only real probability is failure, and the more time and thought and money he puts into them the greater the loss and chagrin he has to expect. If he is to avoid the ruinous risks and the unwholesome excitements and depressions of the gambler he must put into such work only a moderate amount of labor, and must learn to regard the result with an even mind, or, better, disregard it altogether. If then he has time on his hands, and there is either no pecuniary loss, or it is so small that he can bear it without a pang, he may well regard competitions as coming within the range of legitimate business enterprise. No harm can come of them. Even the hells of Homburg and Monte Carlo would lose their name if their votaries satisfied themselves with penny points. But in competitions this temperance is almost impossible if the requirements are at all exacting; that is to say, if anything more than sketches is asked for.

In whatever aspects, then, we regard competitions we come to the same conclusion. We find that their advantages are enhanced and their evils diminished if they are conducted modestly, the issues presented made as simple as possible, the questions to be answered limited in range, and the work required to answer the questions reduced to a minimum. For the only issue a competition is well calculated to determine is that of the *parti*, the kind of thing it is best to do, the sort of building best suited to the case in hand. Questions of cost, material and construction, and personal questions as to the skill, experience and character of the competitors, cannot be answered by this procedure. They must be separately considered, as has been said, either before the competition is set on foot, or after it is concluded. But the main elements of the design, in plan and elevation, can be perfectly well settled in this way, and often more satisfactorily than in any other way. These questions, however, can be answered by sketches, any sketches, however small and simple, that will suffice to indicate the main elements of the scheme. How slight these may be has already been shown. Indeed, it is notorious. One constantly hears, after a decision has been reached by means of large and elaborate drawings, the result of endless labor and of expenditures which are never revealed, that the first sketch, made months before, exhibited all the qualities that finally won the triumph, that the original germ, so to speak, exhibited all the "promise and potency" of the final flower and fruit.

In thus passing in review the advantages and disadvantages of the system of competitions to the public, to clients and to the profession, it seems plain that the advantages are sufficiently real and important to account for and justify its continued existence. Since, then, we cannot reasonably expect to do away with competitions, and on the whole should not desire to, it is gratifying to find that with a little care and pains it is practicable materially to enhance their advantages and almost entirely to get rid of their most objectionable features. Experience has repeatedly shown that if in the first place the requirements of the problem in hand are carefully considered in advance, and clearly presented, and the final decision guided and in great part controlled by a competent and independent tribunal, and if in the second place the time and money to be spent upon them is no more than what is needed for an intelligent choice among the schemes presented, and this service is properly paid for, a procedure may be instituted to which no serious objection can be made, which can be undertaken without too much disturbing the ordinary course of business, and without too much disturbance of mind either before the award is made or after, and which ensures some notable advantages both to the public and to the profession which the system of personal patronage fails to secure.

FOUNDATIONS OF BUILDINGS.¹

IN recent years the field of operations of the architect has been considerably enlarged by the introduction of steel and iron work in the construction of buildings, and what was formerly considered to be exclusively the business of the civil engineer is becoming more the work of the architect. A knowledge, therefore, of the nature and properties of steel and iron and the methods of calculating the strengths of the various members of such structures is becoming more essential every day to the architect. It is not proposed in this paper to deal with the arranging and designing of such structures — this of itself would supply material for more than one paper — but rather to make a few remarks on the superstructure or foundations of such buildings, and, indeed, of buildings in general.

In ordinary buildings constructed of stone or brick walls, the pressure on the foundations is pretty evenly distributed over a comparatively large area of ground surface; so that pressure per square foot on the foundation is usually small, and does not call for any special consideration, except when the ground is soft or treacherous. In the case of lofty buildings of enormous weight supported on pillars, the case, however, is quite different. In such buildings as much as 1,000 tons may come on the foundation of a single pillar; the immense pressure being exerted on a comparatively small area of ground surface, it will be apparent that special means will have to be adopted for insuring the stability of such foundations.

My attention was forcibly drawn to the importance of this subject, and to the scant thought it sometimes receives by the architect, about four years ago, when I was asked to report on the causes of the collapse of a large mill then in course of construction in Germany. This was a typical Lancashire cotton-mill of several stories, the floors being for the most part supported on cast-iron pillars. These pillars rested, on brick piers, underneath which were beds of concrete, the concrete itself resting on sand foundation. Partly owing to the presence of water in the sand, partly owing to inferior bricks and mortar and the slovenly manner in which the work was executed, and, perhaps, also to the defective cast-iron base-plates on which the pillars rested, one day, when the construction of the mill was nearing completion, the foundation of one or more of the pillars subsided, causing the base-plates to fracture, and the shafts of the pillars to pierce through the brickwork and concrete beneath. This occasioned the complete wreck of the structure, and entailed the loss of the lives of several of the workmen. Here we have an example of a building carefully designed and erected, so far as its superstructure was concerned, but, owing to carelessness in the designing and execution of the foundations, meeting with an untimely fate.

In America the construction of lofty steel and iron buildings is carried to much greater lengths than in this country. The erection of what are termed "skyscrapers" seems to have originated in Chicago, and from there have spread to several other cities in the States, and it is not at all improbable that in the near future we shall see their introduction into England.

There may be many objections to these colossal structures from an æsthetic point-of-view, and I dare say many people consider them monstrous eyesores. There may be also some objections to them as excluding light and air; yet, when we admit all this, we cannot but admire the ingenuity displayed in their construction, and from a commercial point-of-view we must admit their claims, especially in cities where land is very valuable. Such being the case, we should face the situation boldly, and, instead of decrying them as monstrosities, should rather study them and make ourselves conversant with all the intricacies of their design.

In America, the work of designing these structures is usually divided between the engineer and architect. The details of their construction are so varied that neither the engineer nor the architect by himself can satisfactorily cope with them. The work of the engineer consists in designing the steel framework, including the pillars and girders, that of the architect in arranging the plan of the rooms and offices and the skeleton walls and partitions, and also the general decorations; while the foundations, which are of the utmost importance, might be planned conjointly by both. In providing for these, the loads coming on the foundations must first be carefully calculated. These consist of, first, the dead weight of the building itself, including that of the floors and roof; and, secondly, the loads on the floors, which may consist of goods, machinery, and people, and also the wind-pressure exerted on the building. These latter loads may change from time to time, and are sometimes termed live or accidental loads, and they vary considerably in different buildings.

The maximum live loads on the floors of dwellings may be taken as 1½ cwt. per square foot; on public buildings at 1½ cwt. per square foot, and on warehouses at from 1½ to 3 cwt. per square foot. In the case of dwelling-houses and public buildings it scarcely seems probable that these loads can be reached, but it is always advisable to have a margin. It is quite possible that such floors may contain a densely packed crowd of people which may weigh as much as 1 cwt. per square foot of floor-surface. In the case of lofty structures consisting mainly of offices with light fixed furniture, it is not necessary to allow for such heavy loads as those specified. The weight of the roof, including wind-pressure and snow, depends on the span, and varies between 25 and 65 lb. per square foot of roof-surface.

A lofty steel structure has just been completed in New York, and it may be of interest to refer to a few particulars respecting it.

This is the Park Row Building, mainly consisting of offices. It is the highest building in the world, its height from the level of the curb in Park Row to the top of the cupola being 386 feet. It has thirty-two stories, and contains 1,000 offices, having accommodation for 4,000 persons. The total weight of the building is estimated at 65,000 tons, and the pressure on some of the pillar-foundations is as much as 1,100 tons.

The structure is carried on round timber piles of spruce from 10 to 14 inches in diameter, driven into a sand foundation to a depth of about twenty feet. The piles are placed from 16 to 18 inches apart, centre to centre, and are driven in rows, the distance between each row being about 24 inches — centres. The load on each pile does not exceed 16 tons. The heads of the piles were cut off level and concrete was filled in between them to a depth of 12 to 16 inches, the surface of the concrete being level with the tops of the piles. Upon the concrete are laid granite blocks which receive brick piers, which in their turn receive the grillage-beams and distributing girders. Some of the interior pillars rest directly on the grillage-beams, which are steel rolled joists. In other cases, distributing girders rest on the grillage-beams of two or more of the foundations, and support two or three pillars. These distributing girders are massive steel-riveted girders of the box form, and vary in length from 20 to 47 feet, and in depth from 6 to 8 feet, and some of them weigh as much as 47 tons.

This example of a building is, of course, an extreme case, and the architect may never be called upon to consider such enormous loads and such intricate foundations; yet the general principles coming into operation here are, in a modified way, applicable to similar buildings of less pretensions.

Having said so much in a general way, we will now consider more in detail as to what constitutes a good foundation, and what working loads different foundations are capable of sustaining. I would, however, remark that within the scope of a brief paper, hastily written, it is not claimed that anything in the nature of a complete survey of the question can be attempted.

In preparing a foundation, the first thing to be done is to examine the nature of the ground on which the building is to be erected. It is not often that the surface of the ground is suitable for building upon. If it is of rock, of course we have all that is necessary so far as stability is concerned. It is the exception, and not the rule, however, that a rocky foundation is to be met with. It then becomes necessary to excavate until a reliable foundation is reached. As to what constitutes a reliable substratum is a matter very largely the result of practical experience.

Ordinary foundations may be ranged under three classes, viz:

1. Foundations in rock, or in some material whose stability is not affected by water.
2. Foundations in firm earth, — under which are included such materials as sand, gravel, and hard clay.
3. Foundations in soft earth.

It must be borne in mind that the base of every foundation should be as nearly as possible perpendicular to the direction of the pressure which it has to sustain; and, moreover, it must be of sufficient area to bear that pressure with safety.

To prepare a rock foundation for being built upon, it will be necessary: — (1) To cut away all loose and decayed parts of the rock; (2) to cut and dress the rock to a plane surface, or to a set of plane surfaces like those of steps, perpendicular to the direction of the pressure; (3) to fill, where necessary, hollows in the rock with concrete or rubble masonry; or it may be advisable, in order to distribute the pressure, to cover the surface of the rock with a layer of concrete varying in thickness from a few inches to several feet.

The crushing-strength of rock varies considerably. That of chalk, if we may consider chalk a rock, is as low as 30 tons per square foot. The crushing strengths of different kinds of sandstone vary between 140 and 450 tons per square foot, that of limestone about 500 tons per square foot, while that of granite or basalt is as high as 1,000 tons per square foot.

The intensity of the working pressure on a rock foundation should in no case exceed one-tenth of the pressure which would crush it. It is not often in practice, however, that the actual pressure on a rock, or indeed any foundation, approaches this limit. Speaking generally, the average pressure coming on a fairly good quality of rock is about ten tons per square foot in work which has been executed; and the architect might fix in his mind anything up to 20 tons as a safe rule to go upon. On weak sandstone which is so soft that it crumbles in the hand two tons is sufficient to allow.

Having said so much on rock foundations I will pass on to the consideration of foundation laid on *firm earth*, under which head may be included hard clay, clean dry gravel, and clean sharp sand. For buildings resting on such foundations it is desirable, in this country, that the foundations should be carried at least 3 feet below the surface of the ground for sand or gravel, and 4 feet for clay, in order that they may not be weakened by the disintegrating effects of frost or other climatic conditions. In other countries where greater extremes of climate are experienced a greater depth is necessary. The practice in Germany, for example, I understand, is that for foundations of this kind the depth should be from 4 to 5 feet, and in North America from 4 to 6 feet.

¹A paper by S. Anglin, Master of Engineering, Royal University of Ireland, read before the Manchester Society of Architects, October 12, 1899, and printed in the *Journal of the Royal Institute of British Architects*.

It is very desirable that surface-water should be kept from such foundations by constructing suitable drains.

Different authorities vary very much in their estimates as to what working pressure it is desirable to place on this class of foundations. The German authorities recognise 2.5 tons per square foot as a suitable pressure. With good clay, however, sufficiently beneath the surface of the ground to be protected from atmospheric influences, much higher pressures can be safely applied. The main piers of the Tower Bridge in London rest on clay, on which they exert a pressure of 4 tons per square foot. At Openshaw, near Manchester, the massive steel pillars of Messrs. Sir W. G. Armstrong, Whitworth & Co.'s works, which are subject to vibratory loads from passing cranes, exert in some cases a pressure of as much as 5 tons per square foot on the clay, and no settlement has been observed. In other buildings, no doubt, greater pressures exist; but this is the limit so far as my experience goes. In the great majority of structures built on clay the pressure is much less. That of the Nelson Column, in Trafalgar Square, London, does not exceed 1.3 ton per square foot. This column rests on clay of great depth and compactness. In preparing this foundation an excavation of 60 feet square and 12 feet deep was made and filled with concrete to a depth of 6 feet; on this base a frustum of a pyramid 13 feet high was built in brickwork, on which the superstructure was erected. On a base 60 feet square, which may be taken as the real base of active support, the gross load amounts to 4,665 tons, equivalent to 1.3 ton per square foot, as already stated. I think I may say that three times this load could with safety be placed on this foundation.

Foundations in gravel and sand, under favorable circumstances, are capable of bearing heavy loads. The Campanile of Cremona, 395 feet high, standing on Pliocene gravel, bears with a pressure of 12 tons per square foot on its base.

It is not often that water is injurious to a gravel foundation, as it can percolate through freely; but with sand, the case is quite different, as water so alters this material as to make it quite useless for a foundation. The obvious tendency of sand saturated with water is to escape laterally under pressure. If this tendency can be counteracted by any means, it may be possible, though not desirable, to utilize a foundation of this description. Sheet-piling driven around the foundation often answers the purpose. A case in point is supplied by the tower of the Hamburg water-works. This tower rises about 290 feet above the surface of the ground; it is built of brickwork, and rests on a circular block of concrete 56 feet in diameter and 11 feet thick. This in its turn rests on quicksand enclosed by sheet-piling driven below the line of saturation of the River Elbe. The gross weight supported amounts to 5,310 tons, which gives a pressure of about 2 tons per square foot on the quicksand.

A foundation of unequal density or compressibility is one to be avoided. When of equal compressibility any subsidence which takes place is uniform all over the foundation, and the structure erected on it is not materially damaged; but if one part of the foundation is more compressible than another, the structure has a tendency to be tilted out of the perpendicular, and cross-stresses are produced which may destroy its stability. In north Italy, as is well known, a number of leaning towers erected so far back as the twelfth and the thirteenth centuries exist, and the reason assigned in the majority of cases for these being out of perpendicular is the unequal compressibility of the foundations on which they are erected. A noted example occurs in the Campanile or leaning tower of Pisa. This is a circular tower 178 feet high, weighing 11,800 tons, with a base 60 feet in diameter, which is equivalent to a pressure of more than 4 tons per square foot. The soil under the foundation is of unequal density, it being more compressible in the direction in which the tower leans. That the settlement took place during the progress of the work may be inferred from the presence of iron bars introduced to hold the building together.

When foundations are too soft for building upon, and when the depth is too great for excavating to a reliable material, special means must be adopted. One method is that to which I have referred in the tower of the Hamburg water-works. Another method is to consolidate the ground by timber piles, which was the method adopted for the Park Row Building at New York. These bearing piles act as pillars, each supporting its own weight of the building. They may either be driven through the soft stratum until they reach a firm stratum underneath and penetrate a short distance into it, or if that be impracticable owing the great depth of the soft stratum, they may be supported wholly by friction in the soft stratum. From practical examples, the safe working loads on these piles may be taken as follows:—

For piles driven until they reach the firm ground, 1,000 lb. per square inch of the area of the pile may be allowed.

For piles standing in soft ground and supported wholly by friction 200 lbs. per square inch of pile section is sufficient.

The best material is elm. The point of the pile should be fitted with an iron shoe, especially if stones or other impediments are to be met with, and the heads should have an iron band to prevent its being split by the blows of the ram. They may be driven by hand or steam power. For the piers of bridges and similar structures iron screw piles or cylinders may be used.

In ordinary steel or iron structures, the main pillars usually rest on concrete, brickwork, or stone, and sometimes on all three in combination. When used in combination a concrete block is first laid, upon which several courses of brickwork may be built, and lastly a stone

slab placed on the top. It is not often, however, that all three materials are used together, one or two generally being found sufficient. The intensity of pressure on the ground underneath may be modified to the required extent by increasing the area of the concrete block, or by stepping-out to the necessary extent the lower courses of brickwork.

It is of great importance that the architect should be conversant with the working loads allowable on these materials.

The working pressure allowed on concrete foundations of sufficient thickness varies considerably according to the quality and the age of the concrete. Generally speaking, it may be taken as varying between 2 and 10 tons per square foot. It is not often, however, in work that has been executed that so high a pressure as the maximum mentioned exists, from 1 to 5 tons being most general. When pressures of 5 tons and upwards are to be provided for, great care should be bestowed on the manufacture of the concrete. All the materials composing it should be of good quality. All earthy substance, ashes, soft broken bricks, or greasy matter should be excluded; round smooth gravel or stone should be broken. The best Portland cement should be used; it ought to have a cohesive strength of 400 lbs. per square inch after seven days from mixing. The proportion of the different ingredients should be four parts of broken hard brick or stone, one of clean sand, and one of cement. The concrete should be turned over twice dry, and three times wet, and well rammed in 12-inch layers. It is not advisable to send the concrete down a shoot or drop it from a height, unless it is afterwards remixed, as the larger pieces fall to the ground first, the smaller pieces next, and last of all the cement. Whenever used under water, the water should be still; a current will carry away the cement and leave only the ballast.

The crushing strength of bricks varies considerably. It may be as low as 60 lbs. per square inch, and as high as 1,700 lbs. per square inch. Best blue bricks show a strength of 1,200 lbs., while Stourbridge fine bricks will stand 1,700 lbs. or even more. When great pressures have to be borne, the latter, or others similar in strength, should be used. It is desirable in a brick foundation that not only should the quality of the bricks be good, but also that they should be properly laid in good cement. Each course as laid should be well rammed down and bedded, leaving the layer of cement between each course as thin as possible. When this is done it is extraordinary what a brick foundation will support.

In connection with the failure of the foundations of the German mill already referred to, I had some experiments made as to what loads a brick pier was capable of sustaining. The test was made on a block of good red brickwork 3 feet 1 inch by 2 feet 11 inches, and 1 foot 4 inches thick. It was built of five courses bedded in cement, the bricks being pressed close together, with a thin layer of cement between them, and allowed to set for ten days before the test was made. The bricks were made by Messrs. Smethurst, of Oldham (and some of similar quality were tested by Mr. D. Kirkaldy, who found that it took a pressure equal to 480 tons per square foot to crush them). The pier composed of these bricks was inserted between iron plates and placed in a hydraulic press, the area of pressure on the brickwork being 5.3 square feet. Pressure was gradually applied until it reached 622 tons, which is equivalent to about 117 tons per square foot. The pressure was not increased beyond this point, as the press was incapable of anything greater. After the brickwork was removed and examined it exhibited no signs of failure, and was apparently as perfect as it was before the test.

According to the Berlin building regulations, with ordinary brickwork set in lime mortar a load of 7 tons per square foot is allowable for a working pressure, while with good hard bricks laid in cement 11 tons per square foot is recognized. Generally speaking, in this country anything between 2 and 10 tons per square foot is the practice.

With iron or steel pillars resting on stone, brick, or concrete foundations, there is another very important matter, frequently lost sight of, which should receive careful attention, and that is the proper bedding of the base of the pillar. When it rests on a block of stone, the stone should be carefully dressed off to a level surface, and the bottom surface of the base of the pillar should also be true. Some engineers insist upon having the latter machined. Even with these precautions, in very important work a layer of sheet-lead might be introduced between the two surfaces. I remember several years ago when the present *Manchester Guardian* newspaper offices were being built a failure arising from improper bedding occurred. The main cast-iron pillars supporting this building sustain very great loads. One day it was discovered that one of the cast-iron base-plates was fractured, and also that the stone on which it rested was cracked. This occasioned a good deal of alarm for the safety of the building, and a celebrated London engineer was called in to report on the matter. He discovered that it arose from imperfect bedding. The top of the stone, instead of being tooled to a level surface, was hollow towards the centre, and the whole pressure was transmitted to two or three points towards the edges, which sufficiently accounted for the failure.

With concrete and brickwork foundations a good plan, when it can be adopted, is to bed the base in cement. This often can be done with a loose base, but in the case of steel pillars, where the base is an integral part of the pillar itself, it cannot be satisfactorily adopted. The *modus operandi* in such cases is to leave the surface

of the foundation rough, and place the pillar upon it with iron wedges inserted at the four corners. By means of these wedges the pillar can be raised to the right level and made plumb. When this is done, liquid cement should be carefully run underneath. This effectually fills up all inequalities and evenly distributes the pressure over the foundation. The cement should be of such a nature as to set hard, and may vary in thickness from $\frac{1}{4}$ inch to 1 inch.

A STEEL ROADWAY IN SPAIN.

THE road between Valencia and Grao is 2 miles in length, and an average of 3,200 vehicles pass over it daily. Until 1892, it was constructed of flint stone. The annual cost of keeping it in repair was about 35,000 pesetas. At the rate of exchange at that date, this amounted to \$5,470.

The construction of a steel roadway was determined on, and the annual cost of keeping in repair the central zone of road thus relieved from heavy traffic — which proceeds over the steel rails — is now only 2,500 pesetas, or about \$380 at the present rate of exchange.

A Belgian firm received the contract to furnish the steel-work, having bid less than Spanish firms at Barcelona and Bilbao.

The length of road so built is 3.2 kilometres (1.988 miles). The cost per kilometre (0.62137 mile) was 44,100 pesetas (\$6,890).

The total cost of the road laid was 60,950 pesetas (\$9,506). The expense in detail was:

	Pesetas.
Steel construction.....	44,100 = \$6,890
Transportation and laying steel construction.....	3,250 = 507
Binding-stone construction between rails and lateral zones.....	13,600 = 2,109
Total.....	60,950 = \$9,506

The rails, during the seven years they have been in position, exhibit a wear of one decimal of a millimetre yearly, and have not required repairing.

Ample room is allowed between the rails for two horses to walk abreast. Horses do not appear to slip on rails of this construction.

At each side of the rail are layers of binding stones, the paved road being higher than the face of the rails.

The municipality of Valencia is of opinion that the saving in cost of repairs, through a road of this description, pays for its construction in a short time, and other and similar roadways are in contemplation.

From various parts of Spain, inquiries have been made concerning this road. I learn that a similar construction was decided on at Alicante, in 1898, but was temporarily abandoned when events caused exchange to increase.

A toll of (about) eight-tenths of a cent is charged each vehicle passing over this roadway.

A fuller description would have been furnished had it not been believed that the technically accurate working-plans submitted herewith would themselves prove of much greater information than unprofessional statements.

I am indebted to the mayor of Valencia and to Señor Mesegner, municipal architect, who invented the road, for copies of these plans.

HORACE LEE WASHINGTON, U. S. Consul.

VALENCIA, September 25, 1899.



MR. BRIGGS'S new book¹ seems to us to deserve a little blame, in connection with a good deal of praise. As a collection of dissertations on the art of arranging school-houses, in general and in detail, it will be useful to architects, while its suggestions in regard to the best way of securing competent professional advice may be particularly recommended to school-committees; but we cannot say that we think the plans fairly representative of the best American practice of the present day. A few years ago they would have been considered admirable, and two or three, such, for example, as that for a large High School and the City School Building, are quite satisfactory, or might be made so without difficulty; but such a plan as that for a State Normal School Building, which shows an interior corridor at least four hundred feet long, entirely enclosed, even at the ends, by rooms, and receiving no light and air from the outside except across the staircases, which, in practice, would have to be cut off from the corridor by brick walls to satisfy the law in many States, certainly does not represent what is now considered good school-house planning by the architects of this or any other civilized country. We do not say that this corridor would be dark, for Mr. Briggs has advanced far enough beyond the hallways lighted with gas, and the "rotundas," or pits, with a little skylight at the top, which give access to the classrooms of the high and normal schools of the last generation, to provide plenty of borrowed lights in the

walls of his corridors; but the French and German and Swiss architects long ago showed us the advantages of school-houses with their corridors open on one side to exterior light and air, and those of their American brethren who concern themselves much with school-planning have learned this lesson thoroughly.

In other respects, nothing but commendation is to be given to Mr. Briggs's plans. The staircases are, in most of them, well separated, and the rooms are of a good shape, and properly lighted, and suitable provision is made for wardrobes and for ventilation; so that in these respects they well deserve study.

The text, also, supplements admirably the special information to be derived from the plans. Mr. Briggs has had much experience with the practical working of school-houses, and he talks about the defects and advantages of various arrangements of rooms, and appliances for heating and ventilation, with delightful frankness. One point that he makes is particularly worth remembering, although we think that it should be taken with a certain discretion. Speaking of indirect radiators, he says that he prefers a box-coil of ordinary pipe to any of the pin-radiators in the market, for the reason that the sections in the latter are set so closely together that the requisite quantity of air cannot pass between them. Our own opinion is that, while coils are much to be preferred to stacks of pin-radiators for the preliminary tempering of the air, the pin-radiators answer very well for the final raising of the warmed air to the temperature at which it should be delivered in the rooms; but heating contractors are rather disposed to use pin-radiators for tempering, and the architect should make sure, before approving them, that there is ample space between them for the required quantity of air to pass through, at such velocity as can safely be counted upon. In regard to steam-boilers, also, Mr. Briggs gives valuable hints. Like all experienced architects, he prefers the ordinary return-flue tubular-boiler to any other for school-house heating, where it can be properly taken care of. As he truly says, the market overflows with patent boilers, some of which, like the water-tube boilers, will, undoubtedly, make steam more quickly than the old-fashioned kind; but, as he points out, a boiler which will make steam quickly will also lose it quickly, and a sensitive boiler, while it is desirable for a fire-engine, is quite unsuited to school-house work, where steadiness and economy are required.

We will not quote further from the multitude of practical suggestions and warnings with which the book is filled; but a little anecdote which Mr. Briggs relates to illustrate the prevailing methods of conducting architectural competitions will be read with relish by the profession. He was once "invited," as one of six architects, to submit plans for a small building in a certain town in limited competition. In due time, three of the competitors, including himself, were requested to appear before the committee, at different periods, and explain their designs more at length. Not long afterwards, meeting an acquaintance from the town in question and knowing that the competition had not been decided, he asked him if he knew anything about the matter. "I only know this," replied his friend, "that that man from New York is getting the bulge on you fellows; he has been up here a number of times, has seen every one of the committee more than once, and has talked his plan and abilities into them so that he has the inside track; he's a hustler, he is. You are dead slow. I wouldn't let a fellow get ahead of me that way. I give you the tip; now go in and knock him out." Presumably, the "hustler" got the job, and Mr. Briggs forbears to say how he succeeded with it; but he uses the story as a text for some suggestions to committees which they would do well to take to heart; and, in fact, the whole book could be read with great advantage by school-superintendents, committee-men and intelligent teachers, as well as by architects.

AN ARCHITECT'S WEIRD ADVERTISING.

A CERTAIN firm of architects, who shall be nameless, are taking advantage of one of the many processes of reproducing letters in fac-simile, and are sending out broadcast the following alluring invitation to call upon them and order a few palaces.

Pinned to the *soi-disant* letter is a little snip of red ribbon, to which the opening paragraph is supposed to refer. As the letter is in a woman's handwriting the advertisers evidently count on the impertinent curiosity of men as to what other men's female belongings have to say:—

Tuesday Afternoon.

My Dear, — I am very sorry you had to go out of town so hurriedly last night and I write to remind you not to forget the errand I spoke of to you — twenty-seven yards — and it ought not to cost over eight cents a yard.

I love to have you talk to me about business matters the way you did, for I truly believe there is a great deal in a woman's judgment.

I want you to call to-day and see B. & G., the architects, in the G — Co's Bldg., about plans for our new house. I called on Nellie to-day (you know B. & G. were her architects). She and Ed. have the *best* arranged house inside I ever saw and the outside is perfectly lovely and you know it didn't cost near so much as Joe's and it's twice as handsome.

While you're there ask them the price of those L — apartments, corner Church and Ann Streets, and if they are not all taken have one reserved for George. He's to be married next month. Come home early.

Affectionately, DOLLY.

¹ "Modern American School Buildings," being a Treatise upon, and Designs for, the Construction of School Buildings. By Warren Richard Briggs, F. A. I. A., with 89 full-page illustrations. New York: John Wiley & Sons. \$4.

ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

EXTENSION OF THE HOTEL RENAISSANCE, FIFTH AVE. AND 43D ST., NEW YORK, N. Y. MESSRS. HOWARD, CAULDWELL & MORGAN, ARCHITECTS, NEW YORK, N. Y.

[Gelatin Print, issued with the International and Imperial Editions only.]

A COMPETITIVE DESIGN FOR THE CLUB-HOUSE OF THE NEW YORK YACHT CLUB, NEW YORK, N. Y. MR. R. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.: TWO PLATES.

ST. PHILIP'S CHURCH, BROOKLYN, N. Y. MR. ALBERT E. PARFITT, ARCHITECT, BROOKLYN, N. Y.

[The following named illustration may be found by reference to our advertising pages.]

THE NEW YORK "BOX-STOOP"—VI: NO. 11 EAST 68TH ST. R. M. HUNT, ARCHITECT.

[Additional Illustrations in the International Edition.]

UNITED STATES POST-OFFICE, NEWARK, N. J. MR. JEREMIAH O'ROURKE, SUPERVISING ARCHITECT, NEWARK, N. J.

[Gelatin Print.]

THE UENGLINGER TOWN-GATE, STENDAL, PRUSSIAN SAXONY.

[Gelatin Print.]

THIS fine structure dates its erection from the fifteenth century. The lower portion, quadratic in plan, contains two stories over the arched gateway. Its four corners are accentuated by prettily-modelled turrets, corbelled out from the brick walls, and connected by battlements, of lively and interesting outline. The upper portion of the gate-tower is round, being supported by arches placed diagonally across the corners of the square substructure. Old engravings show the tower to have been capped by a conical, tile-covered roof which has in the course of time disappeared. The round top is decorated with an arched frieze, and crowned with battlements which have, not long ago, been subjected to a process of renovation by unskilled hands, which, as in many other instances, has deprived them of much of their original charm. The picturesque effect of the architectural scheme is enhanced by the color-treatment of the glazed brickwork standing out from the light-tinted rough-cast wall-surfaces. The granite base of the tower dates from the end of the thirteenth century, when the fortifications of the town were enlarged. A detailed description of this structure, together with plans and sections, may be found in Herr Felix Adler's "*Mittelalterliche Backsteinbauwerke des Preussischen Staates*," vol. I.

WROUGHT-IRON FOUNTAIN ON THE KLEINER RING, PRAGUE, BOHEMIA.

[Gelatin Print.]

THIS masterpiece of forged ironwork dates from the sixteenth century. Of especial excellence of workmanship is the central feature over the basin in the interior of the cage. Together with the neighboring town-hall and the Theinkirche, this fountain represents one of the chief ornaments of the most frequented public square of the Bohemian capital.

HORNSEY CENTRAL LIBRARY, HORNSEY, ENG. MR. E. J. LOVE-GROVE, ARCHITECT.

INTERIOR OF THE SAME.

NOTES AND CLIPPINGS

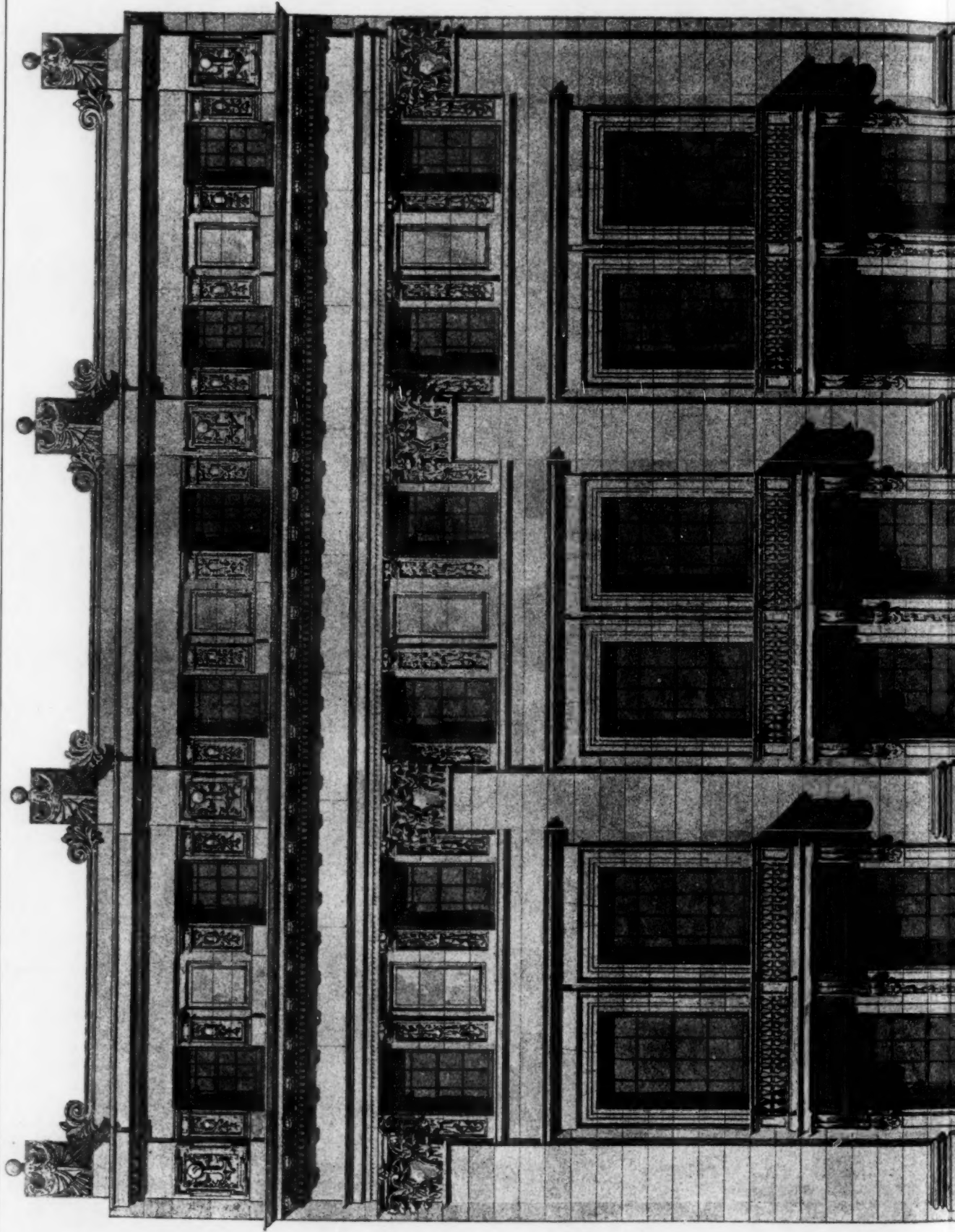
REPAIRS AT THE CRYSTAL PALACE.—The Crystal Palace will always be an interesting object-lesson to engineers. It is true that were a similar work to be undertaken to-day different materials and different methods of construction would almost certainly be adopted; but in its day the Palace had a right to rank as a masterpiece, and the success with which a structure intended at the outset to meet merely a momen-

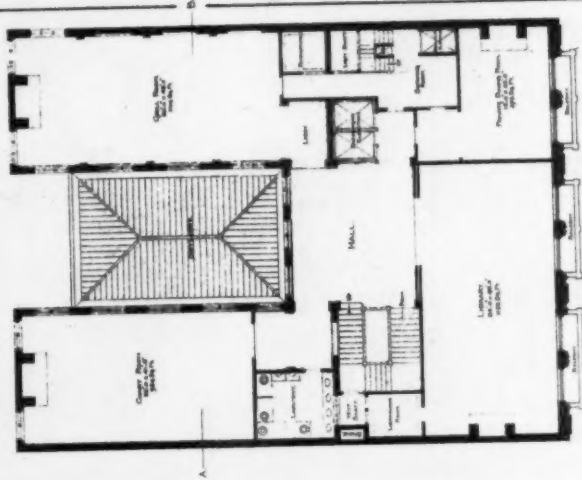
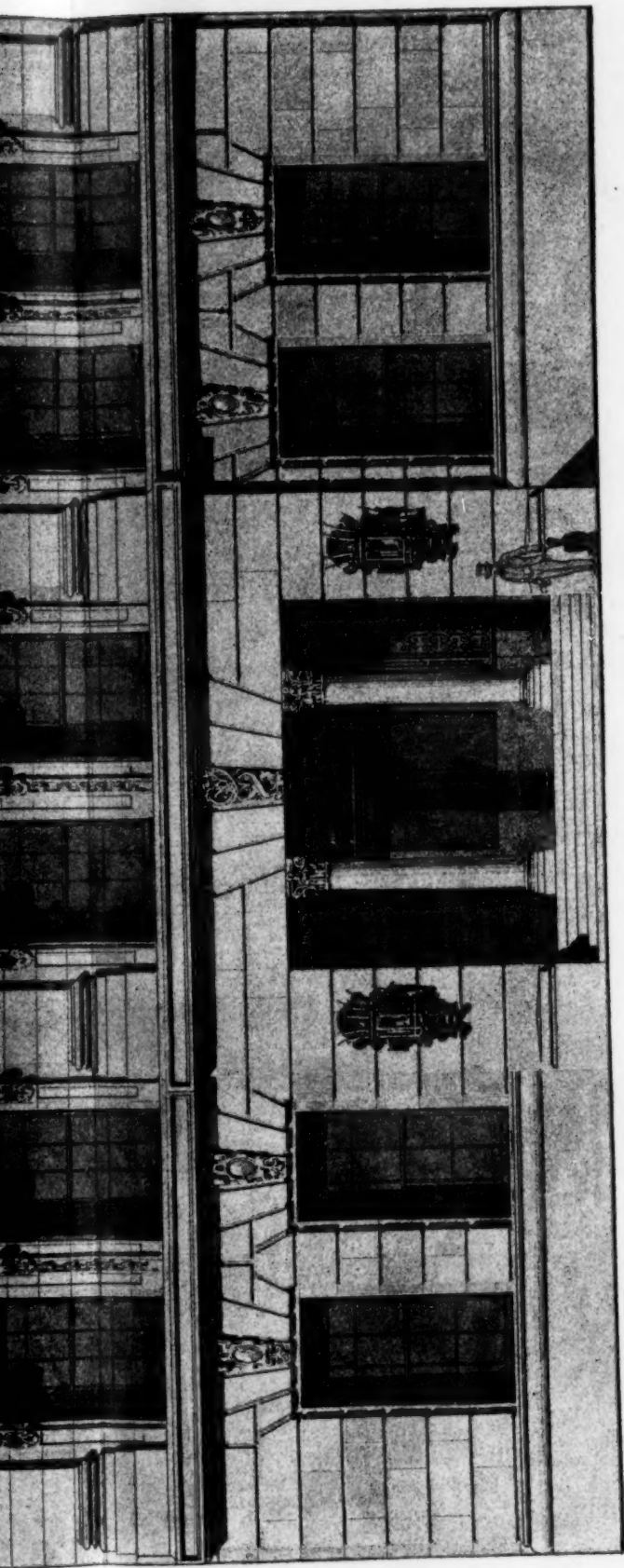
tary need has withstood the ravages of years reflects the greatest credit on its designers, Messrs. Fox and Henderson. During the past three months extensive repairs have been in progress at the Palace. The glass in the whole of the Central Transept is being replaced, the area to be covered measuring nearly two acres, or about one-seventh of the whole glazed surface of the building. It is interesting to note that the proportions of the original structure were largely controlled by the size of glass which it was possible to obtain in large quantities in the Exhibition year. The maximum dimension then commercially practicable proved to be 49 inches, and Paxton's ridge-and-furrow system being adopted, this was laid at a slope of 2 1/2 to 1, thus fixing the distance between the purlins as 8 feet, which became the unit for the building, all its principal dimensions being multiples of this. The glass originally used was the 16-ounce quality, and the strips were 10 inches wide and were fitted into grooves in wooden sash-bars. It was originally intended to use putty, but a machine devised for putting these sash-bars proved unworkable, and the plan was then adopted of passing the bars through a tank of thick paint. This paint was automatically scraped off the surfaces of the bars as they were removed, but the grooves in which the glass was to fit remained full, and on drying made a watertight joint between the glass and the sash-bar. Indeed, it is asserted that the joint was too good, from the point-of-view of the firm who took up the contract for removing the Exhibition building, as it proved practically impossible to break the joint without at the same time smashing the glass. When re-erected at Sydenham 21-ounce glass was substituted for that originally used, but the dimensions of the sheets and the methods of construction were unaltered. In the new work 26-ounce glass is being used, save in the case of certain flat portions at the crown of the arch, where 32-ounce glass is being inserted. In addition to being thicker, the new sheets are also of larger dimensions, measuring 51 inches by 18 inches. The whole of the old wooden sash-bars are being removed, as they were showing in many cases signs of decay, steel sash-bars being substituted, the glass being secured on the system patented by Messrs. Mellowe & Co., of Sheffield. The sash-bars are covered with a special section of tinned-lead and the glass being put in place is secured by simply bending down long flaps of the alloy. — *Engineering*.

THE PROTESTANT MEMORIAL CHURCH AT SPEYER.—In the year 1529 there assembled at the old German city of Speyer on the Rhine the Diet of the German Empire at the call of Emperor Charles V. This Diet was convened for the purpose of suppressing the religious reform movement, which had been started by Luther and other reformers. It would have succeeded with its plans had not a minority consisting of several princes and deputies of free cities boldly and in the face of the imperial ire proclaimed and formally delivered a written protest against such action. It is from this act that the present members of the non-Roman Catholic denominations derived their common name of Protestants. When it was first proposed, a few years ago, to erect a monument in memory of this heroic deed, it was decided to make this memorial representative of the Protestant faith in all countries without regard to the differences of the denominations. After some discussion, it was decided that a memorial church would most properly express the idea. Active work was commenced immediately, and a site was selected on an elevation of ground. A prize was offered for the best plans, and out of forty-five that were submitted, the plans of Messrs. Flügge and Nordmann, of Essen, Prussia, were selected. The plans were of the Gothic style of architecture, which is adhered to in the smallest details. The building has already progressed to the height of the roof. The sextangular tower is expected to reach a height of 300 feet. The ground-floor of this tower is to constitute a memorial hall, 35 feet in diameter and 60 feet high. When the church is completed, the visitor on entering through the beautifully carved portals will find in the centre a bronze statue of Martin Luther. The figure will be 9 feet high without the base. With his left hand he clasps the Bible to his breast, while with the outstretched right he seems to sweep away religious prejudice. He will be surrounded by the figures of the six princes who signed the Document of Protestation. These statues are the gift of their descendants. The corners over the portals will be decorated with the coats-of-arms of the fourteen protesting cities. The wall over the entrance to the main part of the church will be decorated by a colossal fresco painting, representing the delivery of the Document of Protestation by Prince John, elector of Saxony, to Ferdinand, King of Bohemia, who presided over the Diet at Speyer. All the windows have been presented by the Protestant princes of Europe, the German emperor and empress having given five of them. The organ will be presented by German church choirs, who are giving concerts for that purpose. The church will easily seat 1,400 people, and its cost will be nearly two million marks (about \$500,000). For the erection of this memorial to Protestantism widely extended coöperation is desired. — *Boston Transcript*.

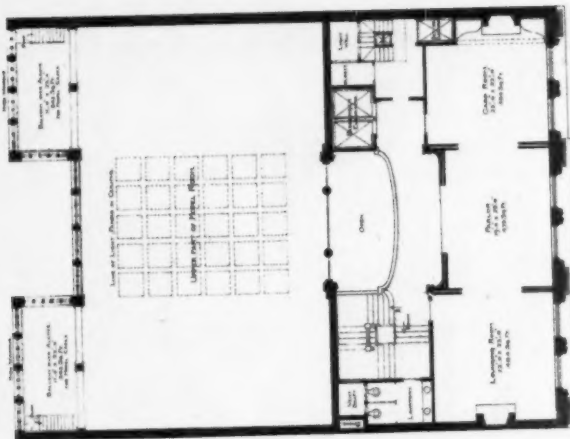
THE CLIFF-DWELLINGS IN COLORADO AND NEW MEXICO.—Commissioner Herman, of the General Land Office, has authorized a special commission to report on the ruins of the cliff-dwellers in the vicinity of Mancos and Cortes, Col., and also near Aztec, New Mexico, with an idea of reserving the lands as a national park. This action has been taken as the result of an agitation in Colorado for the protection of these ruins against vandalous relic-hunters. Some of the best preserved of the ruins have been ruthlessly entered by curio-hunters during the last few seasons. No regard has been paid to the best means of opening the ruins with a view of preserving the buildings entire. Walls and roofs have been broken into and mummies and relics carted away. With these ruins guarded by the Government and given over to the investigation of experts, they may yield a mine of information about the lost race, while at the same time they will be preserved for the benefit of the public. Fortunately, some of the best ruins have not yet been touched, and these can be opened at the doorways made by the ancients, after the accumulated rubbish has been carefully removed. — *N. Y. Evening Post*.

Copyright 1899 by THE AMERICAN ARCHITECT AND BUILDING NEWS CO.

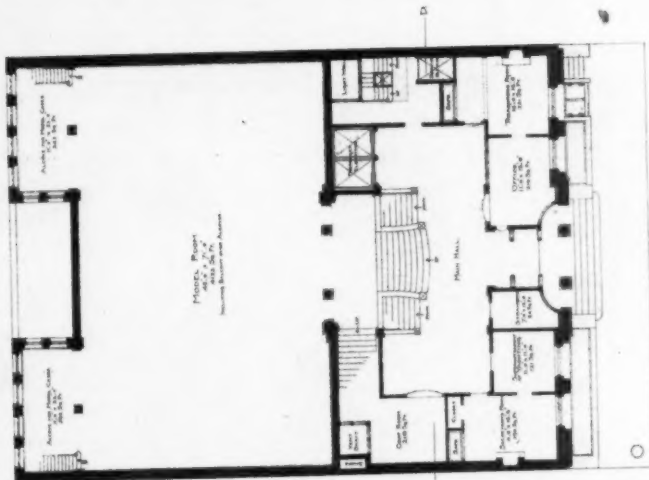




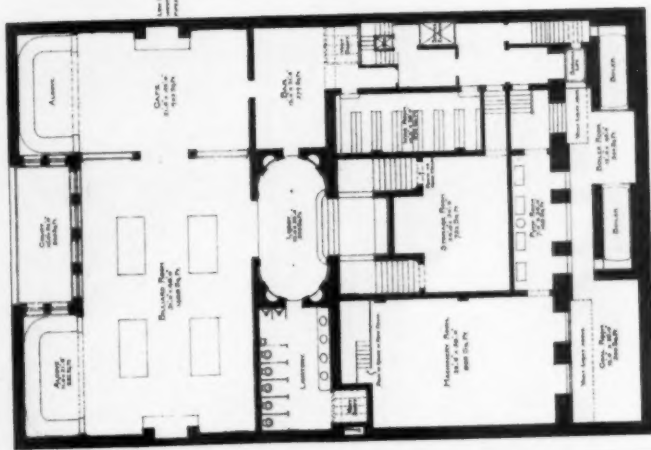
THIRD FLOOR



SECOND FLOOR

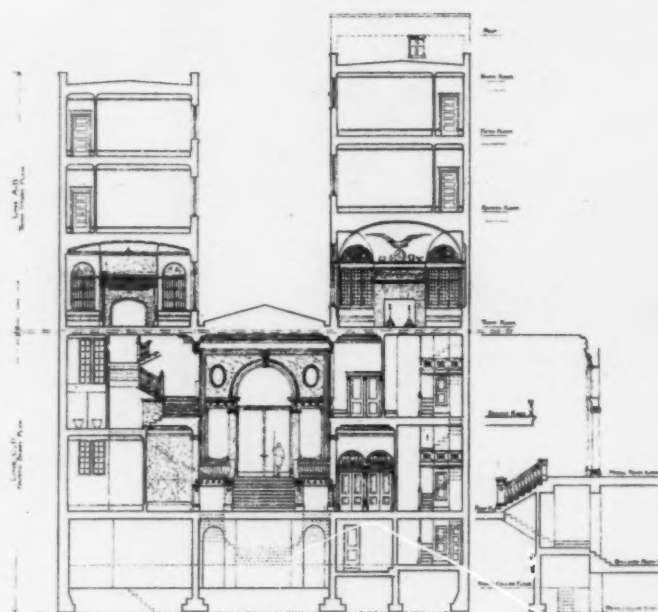


FIRST FLOOR

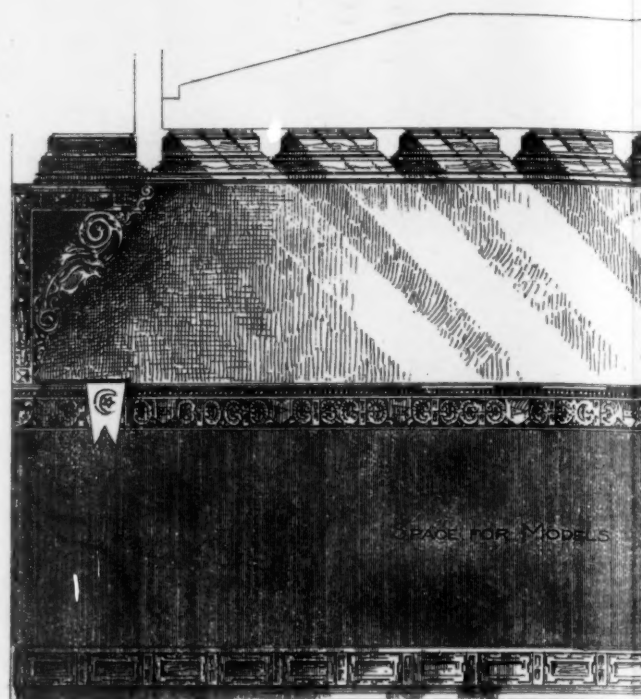


BASEMENT PLAN

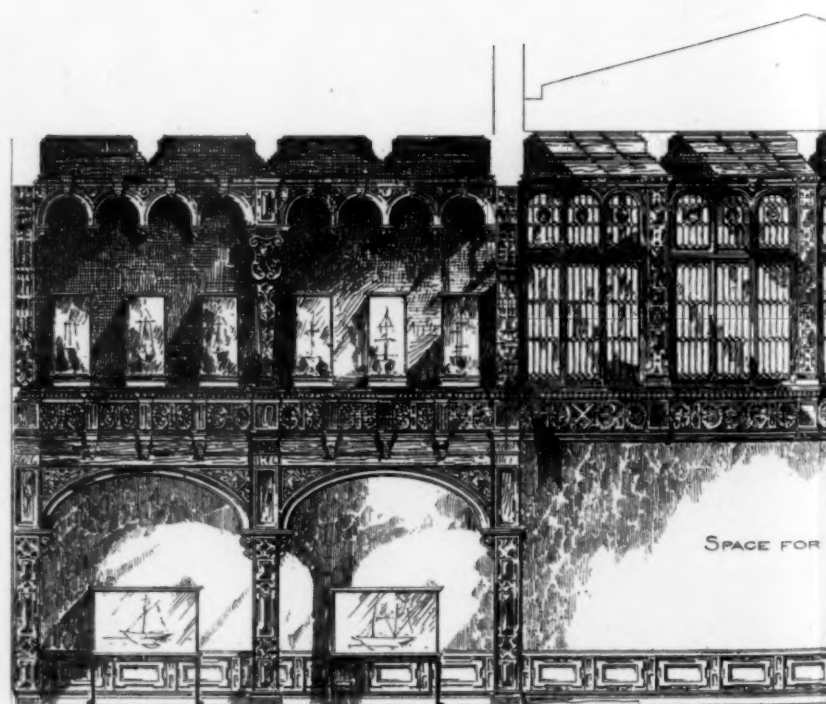
A COMPETITIVE DESIGN FOR CLUB HOUSE OF THE NEW YORK YACHT CLUB.
R. H. ROBERTSON, ARCHITECT.



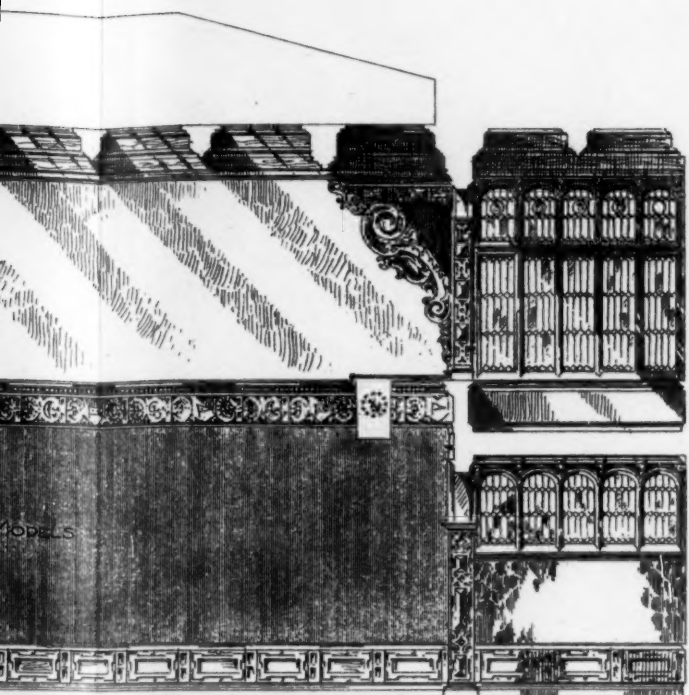
TRANSVERSE SECTION.



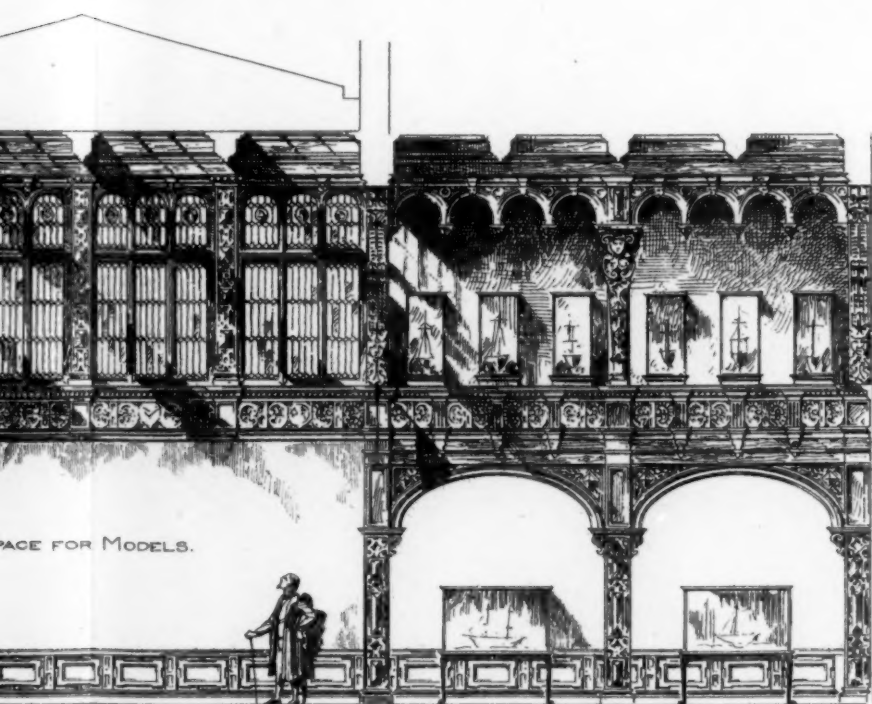
CROSS SECTION OF
LOOKING



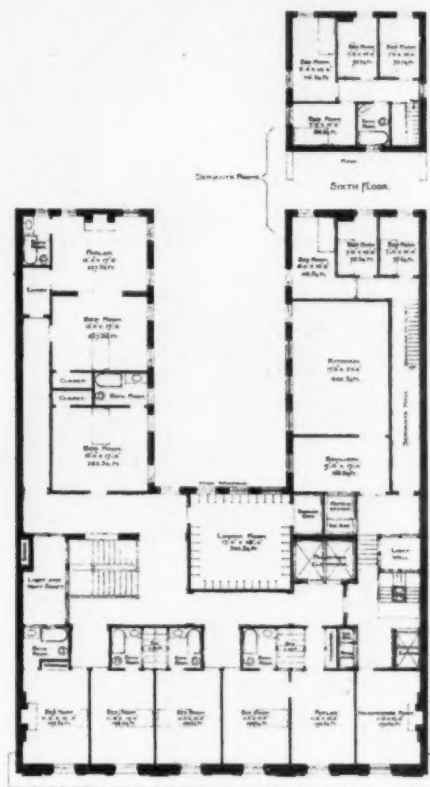
LONGITVDINAL SECTION
LOOKING



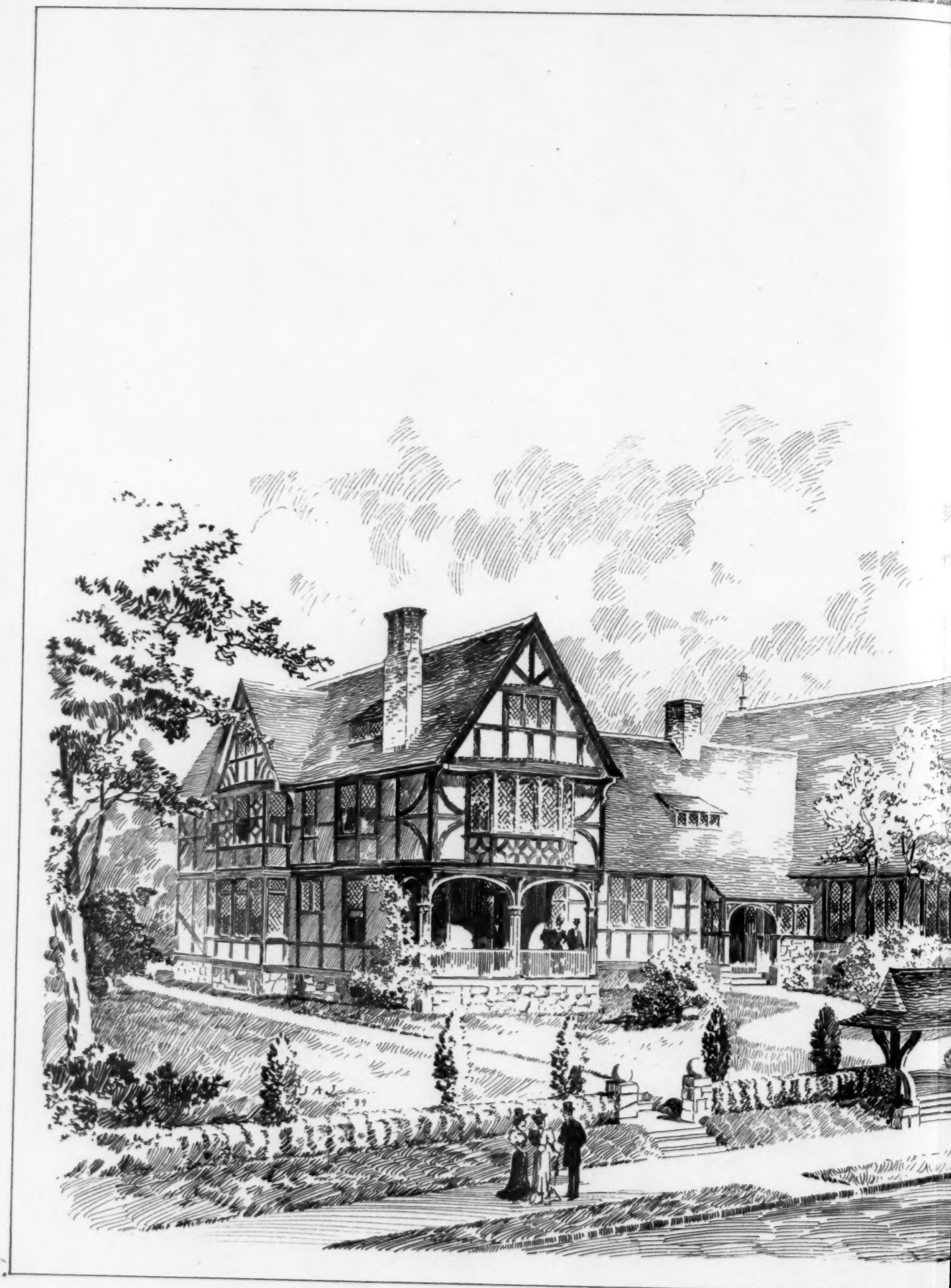
SECTION OF MODEL ROOM.
LOOKING WEST.

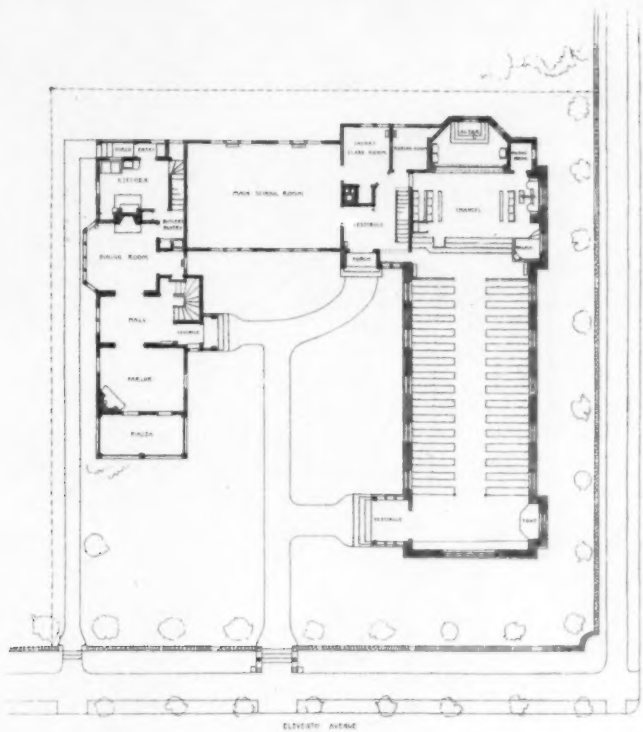


SECTION OF MODEL ROOM.
LOOKING NORTH.



FIFTH FLOOR.





St. Philip's Church.
Dyker Heights,
Brooklyn, N.Y.
Albert E. Parfitt, Archt.

1871

1871



THE AMERICAN ARCHITECT AND BUILDING NEWS

A WEEKLY JOURNAL OF CONSTRUCTIVE AND DECORATIVE ART.

VOL. LXVI. — No. 1253.] SATURDAY, DECEMBER 30, 1899. PRICE, { REGULAR ISSUE, 15 CENTS.
IMPERIAL " 25 "

ARCHITECTURAL INSTRUCTION.

COLUMBIA UNIVERSITY, IN THE CITY OF NEW YORK.

SCHOOL OF MINES.
SCHOOL OF CHEMISTRY.
SCHOOL OF ENGINEERING.
SCHOOL OF ARCHITECTURE.
SCHOOL OF PURE SCIENCE.

Four years' undergraduate courses and special facilities for graduate work in all departments. Circulars forwarded on application to the Secretary of the University.

HARVARD UNIVERSITY.

LAWRENCE SCIENTIFIC SCHOOL.
ENGINEERING,
ARCHITECTURE, Etc., Etc.

For Descriptive Pamphlet apply to

M. CHAMBERLAIN, Secretary,
N. S. SHALER, Dean. Cambridge, Mass.

BOSTON, MASS.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY.
DEPARTMENT OF ARCHITECTURE.
Professor: F. W. Chandler.

BROOKLYN, N. Y.

PRATT INSTITUTE.
W. S. Perry.

CAMBRIDGE, MASS.

HARVARD UNIVERSITY.
LAWRENCE SCIENTIFIC SCHOOL.
Professor H. Langford Warren.

CHAMPAIGN, ILL.

UNIVERSITY OF ILLINOIS.
SCHOOL OF ARCHITECTURE.
Professor: N. Clifford Ricker.

ITHACA, N. Y.

CORNELL UNIVERSITY.
COLLEGE OF ARCHITECTURE.
Professor: A. B. Trowbridge.

CHICAGO, ILL.

ART INSTITUTE.
SCHOOL OF ARCHITECTURE.
Louis J. Millet.

LA FAYETTE, IND.

PURDUE UNIVERSITY.
ARCHITECTURAL DEPARTMENT.
Professor: Fred. Morley.

NEW ORLEANS, LA.

TULANE UNIVERSITY.
Professor: Wm. Woodward.

WHITTIER MACHINE CO.,

PASSENGER AND FREIGHT
ELEVATORS.

53 STATE STREET - - - BOSTON.

LOOMIS FILTERS.

IMPROVED SYSTEM.

RESULTS GUARANTEED.

Main Office, 402 Chestnut St., PHILADELPHIA.

NEW YORK OFFICE,
33 Church St., Havemeyer Building.

SCAIFE FILTERS.

10 to 10,000 Gallons per Hour.

NO CHEMICALS REQUIRED.

RESULTS GUARANTEED.

WM. B. SCAIFE & SONS,
Pittsburgh, Pa.

THE LIBRARY OF CONGRESS,

WASHINGTON, D. C.

Architects: Smithmyer & Pelz:

P. J. Pelz; E. P. Casey.

Twenty Gelatine Plates, in Portfolio,
14" x 16 1/2".

PRICE - - \$5.00.

AMERICAN ARCHITECT AND BUILDING NEWS CO.
BOSTON, MASS.

MAITLAND ARMSTRONG & CO.,

STAINED GLASS & DECORATIVE WORK.

Interior Decorations and work in American Mosaic Glass from the designs of Mr. Armstrong. English Painted Glass from the designs of Messrs. Clayton & Bell.

Sole Agents for
CLAYTON & BELL, GLASS STAINERS, LONDON
61 Washington Square, South, New York, N. Y.

FLYNT

BUILDING AND CONSTRUCTION CO.

GENERAL OFFICE, PALMER, MASS.

We contract to perform all labor and furnish all material of the different classes required to build complete

CHURCHES, HOTELS, MILLS, PUBLIC
BUILDINGS AND RESIDENCES.

Also for the construction of
RAILROADS, DAMS AND BRIDGES.

We solicit correspondence with those wishing to place the construction of any proposed new work under ONE CONTRACT, which shall include all branches connected with the work. To such parties we will furnish satisfactory references from those for whom we have performed similar work.

Columbian Marble Quarrying Co., RUTLAND, VT.

OUR COLUMBIAN MARBLE is the best for building work. It stands the weather.

OUR CHAMPLAIN MARBLES (12 varieties) produce the richest effects for interior decoration.

Samples and prices on application.

The WINSLOW BROS. COMPANY, CHICAGO,

Ornamental Iron and Bronze.

NOW COMPLETE:

THE ARCHITECTURE OF

CLASSICAL ANTIQUITY

and the
RENAISSANCE,

By I. BUEHLMANN.

Seventy-five steel engravings and photographic plates in portfolio, with descriptive text translated by G. A. Greene, \$13.

The work is divided in three parts, which can be bought separate.

Part I. The Orders of Columns (Vignola)
28 plates with text, \$6.50.

Part II. Facades, Arches, Doors and
Windows, 25 plates with text,
\$6.

Part III. Development and Decoration of
Rooms, \$7.50.

To purchasers of two of the three parts the remaining part will be sold at a reduced figure, so that the total amount for the three parts will not exceed \$18 — the price of the complete work — if purchased at once.

American Architect and Building News Co.

ROBERT C. FISHER & CO.

Successors to Fisher & Bird,

MARBLE AND GRANITE WORKS.

97, 99, 101 and 103 EAST HOUSTON STREET,
Established 1830. NEW YORK.

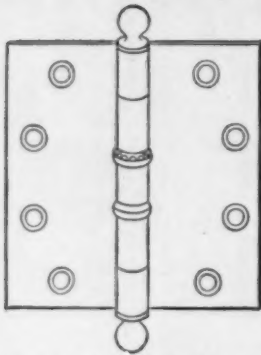
A WHITE DRAWING-ROOM

Must be finished with the very best enamel you can get. For a very white room specify **Whitest Interior Enamel**. We recommend this as the whitest, most elastic and durable interior enamel possible. It is free working, dries with a full and brilliant lustre, and can be rubbed to a dead finish in three or four days. It will dry free from injury from dust in three or four hours. Where absolute whiteness is not needed, call for **White Interior Enamel**.

Varnishes for all purposes. Booklet on request.

EDWARD SMITH & CO., Varnish Makers and Color Grinders, 45 Broadway, New York.

STANLEY'S BALL-BEARING STEEL ... BUTTS



are heavily electro-plated and highly polished, and compare favorably in appearance and durability with solid metal butts. It is impossible to wear them down, and they never creak.

Samples and literature free to architects.

THE STANLEY WORKS, Dept. "C."
NEW BRITAIN, CONN.
79 CHAMBERS ST., N. Y.

FITCH

SASH LOCKS

THE WINDOW.
RATTLE, COLD OUT
AND DUST
SIMPLE, DURABLE, SAFE.
SOLD BY HARDWARE DEALERS EVERYWHERE
TRIAL SAMPLE FREE
THE W. & E. T. FITCH CO. NEW HAVEN, CONN.

"La Construction Moderne,"

A journal of whose merits our readers have had opportunity to judge because of our frequent reference to it and our occasional republication of designs that are published in it, is the most complete and most interesting of the French architectural journals.

The thirteenth annual volume is now in course of publication.

Subscription, including postage, 35 francs.

Each weekly issue contains, besides the illustrations included in the text, two full-page plates, which by themselves are worth double the amount of the annual subscription.

PRICE OF BACK ANNUAL VOLUMES,
:: 40 Francs. ::

Address for subscriptions and catalogues,

LIBRAIRIE DE LA CONSTRUCTION MODERNE,
13 Rue Bonaparte, Paris, France.

FOR INFORMATION ABOUT

U. S. MAIL CHUTES

WHICH ARE

A necessity in Office Buildings and Hotels,
write to the sole makers.

THE CUTLER MFG. CO., ROCHESTER, N. Y.
PATENTED. AUTHORIZED.

CLINTON WIRE-CLOTH

Sole Proprietors and Manufacturers of

WIRE LATH

DOUBLE TWIST WARP
STIFFENED (Iron Furred)
CLINTON CORRUGAT'D
Plain, Japanned or Galvanized.

The Most Perfect and Economic System of FIREPROOF Construction.

SEND FOR CIRCULAR.

BOSTON,
199 Washington St.

NEW YORK,
76 Beekman St.

CHICAGO,
137 Lake St.

FACTORY,
CLINTON, MASS.

KEUFFEL & ESSER CO.

MANUFACTURERS AND IMPORTERS OF.....
DRAWING MATERIALS AND SURVEYING INSTRUMENTS.
127 Fulton Street - - - NEW YORK.
Branches: Chicago and St. Louis.

We make and carry the most complete and best assorted stock in America. Our goods are recognized as the standard of quality. They all bear our trade-mark and are warranted by us. Our prices are reasonable. Our lavishly illustrated catalogue minutely and correctly describes our goods. It contains much valuable information. Sent gratis on application.

BUILDING MATERIALS.

Reported for the American Architect and Building News.

	New York.	Boston.	Philadelphia.
BUILDING MATERIALS			
STONE. (Per cubic foot, rough.)	(Wholesale Prices.)	(Prices to Builders and Contractors.)	
Foundation:			
Dimension.....	5 00	5 00	5 00
Block.....	4 60	4 60	4 60
Rubble.....	1 25	1 25	1 25
Sandstone:			
Longmeadow.....	80	80	80
Kibbe.....	90	90	90
Brown (Connecticut).....	1 00	1 00	1 00
Amherst Ohio.....	90	90	90
Berea.....	75	75	75
Berlin.....	75	75	75
Belleville.....	80	80	80
New Brunswick (Dorchester).....	1 00	1 00	1 00
Potadam Red.....	1 30	1 30	1 30
Oaen.....	2 00	2 00	2 00
Carlisle. English.....	1 05	1 05	1 05
Corse Hill (Scotch).....	1 05	1 05	1 05
Granite: (Maine)			
Limestone:			
Bedford.....	45	45	45
Joliet.....	1 00	1 00	1 00
Lemont.....			
Serpentine.....			
Bluestone: (Per sq. ft.)			
Sidewalk.....	30	30	30
Planned.....	50	50	50
Marble: (Per cu. ft.)			
Lee, Mass.....	1 25	1 25	1 25
Rutland, white and blue.....	1 25	1 25	1 25
Sutherland Falls.....	1 25	1 25	1 25
Glens Falls, black.....	1 25	1 25	1 25
Italian, blue-veined.....	1 25	1 25	1 25
" Sienna.....	1 25	1 25	1 25
Tennessee, red.....	1 25	1 25	1 25
" Knoxville.....	1 25	1 25	1 25
Pennsylvania, blue.....	1 25	1 25	1 25
Vermont, white.....	1 25	1 25	1 25
Slate: Roofing (Per square).			
Green.....	5 00	5 00	5 00
" unfading.....	5 00	5 00	5 00
Purple.....	5 00	5 00	5 00
Red.....	5 00	5 00	5 00
Black, Lehigh.....	4 25	4 25	4 25
" Chapman.....	4 25	4 25	4 25
Genuine Bangor.....	4 25	4 25	4 25
Unfading black.....	6 00	6 00	6 00
".....	5 50	5 50	5 50
Tiles, Am.....	8 00	8 00	8 00
N. Peach Bottom, war. unfading			
Fire Clay Roof Tile on cars at fac.			
LUMBER. — P M.			
Boards: (Ordinary dimensions.)			
Pine, 1st quality, clear.....	65 00	65 00	65 00
" 2d quality.....	55 00	55 00	55 00
" 3d quality.....	18 00	18 00	18 00
Spruce.....	25 00	25 00	25 00
Hemlock.....	20 00	20 00	20 00
Yellow pine.....	20 00	20 00	20 00
Cypress.....	20 00	20 00	20 00
Clapboards:			
Pine.....	35 00	35 00	35 00
Spruce.....	30 00	30 00	30 00
Framing Timber:			
Pine.....	14 00	14 00	14 00
Spruce.....	12 00	12 00	12 00
Hemlock.....	18 00	18 00	18 00
Yellow pine.....	18 00	18 00	18 00
Laths:			
Pine.....	3 40	3 40	3 40
Spruce.....	3 40	3 40	3 40
Shingles:			
Pine, shaved.....	5 00	5 00	5 00
Pine, sawed.....	4 00	4 00	4 00
Spruce, sawed.....	1 50	1 50	1 50
Redwood.....	1 40	1 40	1 40
Cedar split.....	1 25	1 25	1 25
Cedar sawed.....	1 00	1 00	1 00
Cypress, split.....	18 00	18 00	18 00

Merchant's Combination
Skylight
Star Ventilator.



A New Invention.

PATENTED.

The original Metal Top "Star" always did ventilate well, and the introduction of the glass top sacrifices none of its ventilating qualities. The hexagonal top is made in sizes larger than 40 inch diameter. Smaller sizes are made with one piece flat sky-light glass.

Illustrated booklet free.

Write us for prices.

Merchant & Co., Inc.,

Sole Manufacturers,

PHILADELPHIA.

NEW YORK.

CHICAGO.

BROOKLYN.

REMEMBER the REDUCTION

In Subscription Price

of the

International Edition

from

TWENTY-FIVE DOLLAR
to SIXTEEN DOLLAR S

Ready, Part IV "Georgian Period"

PART IV

"THE GEORGIAN PERIOD"

Part IV in addition to its 36 plates—12 of which are gelatine plates—contains a considerable amount of text, illustrated by more than one hundred cuts.



[Date, 1755.]



[Date, 1796.]

[Halfstone Reduction of Gelatine Print in Part IV.]

Cupolas for the Pennsylvania Hospital, Philadelphia, Pa.

Retail price per single copy

Price to non-subscribers to the *American Architect* who have already subscribed for Parts I, II and III

Price to subscribers to the *American Architect* for 1899

\$6.00

5.00

4.00

[PUBLISHED OCTOBER 15, 1899]

PART IV

Price, \$6.00 [\$4.00 to Subscribers to the
American Architect.]

Contains 36 pages text and 36 plates as follows:—

1. Wrought-iron Newels, New York, N. Y.
[Gelatine.]
- 2, 3, 5, 6, 8. Sundry Details from Salem, Mass.
4. Doorway of Lefferts Homestead, Brooklyn, N. Y. Date, 1750.
[Gelatine.]
7. Mantel in Erasmus Hall, Brooklyn, N. Y.
Date, 1787.
[Gelatine.]
9. House of John Bartram, Philadelphia, Pa.
Date, 1730.
- 10-13. St. Paul's Chapel, Broadway, New York,
N. Y. Date, 1764-94.
[Two Gelatines.]
- 14, 15. Old South Church, Boston, Mass. 1729.
16. St. John's Chapel, New York, N. Y. Date,
1803-6.
[Gelatine.]

17. First Church, Hingham, Mass. 1681.
18. The Cloisters ["Saal"] Ephrata, Pa. 1744.
- 19, 20. Taylor House, Roxbury, Mass. 1790.
[One Gelatine.]
- 21, 27, 29. Independence Hall, Philadelphia, Pa.
1729-34.
[Two Gelatines.]
28. Mantels in a South Third Street House,
Philadelphia, Pa.
[Gelatine.]
- 30, 32, 33, 35, 36. Mount Pleasant Mansion, Philadelphia, Pa. Date, 1761.
31. Interior of Christ Church, Philadelphia, Pa.
Date, 1727.
[Gelatine.]
34. Cupolas from the Pennsylvania Hospital,
Philadelphia, Pa. Date, 1755-96.
[Gelatine.]

TEXT

- "The So-called Colonial History of the United States,"
Olof Z. Cervin
- "The Roof of the Old South Meeting House,"
W. G. Preston
- "The Seventh Day Baptist Church, Newport, R. I.,"
G. C. Mason
- "The Virginia Border-Land,"
Glenn Brown
- "Six Hours in Salem, Mass.,"
C. F. Bragdon

PART V [in press.]

FURTHER PARTS IN PREPARATION.



Cabot's Creosote Shingle Stains

ARE the pioneers of their line. They inaugurated shingle-staining and made the wide vogue of the shingled house possible. All other shingle-stains are followers upon their success, but lack their depth and freshness of color, durability, wood-preserving properties and freedom from blackening.

Cabot's Insulating and Deadening Quilt.

A scientific non-conductor of heat and sound. Not a mere felt or paper, but a soft, resilient cushion of dead-air spaces, giving the most perfect conditions for heat insulation or the absorption of sound-waves. Indestructible by moths, vermin or decay and unflammable.

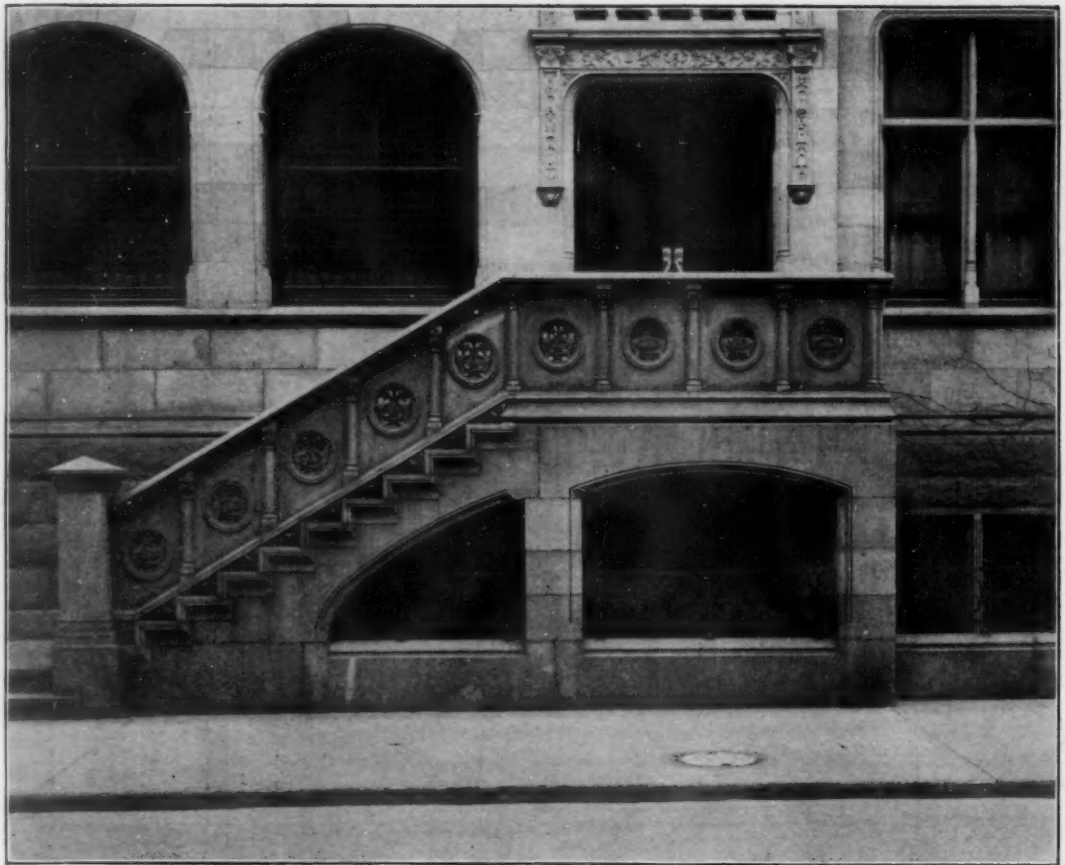
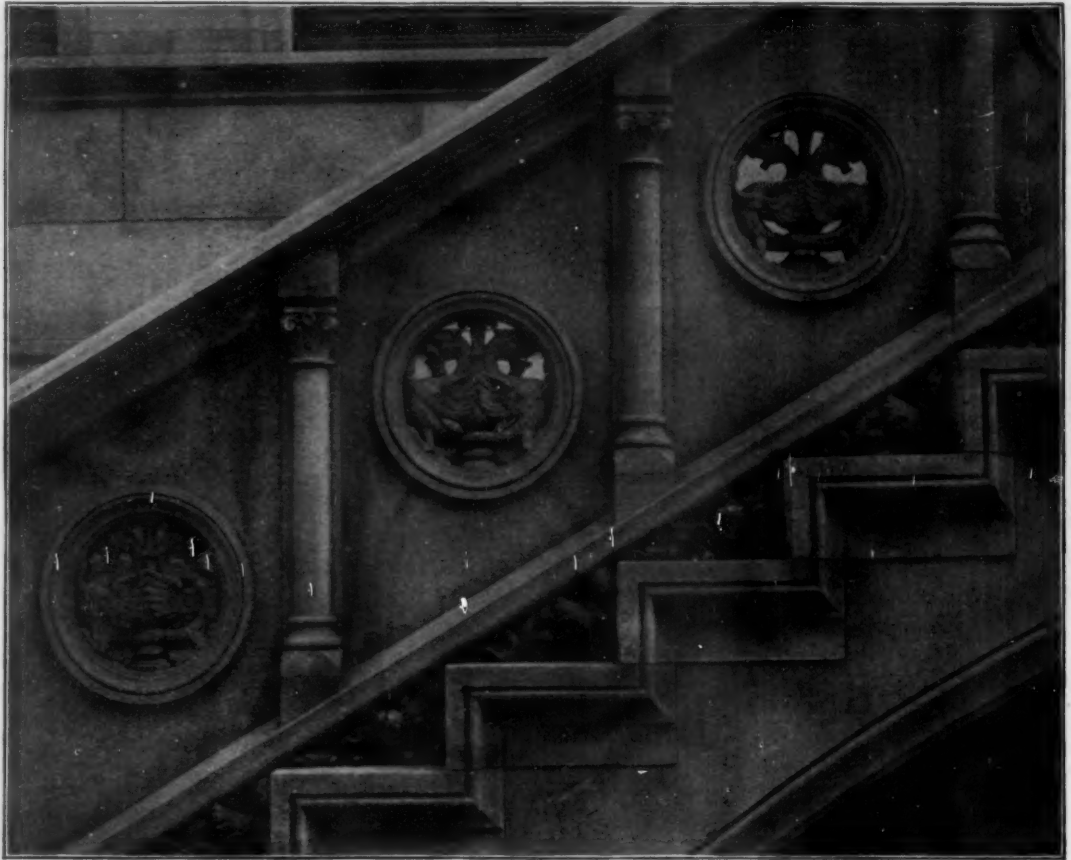
Asbestos-Quilt, the only sheathing made that is heat, sound and fire proof.

Samples and full information sent on request.

SAMUEL CABOT, Sole Manufacturer, BOSTON, MASS.

215 Dearborn Street, Chicago, Illinois.

AGENTS: V. H. Schnieder, 12 Wooster St., New York; Samuel H. French & Co., Philadelphia, Pa.; Charles J. Waterhouse, San Francisco, Cal.; P. H. Mathews, Los Angeles, Cal.; Whitelaw Brothers, St. Louis, Mo.; George H. Lawes & Co., St. Paul, Minn.; John H. Corning, Washington, D. C.; Brady & Co., Detroit, Mich.; The National Building Supply Co., Baltimore, Md.; Bloomer-Timms Co., Portland, Oreg., and Seattle, Wash.; Cleveland Builders' Supply Co., Cleveland, O.; Seymour & Co., Montreal, and at all other central points.



THE NEW YORK "BOX-STOOP," NO. VI.
NO. 11 EAST 68TH ST.

DIXON'S SILICA GRAPHITE PAINT

FOR TIN OR SHINGLE ROOFS AND IRON WORK. Tin roofs well painted have not required repainting for 10 to 15 years.
IT IS ABSOLUTELY WITHOUT AN EQUAL.

If you need any paint it will pay you to send for circular.

JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

Flexible Door and Shutter Co.,

Manufacturers of
Patent Improved

Partitions :: Doors **FLEXIFOLD SPECIALTIES.** Shutters :: Wardrobes, etc.

Simple in construction. Easy to operate. No springs, weights or cords.

Main Office: WORCESTER, MASS.

Send for illustrated
catalogue.

New York Office: 1125 BROADWAY.

ESTABLISHED 1868

SKYLIGHTS HAYES LATHING & CO.

71-8TH AVE. NEW YORK.

FIRE-PROOF CONSTRUCTION



PNEUMATIC TUBES

For Rapid Transmission of Cash, Orders, Papers, Documents.

USED IN Prominent Department Stores, Dry Goods Houses, Wholesale Establishments, Newspaper Offices, Banks, etc. Write for Estimates.

BOSTEDO PACKAGE AND CASH CARRIER CO.,

CHICAGO, 156 Lake Street.

NEW YORK, 186 Fifth Avenue.

BOSTWICK STEEL LATH. The Best Metal Lath on the Market.

ACME METAL CORNER STRIP. The Best Metal Corner Bead on the Market.

Write for Samples and Prices.

Boston Agency: WALDO BROS., 102 Milk St.

Bostwick Steel Lath Co., Niles, Ohio.

Specify the Best

Each Sheet Stamped with Brand and Thickness

ONE OF THE
OLDEST AND
BEST TRIED
BRANDS IN
THE COUNTRY

**OSBORN'S
GUARANTEED
IC
OLD STYLE**

HAS STOOD
THE TEST
OF TIME
AND WEAR

IC OR IX

A ROOFING PLATE cannot be made better than this: Coated by the Palm Oil Process; Redipped by Hand Evenly Coated over Entire Sheet; Contains the Best Working Quality of Steel.

Made Solely by **J. M. & L. A. OSBORN, Cleveland and Columbus, Ohio**

HITCHINGS & CO.,

Established 50 years

HORTICULTURAL ARCHITECTS AND BUILDERS

and largest Manufacturers of

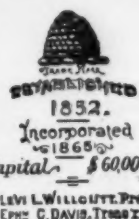
GREENHOUSE HEATING AND VENTILATING APPARATUS.



The highest awards received at the World's Fair for Horticultural Architecture, Greenhouse Construction and Heating Apparatus. Conservatories, Greenhouses, Palmhouses, etc., erected complete with our Patent Iron Frame Construction.

Send four cents for Illustrated Catalogue.

233 MERCER STREET, N. Y. CITY.



NEW ENGLAND FELT ROOFING WORKS,

13 Post Office Sq., BOSTON.

Originators of Felt Roofing in New England.

Inventors and only Manufacturers of the Celebrated

"BEEHIVE BRAND."

Heliotype Printing Co.,

211 Tremont Street, Boston.

ESTABLISHED 1872.

- PHOTO-LITHOGRAPH.
- PHOTO-COLOR-LITHOGRAPH.
- PHOTO-GELATINE.
- PHOTO-GRAYURE.
- PHOTO-ENGRAVING.

COPIES OF ARCHITECTURAL,
MECHANICAL AND OTHER
DRAWINGS, MAPS, PLANS, ETC.,
PORTRAITS, VIEWS AND ALL
BOOK ILLUSTRATIONS.

Heliotype Printing Co.

A Supplement



to Catalogue No. 16, devoted to the Hardware of Ornament, has been issued and will be sent, on request, to such Architects as may not already have received it.

The Yale & Towne Mfg. Co.

9-11-13 Murray Street, NEW YORK CITY.

S. J. PARKHILL & CO. PRINTERS

226 Franklin St., Boston, Mass.

BOOK AND MISCELLANEOUS PRINTING
ILLUSTRATED TRADE CATALOGUES
TOWN HISTORIES AND GENEALOGIES

Electrotyping and Stereotyping
Mercantile and Commercial Printing

With all the most approved modern machinery and material in each department, the excellence of the work at fair prices is assured.

Works on Architecture a Specialty

Information regarding work in any department will at all times be cheerfully and promptly furnished, either personally or by correspondence.

Ready, Part IV "Georgian Period."

To the Architect and Builder:

If you will investigate our glass globes for illuminating purposes, you will use them because they are scientifically designed, artistic and ornamental, and superior to anything yet made.

Our book "Light vs. Illumination" explains the subject thoroughly.

HOLOPHANE GLASS CO., No. 1 Broadway, New York.

ASPHALT ROOFING & PAVING MATERIALS.

WARREN'S "ANCHOR BRAND" NATURAL ASPHALT ROOFING. WARREN'S NATURAL ASPHALT READY ROOFING.
Send for circulars, samples and specification forms to
WARREN CHEMICAL & MFG. CO. 81 & 83 Fulton Street, NEW YORK, U.S.A.

JENKINS' AUTOMATIC AIR VALVES



with Drip-pipe Connections insure perfect circulation. You are not annoyed with escaping steam or dripping of water. They are stamped with our Trade-Mark.

JENKINS BROTHERS, NEW YORK, BOSTON, CHICAGO, PHILADELPHIA.



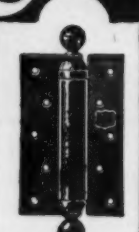
BOMMER SPRING HINGES

ARE THE BEST

"PRACTICALLY UNBREAKABLE"
SAYS THE WORLD'S FAIR AWARD.

MADE OF WROUGHT STEEL, BRONZE & BRASS

For sale by Dealers in Builders Hardware.



JOHN WILLIAMS, 544 to 556 West 27th Street, New York.
WROUGHT IRON AND BRASS WORK TO SPECIAL DESIGNS ONLY.

REFERENCES: Tiffany & Co., N. Y.; Cottier & Co., N. Y.; L. Marcotte & Co., N. Y.; McKim, Mead & White, N. Y.; Babb, Cook & Willard, N. Y.; Bruce Price, N. Y.; R. M. Hunt, N. Y.; Bailey, Banks & Biddle, Phila.; Frank Hill Smith, Boston; A. H. Davenport, Boston.

W. & J. Sloane

having established a special

Department of Decoration

are now prepared to undertake the decorating and furnishing of residences and buildings.

An exclusive stock of domestic and imported Carpets, Rugs, Wall Papers, Textile Fabrics, Furniture, Curtains, etc., together with fine examples of Ceiling and Wall Decoration in color and relief, Cabinet Work, Leaded Glass, etc., is offered for inspection.

DESIGNS AND ESTIMATES SUBMITTED
WORK EXECUTED PROMPTLY

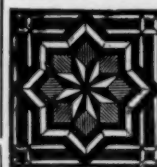
Broadway & 19th Street
NEW YORK

ASPHALT FLOORS, ROOFS, SIDEWALKS AND CARRIAGE-WAYS

Of Public Buildings, Hospitals, Warehouses, Stables, Cellars, etc.
Laid with VAL de TRAVERS ROCK ASPHALT,
DURABLE, FIREPROOF AND IMPERVIOUS.
For estimates and list of works executed, apply to
THE NEUCHÂTEL ASPHALT CO., Limited,
265 BROADWAY - - - NEW YORK.

PARQUET FLOORS.

The National Wood Manufacturing Co.,



129 5th Avenue, New York.

WAINSCOTINGS and CEILINGS.

Inlaid Wood Floors 5-16 and

7-8 inch thick.

Solid work, Tongued and Grooved

in each piece.

Designs & Estimates on applica-

tion. Established 1867.

F. W. DEVOE & CO.

(Established 1852.)

Fulton St., cor. William, New York.
No. 176 Randolph St., Chicago.

Pure Ready-mixed Paints.

We desire to call attention of consumers to the fact that we guarantee our ready-mixed paints to be made only of pure linseed oil and the most permanent pigments. They are not "Chemical," "Rubber," "Patent," or "Fireproof." We use no secret or patent method in manufacturing them by which benzine and water are made to serve the purpose of pure linseed-oil.

Sample cards, containing fifty desirable shades sent on application.

FINE VARNISHES.

Hard Oil-Finish & Wood-Stains.

Illustrated Catalogue of Engineers' and Architects' Supplies, 250 pages, 700 Illustrations, on request.

White-Lead Colors in Oil and Japan.

HIGH-GRADE WOOD MANTELS ...AND ALDINE GRATES

40-Page Illustrated Catalogue
FREE.

ALDINE MANUFACTURING CO.,
101 Court St., Grand Rapids, Mich.

Masonry in Modern Work

A "Prolegomenos" on the Function of Masonry in Modern Architectural Structures.

By R. GUASTAVINO, ARCHITECT.

Price, Paper Cover, 30 Cents.

For Sale by the AMERICAN ARCHITECT.

Conservatories, Greenhouses, Vineries, Etc.

Designed, erected and heated. Catalogue, also special plans and estimates, on application.

LORD & BURNHAM CO.,
1133 Broadway - - - New York City.

Ready, Part IV "Georgian Period."

E. ELDON DEANE,
Architectural Colorist and Draughtsman.
 63 Seymour Building, Fifth Ave., cor. 42d St.
 NEW YORK CITY.

PERSPECTIVES RENDERED
 IN PEN-AND-INK AND WATER-COLOR,
 WALTER M. CAMPBELL,
 54 Devonshire St., Boston, Mass

MASON SAFETY TREAD.
 UNWEARABLE. NON-SLIPPING.
 The approved stair covering. Refer to Brooklyn
 Bridge and Boston Subway. For information address
 American Mason Safety Tread Co., 40 Water Street,
 BOSTON.

Remember

I. That this is *the last issue* of

"THE IMPERIAL EDITION."

II. That through and because of this discontinuance the subscription price of "The **INTERNATIONAL** Edition" is reduced from \$25.00 to \$16.00 for the year 1900.

III. That subscribers to the "International Edition" remitting to us the *full* amount of their subscription (\$16.00) will receive, without charge, the Fifth Part of

"THE GEORGIAN PERIOD."

Ready, Part IV "Georgian Period."

The American Architect and Building News

IS PUBLISHED EVERY SATURDAY BY

The American Architect and Building News Co.,
211 TREMONT ST., BOSTON, MASS.

Advance Subscription Rates:

Regular Edition, \$6.00 per year; six months, \$3.50
International Edition, per year in advance, 16.00
quarterly 18.00

[Foreign Postage, \$2.00 Extra.]

Payment should be made to American Architect and Building News Co. direct, either by draft or post-office order.

Address all business correspondence to the publishers direct.

Advertising Agents:

New York City:—

H. M. Carleton, Temple Court, 5 Beekman St.

Chicago and the Central States:—

A. B. Titcomb, 177 LaSalle St., Chicago, Ill.

Agents at Large:—

F. P. Spokesfield, 211 Tremont St., Boston, Mass.

Burrell & Fowler, 310 New England Bldg., Cleveland, O.

Advertising Rates: For "wants" and "proposals," 15 cents per line [8 words to the line], each insertion. 50 cents the least charge. Other rates on application.

See last or next issue for the following advertisements:—

Barron, Boyle & Co.
Buckeye Paint and Varnish Co.
Bartlett Lumber Co.
Butcher Polish Co.
Gorton & Lidgerwood.
L. Haberstroff & Son.
New York Belting & Packing Co.
T. W. Jones.
Okonite Co.
Samson Cordage Works.
H. B. Smith Co.

See the first issue of the month for the following advertisements:—

Alsen's Portland Cement Works.
Atlas Cement Co.
Brooks & Co., T. H.
Dayton Automatic Elevator Gate Co., The.
Folsom Snow Guard Co.
Grand Rapids Moulding Co.
Ludlow Saylor Wire Co.
Nelson, C. T., & Co.
New Jersey Zinc Co.
Pitt, Wm. K.
Thiele, E.
Vance Boiler Works.

ARCHITECTS' REMOVALS, Etc.

JAMES METCALFE REDFIELD has opened an architectural office in the Winston Building, Utica, N. Y., and requests samples and catalogues of the building trades. 1253

WANTED.

SITUATION.—Competent draughtsman having been six years in last position wishes new situation in Boston. Has had experience in specification writing and superintending, and has recommendation from last employer. Address "P. H. D.," American Architect. 1253

WANTED.

DRAUGHTSMAN.—Wanted, first-class draughtsman, not older than 35, who is good at perspectives and water-color. State experience and salary. "Grant B. Williams," Parkersburg, W. Va. 1253

WANTED.

CORRESPONDENCE.—An architect practicing in New England desires partnership or salaried position in the West. Address "Out West," care of American Architect. 1253

BUILDING PATENTS.

[Printed specifications of any patents here mentioned together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for five cents.]

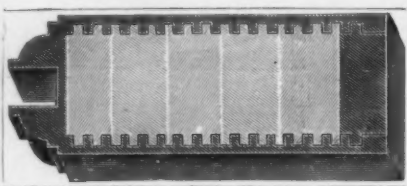
639,151. WINDOW-SASH PULL.—Rob't F. Cornell, Phillipsburg, Mont.
639,154. STAIR-LIFT.—James M. Dodge, Philadelphia, Pa.
639,155. DREDGER FOR USE IN WELLS.—Robert M. Downie, Beaver Falls, Pa.
639,157. MACHINE FOR MAKING EXPANDED METAL LATHING.—William Duncan, Kearny, N. J.
639,164. SASH-FASTENER.—Alexander Forin, Nelson, Can.
639,170. MEANS FOR CONTROLLING ELECTRIC HEATERS.—Edward E. Gold, New York, N. Y.
639,189. TELESCOPIC TOWER.—Henri A. Van der Cruyssen, Lafayette, La.
639,219. LOCK.—Jacob J. Dillenbeck and Emil Flueso, Pulaski, N. Y.

METAL CEILINGS

Suitable for
Residences, Offices, Stores, Schools,
Hospitals & Churches
Can be applied over old Plaster
Give Measurements for estimate

N.Y. METAL CEILING CO.
21 ST. AND 13TH AVE.
NEW YORK, N.Y.

Boston Office: 48 Congress St., Room 23



VARNISHES

FOR HOUSEWORK

Are a specialty with us, and whether for finest or ordinary work, none will give better satisfaction than the

HARRISON VARNISHES

Harrison Bros. & Co., Inc.

PHILADELPHIA CHICAGO NEW YORK

Descriptive Varnish catalogue sent on request.

J. W. TAYLOR'S PHOTOGRAPH SERIES
151 MONROE ST., CHICAGO OF AMERICAN ARCHITECTURE.

Removed to Owings Building.
Send two 5 cent stamps for Catalogue.

THE BEST DOOR MADE.

Architects Designs Carefully Followed.

WRITE FOR PRICES.

THE COMPOUND DOOR CO.,

ST. JOSEPH, - - MICH.

"JUST A MOMENT!"

Invaluable

TO THE
Architect and Builder
ARE

BERGER'S

"Classified Designs"

IN

METAL CEILINGS.

The Berger Mfg. Co., Canton, O.

ELEVATORS

EVERYBODY .. GO TO ..
.. GO TO ..
SPAULDING PRINT PAPER CO. for Blue Prints
—the best place in the city. We take them while you wait. 1105 Exchange Bldg.

BUILDING PATENTS.

639,241. ELEVATOR.—August Ihlenfeldt, Springfield, Ill.
639,254. SPRING-HINGE. Joseph Lehnbeuter, St. Louis, Mo.
639,268. WINDOW-FRAME.—Archibald N. McBean, West Hoboken, N. J.
639,278. FLOOR-SURFACING MACHINE.—Fred R. Patch, Rutland, Vt.
639,290. WATER-CLOSET.—Jerome B. Rhodes, Shreveport, La.
639,320. GIRDER OR BEAM FOR BRIDGES.—Arthur Vierendeel, Bruges, Belgium.
639,321. SASH-LIFTER.—Robert Washburn, Harrison, Can.
639,329. WINDOW-OPERATING MECHANISM.—John P. Yawn, Moselle, Miss.
639,340. PLASTER.—William H. Beardsley, Pittsburgh, Pa.
639,417. TUBULAR GAS WATER-HEATER.—John Mander, Philadelphia, Pa.
639,419. SASH-FASTENER.—George W. Manuel, Oakland, Cal.

Morse, Williams & Co.,

BUILDERS OF

:: High Grade ::

PASSENGER and FREIGHT ELEVATORS.

(Over 11,000 in operation.)

WEST END TRUST BUILDING, BROAD ST.
AND SOUTH PENN SQUARE,

PHILADELPHIA, - - PA.

Write for full information.

BUILDING PATENTS.

639,465. HOT-AIR FURNACE.—James Timms, Columbus, O.
639,478. INSTANTANEOUS WATER-HEATER.—Geo. Wilson, Chicago, Ill.
639,500. SASH-BALANCE.—George Barnes, Albert Park, Victoria.
639,510. HOT-AIR FURNACE.—John Booker, Hamilton, Can.
639,523. NON-CONDUCTING COVERING FOR PIPES.—William G. Chapin, New York, N. Y.
639,544. FLOORING AND CEILING.—Alfred P. Elten, Cleveland, O.
639,546. SASH-LOCK.—Alan R. Fergusson, New York, N. Y.
639,565. ANTI-FRICTION-HINGE.—Wm. H. Hart, New Britain, Conn.
639,569. JOINT FOR HOLLOW BUILDING-BLOCKS, TUBES, ETC.—Joseph Hickson and Oscar P. Bushnell, Mount Gilead, O.
639,571. HOT-AIR FURNACE.—Wm. H. Hillyer, Freeport, O.
639,580. CLOSET.—Charles H. Lawrence, Detroit, Mich.
639,591. FIRE-REFUGE.—Jas. P. Lowell, Waynesborough, Pa.
639,610. OVERFLOW-TRAP.—Frank A. Radcliffe, Cleveland, O.
639,622. COMPRESSED-AIR WATER-ELEVATOR.—William H. Shaffner, Louisiana, Mo.
639,637. TILE STRUCTURE AND TILES THEREFOR.—Frank L. O. Wadsworth, Williams Bay, Wis.

Ready, Part IV "Georgian Period."

G. BICKELHOUP,

PATENT

**METALLIC
SKY-LIGHT
WORKS.**

242 and 245 West 47th Street, New York.

Telephone: 675 39th St. a few doors west of Broadway.
Send for Catalogue.**BUILDING INTELLIGENCE.**

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

ADVANCE RUMORS.

Altoona, Pa.—Contracts have been let for the erection of a new building for the Keystone State Savings and Loan Association; cost, \$13,000.

Amherst, Wis.—It is said that P. N. Peterson and others will form a company with \$10,000 capital stock to build a canning factory.

Ashland, Pa.—C. T. Mould, architect, Pottsville, has drawn plans for a hospital ward for the State Hospital. It will be constructed of stone, and will cost about \$15,000. J. C. Biddle, medical superintendent.

Aurora, Ill.—Press reports state that St. Mary's parish will erect a \$12,000 school-building. Rev. P. A. McLaughlin, pastor.

Beaver, Pa.—Press reports state that plans have been prepared for a new church to be erected by St. Peter and St. Paul's Catholic Church, to cost about \$15,000. Rev. B. Gerold, pastor, Rochester.

Boise, Ida.—W. S. Campbell, architect, has prepared plans for a modern hotel to be erected at 10th and Main Sts., for the "Idanha" Hotel Co. It will be 56' x 122', five-story, attic and basement, of pressed and common brick, with terra-cotta trimmings; cost, \$65,000. Contract will probably be let in March.

Boston, Mass.—A syndicate of Boston capitalists and several wealthy New Yorkers are interested in a project, preliminary steps of which have already been taken, to establish a new music hall with promenade attached in separate building. The site will probably be in the vicinity of the corner of Washington and Boylston Sts. It will be one of the very best appointed play-houses in the country. James E. Nelson will erect a building to be used as a dry-goods store on land recently purchased on Franklin St. He will also erect a factory building on Ashland St.

Bridgeton, N. Y.—The American Railway Co. has awarded the contract for a new power plant to Contractor Kerr, of Eddystone, Pa.; cost, \$100,000.

Brooklyn, N. Y.—Dr. A. C. Dixon is said to be considering the matter of erecting a new edifice to cost about \$125,000.

Buffalo, N. Y.—The Husted Milling and Elevator Co., 839 Elk St., have had plans drawn by Engineer Geo. A. Ricker for an elevator structure to replace one recently destroyed by fire. The new structure will be 115 feet high, and 59' x 105', and cost \$25,000.

Cambridge, Mass.—The plans for the new Semitic Museum have been decided upon and work will be begun in the spring. The building will be in Divinity Ave., a short distance south of the Peabody Museum of Archaeology and Ethnology, and its exterior construction will be of brick, to harmonize with the surroundings. The frontage will be 80 feet and the depth 52 feet. On the second and third floors will be exhibition rooms, 32' x 74',

THE LAUGHLIN-HOUGH PATENT DRAWING TABLES.

Send for Catalogue Illustrating all Styles.

Endorsed
by
World's
Experts.



It is to
Drawing
What
Shorthand
is to
Writing.

"We find we can do drawings in about half the time which it takes on ordinary boards."—*Fetherstonhaugh.*

"I would consider it economy to change from the best styles of Tables of which I have any knowledge."—*See.*

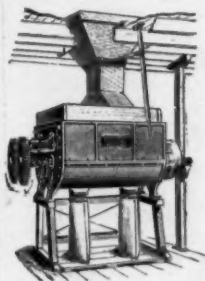
"From an employer's point of view, the cost of turning out drawings must be materially lessened."—*Maginnis.*

"It is an invaluable instrument to our business, enabling the work to be done in one quarter the time, and absolutely correct."—*Simpson.*

LAUGHLIN-HOUGH CO.
30 BROAD ST.,
NEW YORK.

PHILADELPHIA: REAL ESTATE TRUST CO. BLDG.

Constructed strictly upon mathematical and scientific principles, enabling the draughtsman to accurately and rapidly make any desired drawing without the use of T squares, angle squares, protractors, parallel rules, dividers or sectors, the operator working in the most comfortable attitude (sitting or standing).

**The Broughton
.... MIXER**

For HARD PLASTER, LIME, CEMENT, ETC.

Description and Prices on application.....

W. D. DUNNING,

239 W. Water St. SYRACUSE, N. Y.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

and lighted from the north and south sides alone, in order to avoid cross lights.

Charleston, W. Va.—The Children's Home Society of West Virginia will erect a new building to cost about \$10,000.

Chester, Pa.—A new high-school building to cost about \$100,000 is to be erected here.

Chicago, Ill.—William Peifer is having plans prepared by Henry Sierka for a four-story brewery to be erected at 343 N. Leavitt St.; cost, \$30,000.

Colorado Springs, Col.—It is reported that R. P. Davis will erect a four-story store and office building, 25' x 125', to cost \$15,000.

Davenport, Ia.—Dr. A. L. Hageboeck has let the contract for the erection of a three-story modern flat building, at 806-808 W. 3d St.; cost, \$5,000.

Deadwood, S. D.—Architect S. J. Bowler, 3 Collum Block, Minneapolis, Minn., has prepared plans for a frame and stone brewery to be erected here at a cost of \$25,000.

East Grand Forks, Minn.—The publication office of the *Courier*, owned by F. J. Duffy, the proprietor, was burned with a loss of \$5,000 and \$3,500 insurance. It is understood Mr. Duffy will rebuild in the spring.

Fairmount, Minn.—Omeyer & Thorl, of St. Paul, architects, have plans for a church to be erected by the German Lutheran Church Society. It will be frame, with stone foundation, 45' x 76', and high steeple; seating capacity about 500; cost, \$6,000.

Germantown, Pa.—A number of prominent business men, headed by Harlan Page, are organizing a company for the erection of a new apartment-house to be known as the Chelton Apartments, on the south side of Chelton Ave. It will be six stories high, constructed of Pompeian brick and Indiana limestone, and contain 250 rooms.

Houghton, Mich.—Plans are being prepared for a three-story brick and stone building, 60' x 80', for Stephen Carkeek of this city; cost, \$30,000.

Indianapolis, Ind.—F. M. Andrews, architect, Dayton, O., is preparing preliminary plans for the new Bates House, to be built in this city; cost, about \$800,000. E. F. Claypool and Henry W. Lawrence are interested.

Plans have been drawn by Handy & Cady, 172 Washington St., Chicago, Ill., for a three-story apartment-house to cost \$60,000, for Mrs. Catherine F. Zoner.

Kansas City, Mo.—It is said that Thos. H. Swope will erect a \$150,000 building on 11th St. and Grand Ave., to be occupied by the Robert Keith Furniture & Carpet Co.

Knoxville, Tenn.—The Y. M. C. A. will erect a new building on Main and Gay Sts., to cost about \$60,000. J. O. Fink, secretary.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Laramie, Wyo.—The University Trustees are stated to have decided to erect a science building, to cost \$35,000.

Luray, Va.—The American Orphanage Association of Richmond, are having plans prepared by Albert S. Hunt and Lewis E. Marie, architects, Richmond, for the Winnie Davis Memorial to be erected in this city; cost, about \$25,000.

Madison, Wis.—The Monora Assembly management contemplates erecting a circular-roofed structure, to seat about 5,000, and to cost not more than \$8,000.

Memphis, Tenn.—It is announced that Col. Napoleon Hill will build a \$100,000 department-store on Main and Ganose Sts.

Milwaukee, Wis.—Local reports state that the American Malting Co., L. J. Merkle, of New York City, pres., will establish a brewery here, to cost \$600,000.

P. R. Sanborn has plans for a modern residence to be erected on Shepard Ave., near Newberry Boulevard; cost, \$6,000.

Minneapolis, Minn.—Ganglehoff Bros. will soon begin the erection of a wire-bed factory, to cost \$10,000.

Montgomery, Ala.—Lockwood & Smith, architects, have drawn plans after which J. R. Niernast will erect a \$30,000 store and office building at the corner of Commerce and Tallapoosa Sts.

Nashville, Tenn.—S. K. Harvel will erect a two-story brick and stone residence after plans by Thompson, Gibel & Asmus; cost, \$8,000.

New Haven, Conn.—Architect Robinson is preparing plans for a new school-house to be erected on the corner of Conner and Livingston Sts.; cost, \$50,000.

Newport, R. I.—Ogden Codman, Jr., 281 Fourth Ave., New York City, is preparing plans for a dwelling to be erected for A. M. Coates.

Miss Ella F. Mason, of Boston, Mass., has purchased the Counters de Robiglio, of Nice, Italy, and her sister, Mrs. Margret King Bentley, of this place, 10,000 feet of land on which she will build a cottage.

New Ulm, Minn.—The New Ulm Boot and Shoe Co. has been incorporated with \$25,000 capital stock. They will erect a factory at once.

New York, N. Y.—Oscar Hammerstein has filed plans with the Building Department for a new theatre building, to be called the Republic, which he proposes to erect at 207-211 W. 42d St., adjoining his Victoria music-hall on the corner of 7th Ave. The projected building will be constructed of brick and limestone, at an estimated cost of \$200,000. The architecture of the Victoria will be preserved in the elevation of the Republic.

Ready, Part IV "Georgian Period."

Iron-Work.

THE BERLIN IRON BRIDGE CO.

Notice to Architects, Contractors and Builders:

We carry constantly in stock 8,000 to 10,000 tons of beams, channels, girders and angles, and can supply this material promptly.

Design and Build All Classes of . . .

STEEL STRUCTURES.



The above illustration shows a Ribbed Steel Arch Bridge built by us for the City of New Haven, Connecticut. It consists of one span of 85 ft. with a Roadway 20 ft. wide, and two Sidewalks 6 ft. wide. The Roadway is paved with Asphalt on Cresseded Hard Pine Plank.

BOSTON OFFICE:
200 Equitable Building.

NEW YORK OFFICE:
Room 718 Bennett Building,
Cor. Fulton and Nassau Sts.

Main Office and Works EAST BERLIN, CONN.

JACKSON ARCHITECTURAL IRON WORKS,

ESTABLISHED 1840.

IRON

Fronts for Buildings, Cornices, Lintels and Sills, Doors and Shutters, Girders and Beams, Fire-escape Balconies and Ladders, Columns and Roofs, Sky and Floor Lights, Stable Fittings and Fixtures, Sidewalk Lights. Artistic work in Wrought and Cast Iron, Brass and Bronze. Designs and Estimates of Cost Furnished for Work in any Department.

Foundry and Shops, East 28th and East 29th Sts. Office, 315 East 28th St., New York.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Philadelphia, Pa.—Contractors William Steele & Son have plans and specifications for a manufacturing plant, which the Moss Rose Manufacturing Co. propose to have built at the northwest corner of Hancock St. and Allegheny Ave. The buildings will be constructed of stone, brick, terra-cotta, hemlock and iron. The main building will be four stories high, 50' 4" x 261'.

Press reports state that the Stratford Hotel, at the southwest corner of Broad and Walnut Sts. is to be torn down and replaced sometime in the spring by a thirteen-story modern structure to cost about \$1,000,000. It will be modelled after the Waldorf-Astoria, New York. Geo. C. Bolt is the owner.

Henry W. Fletcher has purchased property, adjoining his own, at Greene St. and Maplewood Ave., Germantown, and will convert the two dwellings into one large mansion. The cost will be about \$10,000.

Pittsburgh, Pa.—The Allegheny Country Club has purchased 150 acres of land near Sewickley, on which they will erect a club-house, to cost about \$60,000. John Moorhead, secretary.

A new steel plant is to be erected here at a cost of about \$250,000. A. W. Herron, Thos. Rodd, T. H. Bakewell among others are interested.

Plattsburgh, Neb.—Plans are out for an M. E. Church to be one-story and basement, frame and brick, 54' x 75', cost about \$7,000. F. A. Henninger, architect, Omaha.

San Francisco, Cal.—The Oscar Beyer Co. of 56 Fifth Ave., Chicago, Ill., are arranging to erect a \$100,000 brewery here.

Seattle, Wash.—Stephen S. Bailey has purchased three lots on the west side of 3d Ave., between Jefferson and James Sts., on which he will erect a modern hotel six stories in height and containing 300 rooms.

Sioux City, Ia.—The C. Shenberg Co. will erect a new building to replace the one recently burned. It will be five-story, with pressed-brick front, and will cost \$40,000.

Spokane, Wash.—Efforts will be made to raise \$25,000 for the erection of a building for the fruit fair. It will be a permanent structure. J. A. Borden is chairman of the committee of arrangements from the chamber of commerce, which has the matter in charge.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

St. Louis, Mo.—Architect R. A. Berger has prepared plans for a two-story brick store and flat building, 40' x 60', to be erected on Warne near Florissant Ave.; cost, \$7,000.

William Elias will erect a two-and-one-half-story brick residence on 4245 Finney Ave., after plans by Wm. Foltmann; cost, \$8,000.

St. Paul, Minn.—The Hamm Brewing Co. will begin work soon on a frame ice-house and cold-storage warehouse. It will be 68' x 135'; cost, \$5,000.

Tower, Minn.—The Tower Lumber Co. has let the contract to the D. J. Murray Co., of Wausau, Wis., to build a three band sawmill, to cost \$40,000.

Victor, Col.—The Woods Investment Co. is said to be considering the matter of erecting a \$75,000 theatre on the site of the old Victor Hotel.

Warner, Wis.—The Menasha Woodenware Co., of Menasha, will erect a large woodenware factory here.

Weissport, Pa.—It is said that the plant of the Carbon County Improvement Co. recently destroyed by fire at a loss of \$175,000, will be rebuilt as soon as the insurance is adjusted.

Westfield, Mass.—It is reported that J. C. Buschmann is to build a three-story hotel after plans by A. W. Holden; cost, \$40,000.

Winnipeg, Man.—The council has selected a site for the crematory. The building will cost \$12,000.

ALTERATIONS AND ADDITIONS.

Chicago, Ill.—Adams St., Nos. 239-41, alterations to six-story building; \$10,000; o. C. M. Henderson; a. Otto H. Matz.

Washington Boulevard, No. 1104, two-story bk. addition, 28' x 40'; \$7,000; o. William Brandt; a. Frohmann & Jensen; b. Therman & Bagull.

W. Lake St., No. 137, two-story bk. addition to store, 30' x 79'; \$6,000; o. Robert Kelso; a. Iver C. Zarbell, 95 Clark St.; b. Abraham Lund.

New York, N. Y.—Broadway, No. 390, fire damage repaired; \$27,500; o. Estate Alex. M. Bruen, 41 Park Row; a. Jardine, Kent & Jardine, 1262 Broadway.

Madison Ave., No. 229, two-story extension, 11' 10" x 13' 2"; \$20,300; o. Geo. A. St. John, 91 E. 10th St.; a. S. E. Gage, 3 Union Sq.

Tremont Ave., No. 737, three-story extension, 24' x 25'; \$8,500; o. Geo. W. Hojer Estate, 13 Chambers St.

Structural and Ornamental.....

IRON WORK, CASTINGS, :: ::
STEEL BEAMS, Etc.

..... WHITE US

DAVENPORT FOUNDRY and MACHINE CO.,

1075 W. 4th St., Davenport, Iowa.

Contracts executed anywhere.

PASSAIC ROLLING MILL CO.,
PATERSON, N. J.

Steel Beams

4 inches
to
20 inches
deep.

ALL STRUCTURAL SHAPES.

NEW YORK OFFICE . . . 45 BROADWAY.

Boston Office, No. 31 State Street.

E. T. BARNUM,
DETROIT, MICH.

ART METAL WORK

... IN ...

BRASS, STEEL and IRON.

Send for Catalogue.

J. S. THORN CO.,
Architectural Sheet-Metal Works.

Metal Building Trimmings, Ventilating Skylights, Metallic Roofing Tiles, Building Specialties, Builders' Light Iron Work of every description.

Nos. 1225 to 1229 Callowhill Street,

PHILADELPHIA, PA.

BUILDING INTELLIGENCE.

(Alterations and Additions Continued.)

Philadelphia, Pa.—Logan and Ruffner Sts., one-story bk. & iron foundry extension, 60' x 90'; \$5,000; o. D. S. Cresswell; b. Chas. P. Nesbitt.

APARTMENT-HOUSES.

Chicago, Ill.—Flournoy St., Nos. 806-808, \$60-662, 4 three-story bk. flats, each 22' x 61'; \$20,000; o. John J. Lyons, 369 S. Kedzie Ave.; a. John Danielson, 204 Dearborn St.

Gladys Ave., Nos. 2169-71, 2 two-story bk. flats, each 22' x 52'; \$10,500; o. Dutton & Callan; a. A. G. Ferree, 6452 Union Ave.

Milwaukee Ave., No. 2250, three-story bk. & st. store & flats, 28' x 125', 22' x 115'; \$12,500; o. Augustus Allen; a. Henry Worthmann.

Madison St., nr. Hamlin Ave., two-story bk. store & flats, 26' x 75'; \$7,500; o. C. Koerstein; a. Harry E. Stevens.

Dayton St., No. 167, three-story bk. flats, 21' x 62'; \$7,000; o. Louis Ahle; a. Louis Martens; b. C. H. Binders.

W. Twenty-second St., No. 992, one & two-story bk. store & flat, 25' x 100'; \$5,000; o. C. Ludemann; a. Burtar & Garsman, 1063 W. 12th St.; b. August Buettner, 1680 S. Robey St.

CHURCHES.

Boston, Mass.—Lauriat Ave., nr. Blue Hill Ave., fr. chapel, 30' x 65', pitch roof, furnace; \$5,500; o. Dorchester Baptist Church; b. W. T. Eaton; a. W. H. Brainerd.

FACTORIES.

Chicago, Ill.—Archer Ave. and Farrell St., one & two-story bk. factory, 97' x 163', 25' x 103', 39' x 81', comp. roof; \$20,000; o. Board Cumming Foundry Co.; a. A. H. Lowden.

Philadelphia, Pa.—Nineteenth St. and Allegheny Ave., one-story & base. bk. reducing house, 103' x 141'; \$12,000; o. Electric Storage Battery Co.; b. Charles McCaul.

HOUSES.

Boston, Mass.—Harvard St., nr. Wales St., 2½-story fr. dwell., 36' x 46', pitch roof, hot water; \$6,000; o. J. V. Whidden; a. C. A. Russell.

Harvard St., nr. Esmond, two-story fr. dwell., 32' x 46', pitch roof, furnace; \$6,500; o. J. D. McKay; a. Chabot & Co.

Kenwood Road, 2 fr. dwells., 28' x 53', pitch roofs, furnaces; \$11,000; o. a. & b., J. C. Spillane.

Chicago, Ill.—Junior Terrace, No. 42, two-story bk. & fr. dwell., 35' x 50', pitch roof, hot water; \$8,500; o. A. W. Hester; a. Harvey L. Page & Co.

Cornell Ave., four-story bk. dwell., 44' x 46', comp. roof, steam; \$12,000; o. A. B. Mulvey; a. Henry K. Holman.

N. Hermitage St., Nos. 1581-83, 2 three-story bk. dwells., 23' x 61'; \$10,000; o. W. A. Lloyd; a. A. W. Cole; a. S. E. Ockerlund.

Lawrence Ave., No. 1247, two-story bk. dwell., 28' x 34'; \$6,000; o. Aug. F. Schmidt; a. H. J. Liedberg; b. William Walter.

Columbus, O.—E. Broad St., 2½-story bk. dwell., hot water; \$15,000; o. Edward Merkle; a. Yost & Packard.

St. Louis, Mo.—Louisiana and Merrimac Aves., 2½-story bk. & st. dwell., 25' x 42', slate roof, steam; \$6,000; o. R. C. Rielly; a. V. J. Klutho.

Ready, Part IV "Georgian Period."

THE KENNEY FLUSHOMETER



An ingenious device for flushing water-closets. Takes the place of noisy and dirty overhead flush-tanks. It has passed the experimental period; can be adapted to conform to almost every conceivable requirement, and the only system that will operate successfully at all times one or any number of closets under the varying conditions of water pressure. No Cup Leathers or Springs.

SIMPLE, SURE AND SANITARY

Endorsed and Specified by Leading Architects in all Sections of the Country.

Write for Catalogue and List of Installations.

THE KENNEY CO., 72-74 Trinity Place, NEW YORK.

Application of Flushometer.

Patented.

The Monarch Water Heater

FURNISHES HOT WATER INSTANTLY,
AT ANY MOMENT, DAY OR NIGHT...

Open a Hot Water faucet anywhere in the house, and this act instantly turns on the gas at the heater. As there is no storage, the water is heated as it passes through the coil, furnishing a constant stream of hot water in any quantity desired. The instant the water is turned off, the gas is shut off likewise. The hot water is always fresh, and can be used for cooking or any purpose. Write the

MONARCH WATER HEATER CO.,
PITTSBURGH, PA.,

For information and catalogue.



THE J. L. MOTT IRON WORKS,

88 Beekman St.,
NEW YORK, N. Y.

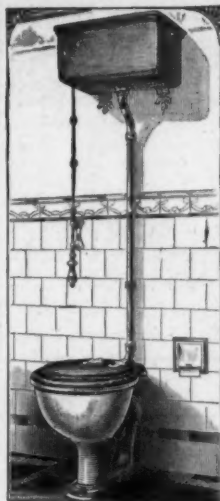
**The Primo
Improved
Vitro-
Adamant.**

PLATE 495 R.

No. 33 Design I.
Cistern with Nickel-plated Brass Brackets, Nickel-plated Brass Flush Pipe, Nickel-plated Chain, Hardwood Pull, and Brass Floor Flange.

Copyrighted, 1897.

Copy of Circular furnished on application.



ADAMS SEWAGE LIFT.

Automatically operated by water or sewage.

Drains Sanitary Fixtures in Basements of Buildings, Flat and Low Level Districts.

HIGHEST REFERENCES.

ADAMS SEWAGE LIFT CO.,

Stephen Girard Building,

PHILADELPHIA, PA.

Also of London, Glasgow, Dublin.



BUILDING INTELLIGENCE.

(Houses Continued.)

Burd Ave., bet. Ridge & Wells Aves., 2 two-st'y bk. dwells, 54' x 58'; \$12,000; o. & b., John Davies.

Raymond Ave., bet. King's Highway & Academy Ave., two-st'y bk. dwell., 34' x 39'; \$5,000; o., W. Hambley.

Kensington Ave., No. 5198, two-st'y bk. dwell., 22' x 71'; \$5,500; o., D. R. Breuman R. E. Co.; b., J. T. Crath.

PUBLIC BUILDINGS.

Chicago, Ill. — Ingraham Ave., No. 25, two-st'y bk. hall, 64' x 70'; \$5,000; o., Catholic Bishop of Chicago; a., R. O. Berlin, 1212 Tacoma Building; b., John Rudink.

STABLES.

Boston, Mass. — Lusselle St., nr. La Grange St., two-st'y fr. stable, 20' x 25', pitch roof; \$800; o., E. F. Magee.

Far Rockaway, L. I., N. Y. — Two-st'y fr. stable & carriage-house, 25' x 33'; \$15,000; o. & b., Thos. J. McLaughlin, 418 W. 45th St., New York City.

Germantown, Pa. — W. Walnut Lane, No. 269, st. stable; \$5,500; o., Wm. H. Sholmerdine; b., Chas. P. Nesbitt; a., Rankin & Kellogg.

Newark, N. J. — Brunswick St., No. 131, two-st'y bk. stable, 27' x 45', will have 3 stalls & room for coachman; \$2,000; o., Charles L. Hill; a., Carl F. Rehman.

STORES.

Chicago, Ill. — Commercial Ave., Nos. 9136-38, two-st'y bk. store & flat, 60' x 138', comp. roof, steam; \$17,000; o., Chas. Fink; a., Franz Roy.

Commercial Ave., No. 9146, two-st'y & base. bk. store & flat, 25' x 76', comp. roof, steam; \$6,300; o., James McLaughlin; a., Franz Roy.

Greensburg, Pa. — Three-st'y st. & bk. store & flat, 23' x 123', gravel roof, hot water; \$12,000; o., Miss Hodge; a., A. Dudgeon.

Newton, Mass. — Washington St., one-st'y bk. store, 40' x 45', stoves; o., C. A. & J. A. Patten.

TENEMENT-HOUSES.

Boston, Mass. — Ruggles St., Nos. 56-58, 2 fr. tenements, 23' x 55', flat roofs, stoves; \$12,000; o. & b., Joseph Adolph; a., F. A. Norcoros.

Mounifera Ave., nr. Washington St., 3 fr. tenements, 34' x 36', flat roofs, stoves; \$15,000; o., John Anderson; a. & b., H. J. Eeklund.

Chicago, Ill. — Dayton St., No. 167, three-st'y bk. & st. apart., 24' x 82', comp. roof, stoves; \$9,000; o., Louis Ahle; a., Louis Martens.

WAREHOUSES.

Chicago, Ill. — W. Randolph St., Nos. 117-121, six-st'y bk. warehouse, 54' x 90'; \$35,000; o., R. Gottlieb; a., Hoesenmueller & Meidahl, 103 State St.; b., S. N. Nielsen, 132 W. Erie St.

State St., four-st'y bk. warehouse & barn, 65' x 143'; \$50,000; o., E. J. Lehman Estate; a., E. R. Krause, 100 Washington St.

James and Benson Sts., five-st'y bk. warehouse, 112' x 220'; \$70,000; o. & b., Armour & Co.

Philadelphia, Pa. — Chancellor and American Sts., four-st'y bk. store & storage building, 70' 9" x 85' 8"; \$12,000; o., David M. Ellis; b., Armstrong & Printzenhoff.

BUILDING INTELLIGENCE.

(Warehouses Continued.)

Callowhill St. and Delaware Ave., fr. & iron freight-shed, 140' x 547', by 20' high, slag roof; \$30,000; o., Philadelphia & Reading Railway Co.; b., Armstrong & Printzenhoff.

MISCELLANEOUS.

Boston, Mass. — Fenway St., cor. Boylston St., two-st'y bk. medical library building, 75' x 100', pitch roof, steam; \$75,000; o., Boston Medical Library; b., McNeil Bros.; a., Shaw & Hunnewell.

PROPOSALS.

GRANITE PAVING BLOCKS. [At Brookline, Mass.]
Sealed proposals will be received until January 2, 1900, at the office of the Selectmen, Brookline, about \$180,000 feet granite paving-block, and 2,000 feet of granite flagging, etc. A. H. FRENCH, Town Engineer. 1253

CHURCH. [At Fort Wayne, Ind.]
Bids will be received until February 15, 1900, for the erection of a school and church to cost \$15,000. LUTHERAN SOCIETY. 1255

COURT-HOUSE. [At Pipestone, Minn.]
Sealed proposals will be received until January 3, 1900, for the erection of a county court-house. WILLIAM DAMS, Chairman County Commissioners. 1253

CITY-HALL. [At Columbia, S. C.]
Sealed proposals will be received until January 5, 1900, for the erection of a city-hall. THOS. H. GIBBS, et al., committee. 1254

JAIL. [At Nevada City, Nev.]
Sealed proposals will be received until January 9th, for the erection of a jail to cost \$175,000. SUPERVISORS. 1254

HIGH SCHOOL. [At Centerville, Md.]
Bids are wanted January 15th for the erection of a high-school building. L. L. BEATTY, Sec'y Bldg. Com. School Commissioners. 1253

Treasury Department, Office Supervising Architect, Washington, D. C., December 9, 1899. Sealed proposals will be received at this office until 2 o'clock P. M. on the 15th day of January, 1900, and then opened, for the installation of a wiring system in the boiler-house, isolation ward, etc., for the U. S. Marine Hospital Building, Chicago, Ill., in accordance with the drawings and specification, copies of which may be obtained at this office or at the office of the Superintendent of Construction at Chicago, Ill., at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1253

Treasury Department, Office Supervising Architect, Washington, D. C., December 19, 1899. Sealed proposals will be received at this office until 2 o'clock P. M. on the 31st day of January, 1900, and then opened for the construction (except electric work, heating and ventilating and elevators) of the hospital building at the U. S. Immigrant Station, Ellis Island, New York Harbor, in accordance with the drawings and specification, copies of which may be had at this office or the office of Boring & Tilton, architects, 32 Broadway, New York City. JAMES KNOX TAYLOR, Supervising Architect. 1253

EXCELSIOR GREASE TRAPS



are guaranteed to prevent stoppage of Waste Pipes by removing all grease from the water. Used in hundreds of private and public buildings.

Manufactured by
SPROUL & MCGURRIN
Grand Rapids, Mich.



For HOT WATER RADIATORS
Full Water-Way. Guaranteed not to Stick.
THE OHIO BRASS AND IRON MANUFACTURING COMPANY
Cleveland, Ohio

PROPOSALS.

M. on the 31st day of January, 1900, and then opened for the construction (except electric work, heating and ventilating and elevators) of the hospital building at the U. S. Immigrant Station, Ellis Island, New York Harbor, in accordance with the drawings and specification, copies of which may be had at this office or the office of Boring & Tilton, architects, 32 Broadway, New York City. JAMES KNOX TAYLOR, Supervising Architect. 1253

Ready, Part IV "Georgian Period."

THE MAN BEHIND THE BOOKS

holds a responsible position. We guarantee to prepare young men and women to fill the highest places in book-keeping if they are anxious to advance and will study "between times." Thousands have prospered through our unequalled course of

**EDUCATION BY MAIL.**

in Electrical, Mechanical, Steam, Mining and Civil Engineering; Metallurgy, Art, Architecture, Practical Newspaper Work, English Branches, Stenography, Machine Design and Mechanical Drawing. Low price; easy terms.

Sent free to those who enroll now, a complete drawing outfit worth \$11.10, or other premiums. Mention subjects interested in when writing to

The United Correspondence Schools,

154-156-158 Fifth Ave., New York, for Catalogue No. 102

"Cohesive Construction."

An Essay on the

Theory and History of Cohesive Construction.

By RAFAEL GUASTAVINO - - - Architect.

Price, \$1.25.

For Sale by the AMERICAN ARCHITECT.

The New System OF EDUCATION**Architecture**

Architectural Drawing; Steam, Electrical, Mechanical; Civil and Mining Engineering; Drawing; Surveying; Chemistry; Plumbing; Book-keeping; Shorthand; English Branches

TAUGHT BY MAIL.
Over 50 Courses

We have helped thousands to better positions and salaries. Send for free circulars, stating the subject in which you are interested.
THE INTERNATIONAL CORRESPONDENCE SCHOOLS,
Box 986, Scranton, Pa.

The Heliotype Printing Co.

LITHOGRAPHERS, ETC.

211 Tremont Street

Boston

FAC-SIMILE REPRODUCTIONS IN COLOR
OR MONOCHROME A SPECIALTY



Lithography

Heliotype

Color Printing

Photogravure

Maps, Plans, etc.

BEST WORK ONLY
PROMPT DELIVERY
REASONABLE PRICES

WRITE FOR ESTIMATES

Ready, Part IV "Georgian Period."

Professional Ethics.

The following . . .

. . . CODE OF ETHICS . . .

Prepared in Conformity with the Best Standards of Practice, and Recommended to its Members by the Boston Society of Architects, was

ADOPTED BY THE SOCIETY, FEBRUARY 1, . . . 1895. . .

SECTION 1. No Member should enter into partnership, in any form or degree, with any builder, contractor, or manufacturer.

SECTION 2. A Member having any ownership in any building material, device or invention, proposed to be used on work for which he is architect, should inform his employer of the fact of such ownership.

SECTION 3. No Member should be a party to a building contract except as "owner."

SECTION 4. No Member should guarantee an estimate or contract by personal bond.

SECTION 5. It is unprofessional to offer drawings or other services "on approval" and without adequate pecuniary compensation.

SECTION 6. It is unprofessional to advertise in any other way than by a notice giving name, address, profession, and office hours, and special branch (if such) of practice.

SECTION 7. It is unprofessional to make alterations of a building designed by another architect, within ten years of its completion, without ascertaining that the owner refuses to employ the original designer, or, in event of the property having changed hands, without due notice to the said designer.

SECTION 8. It is unprofessional to attempt to supplant an architect after definite steps have been taken toward his employment.

SECTION 9. It is unprofessional for a Member to criticize in the public prints the professional conduct or work of another architect except over his own name or under the authority of a professional journal.

SECTION 10. It is unprofessional to furnish designs in competition for private work or for public work, unless for proper compensation, and unless a competent professional adviser is employed to draw up the "conditions" and assist in the award.

SECTION 11. No Member should submit drawings except as an original contributor in any duly instituted competition, or attempt to secure any work for which such a competition remains undecided.

SECTION 12. The American Institute of Architects' "schedule of charges" represents minimum rates for full, faithful and competent service. It is the duty of every architect to charge higher rates whenever the demand for his services will justify the increase, rather than to accept work to which he cannot give proper personal attention.

SECTION 13. No Member shall compete in amount of commission, or offer to work for less than another, in order to secure the work.

SECTION 14. It is unprofessional to enter into competition with or to consult with an architect who has been dishonorably expelled from the "Institute" or "Society."

SECTION 15. The assumption of the title of "Architect" should be held to mean that the bearer has the professional knowledge and natural ability needed for the proper invention, illustration and supervision of all building operations which he may undertake.

SECTION 16. A Member should so conduct his practice as to forward the cause of professional education and render all possible help to juniors, draughtsmen and students.

Fire-proof Building,

TRADE
RARITAN

**FRONT BRICK.
HEARTH TILE.
FIREPROOFING.**

MARK. MANUFACTURED BY
RARITAN HOLLOW AND POROUS BRICK CO.
Henry M. Keasbey, Vice-Prest. Office, 874 Broadway, New York. Rowland P. Keasbey, Sec. and Treas.

PIONEER FIREPROOF CONSTRUCTION CO.,
1515 Marquette Building, Chicago.

Manufacturers and Contractors for every description of

Tile for Fireproofing
ALL KINDS OF BUILDINGS.

Our Goods embody all the latest Scientific ideas for rendering buildings Thoroughly Fireproof.
CONTRACTS TAKEN IN ALL PARTS OF THE UNITED STATES. Send for Illustrated Catalogue and Price List.

PITTSBURGH TERRA COTTA LUMBER CO.,

Manufacturers and Contractors for the Erection of

POROUS AND DENSE
TERRA-COTTA.

FIRE PROOFING

Works: PITTSBURGH, PA.
WASHINGTON, N. J.
E. PALESTINE O.

General Offices: Carnegie Building, Pittsburgh, Pa.
Eastern Offices: Townsend Bldg, New York, 411 John Hancock Bldg, Boston, Mass.

The Roebling System of Fireproofing.



Highest efficiency in fire and water tests of the New York Building Department and now the recognized standard of fireproof construction. Send for catalogue.

The Roebling Construction Company,
121 Liberty Street, New York.

The Atlas Clay Material Co. :: ::

GERMAN NATIONAL BANK BUILDING, PITTSBURGH, PA.

Manufacturers and
Contractors of

FIREPROOFING

All material made at our own plants. Contracts taken anywhere.

MINERAL WOOL

FIRE, SOUND and VERMIN PROOF INSULATOR.

Samples and Circulars Free.

U. S. Mineral Wool Co., 1 Cortland Street,
NEW YORK.

FOR A SUMMER CRUISE TAKE THE
COAST LINE to MACKINAC

NEW STEEL PASSENGER STEAMERS

SPEED, COMFORT AND SAFETY.

D&C

The Greatest Perfection yet attained in Boat Construction. Luxurious Equipment, Artistic Furnishing, Decoration and Efficient Service.

To Detroit, Mackinac, Georgian Bay, Petoskey, Chicago

No other Line offers a Panorama of 460 miles of equal variety and interest.

Four Trips per Week Between

Toledo, Detroit and Mackinac
PETOSKEY, "THE SOO," MARQUETTE AND DULUTH.

LOW RATES to picturesque Mackinac and return, including Meals and Berths. Approximate cost from Cleveland, \$19; from Toledo, \$16; from Detroit, \$13.50.

Send 2c. for Illustrated Pamphlet. Address,

A. A. SCHANTZ, G. P. A., DETROIT, MICH.

Every Day and Night Between

CLEVELAND,

PUT-IN-BAY

and TOLEDO.

Day and Night Service Between

... DETROIT AND CLEVELAND ...

Fare, \$1.50 Each Direction.

Berths, 75c., \$1. Stateroom, \$1.75.

Connections are made at Cleveland with Earliest Trains for all points East, South and Southwest, and at Detroit for all points North and Northwest.

Sunday Trips, June, July, August, September and October Only.

Detroit and Cleveland Navigation Company.

