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NEW YORK building matters have again a gloomy appearance. Mr. Parks seems to have everything his own way among the housesmiths and bridgemen. His propositions are "carried with whoops," and strikes of iron-workers are of constant occurrence. The steam-pipers, also, have struck, delaying several large buildings; and the walking-delegates are said to threaten to stop building operations for six months longer. It is needless to point out that the families of many workmen will be in distress before that time expires. That the employers will recede from their position is unlikely. They have been so near victory, and they are, either secretly or openly, supported by such an immense majority of the building mechanics of the city, that it would be foolish of them to retreat; while their exposure of the methods of the walking delegates means war to the knife on the part of the latter, and no durable peace is probable until one party or the other is utterly routed. Meanwhile, the air is full of rumors that the price of labor is likely to fall. Building operations have become so restricted, on account of the general feeling that wages were forced up to a point not warranted by the demand, that there are likely to be many men unemployed for the remainder of the season, and they would be foolish not to make concessions to keep themselves at work.

UNION matters in New York are becoming interesting in certain ways. The former treasurer of the Brooklyn Stonecutters' Union has been lodged in jail, on a charge of embezzling about twenty-seven thousand dollars, which had been extorted from builders, in the shape of fines, or as payments for averting strikes, and which, as the union men think, belonged in the union treasury. The money has been traced to him, and it appears from the books of the bank in which it was deposited that he drew it out on his personal check, leaving a balance to the credit of the union of forty dollars. He immediately started for Europe, where, as he says, he "had a good time," and, on his return, was arrested, on complaint of the union officials. The defence in this case is not less remarkable than the accusation. It is not denied that the defendant met with some other union magnates in a saloon, and, after consultation, went to contractors and builders, and demanded money from them, under threats of a strike, and that the demand was complied with; and the defendant's counsel hints that the proceeds were divided among the ingenious magnates; but, on behalf of the defendant, it is claimed that these various sums never belonged to the union, or were intended for its treasury, but were the private perquisite of the treasurer and his ingenious associates. If the twenty-seven thousand dollars never belonged to the union, it is obvious that the union cannot charge its treasurer with stealing them; and, although, perhaps, strait-laced and squeamish persons might see something objectionable in the way in which they came into Mr. Murphy's pocket, the union, at least, has, according to the view of Mr. Murphy's counsel, nothing to complain of.

The defendant's counsel had, apparently, an impression that the jury would look more favorably upon his client if it knew that such transactions were quite usual in labor circles; for he is reported to have indicated, by his questions to talesmen, his personal knowledge of the fact that more than two hundred thousand dollars had been paid within the past year by builders and contractors to union officials under the name of "fines," "assessments," and "expenses." It is said that some of the union men, on the return and capture of their treasurer, went to see him in jail. He told them, with charming frankness, about his trip to Europe, and said that he had five thousand dollars left which he would give them if they would have him set at liberty. They replied that this was not in their power, and he said that he would then use the money "to hire counsel to fight them as long as he could." How long five thousand dollars will enable Mr. Murphy to postpone his fate remains to be seen.

THE legality of the various State laws for the registration and licensing of architects is, we are inclined to think, open to a doubt, so far as architects out of the State are concerned, which it would be interesting to have settled by the courts. There is no question that the police power of a State extends far enough to cover licensing its own citizens to practice architecture, medicine, or any other difficult art in which the health of the community might be endangered by malpractice, but no State can exercise such police power over citizens of another State, and, if a person in one State chooses to employ an architect of another State to make plans for his house, it is doubtful whether, under the Constitution of the United States, the architect can be compelled to pay a fee, and take out a license, before he can do the work required of him. It is well known that some architects openly advocate laws licensing architects as a protective measure against competition from architects of other States. So far as such laws are protective, either in intention or practice, they are plainly in conflict with the Constitution of the United States, which expressly forbids any restriction whatever on freedom of trade between the States. How far the employment of architects comes under the definition of trade is a question which courts, so far as we know, have not yet considered; but it would be for the public advantage to have this provision of the Constitution defined in greater detail, and a stop, perhaps, put in this way to the practice, now rapidly increasing in the States, of laying burdens on non-residents which, even if legal, are felt as oppressive, and may form precedents for exactions which will lead, later, to civil war.

THE newspapers of the city of Manchester, New Hampshire, are agitated over the apparent forgetfulness of certain citizens and corporations of the existence of an official inspector of buildings for that municipality, who is authorized, according to the city ordinance, "to examine the condition of all buildings undergoing alterations or being erected within the city limits, and to serve notice in writing upon the builders, owners or architects of such structures as he deems to be unsafe or insecure, by reason of the mode or manner of construction, or the material used in the construction thereof; and shall order such changes in the mode or manner of construction thereof, and the materials used, as he shall deem necessary for the public safety."

THERE is a theory among lawyers that all forms of public control of building operations are illegal and unconstitutional; and that every man is entitled to erect upon his own land whatever sort of building he chooses, so that it does not unreasonably shade his neighbors' windows, or the public streets, or annoy his neighbors or the public in any other way, and that he holds himself responsible, civilly and criminally, for any injury caused to life, limb or property through defects in its materials or construction; and, as is well known, some of the best architects think that building laws and building inspectors promote bad building, by relieving owners and contractors of the direct responsibility placed on them by the common law, and throwing it upon the inspector, or rather, throwing it away altogether, for an inspector cannot

be held to any responsibility for his official acts. Whether these views are well founded we will not attempt to say; but there is no doubt that, if inspection is to be of any value, it must be thoroughly competent and perfectly honest. We have, of course, no reflections to make upon the official inspector for Manchester, but architects will agree that in small cities generally a combination of these qualities in the inspection of buildings is extremely rare. Even in what the Germans call the "million-cities" liberal salaries seldom attract competent men, and in smaller towns, in which salaried offices of this kind are almost always divided around among the members of a little ring, without control from Citizens' Associations or any other instrument of public opinion, incompetency and corruption flourish. We will give the inspectors of buildings the credit of being, as a rule, far more honest than many other town officials, but they rarely know anything of building beyond the rudiments of local practice, even if their qualifications extend as far as that; and yet the Manchester ordinance, like that of many other places, gives them absolute power to enter upon any structure in process of construction or alteration, and to stop any work, and reject any material, that they choose, and to order any other material used, and any kind of work done, that they alone may "deem necessary for public safety." It is hardly conceivable that, in these days of almost universal corruption, such powers should not be abused; and architects know that they are abused to promote the interests of favorite contractors, and injure those of their rivals, or to force the use of certain materials, at the same time that the art of building is little, if at all, benefited, some of the grossest architectural malpractice taking place under official approval. It is very possible that the official inspection of buildings may be made useful to the community, but only careful, competent and honest inspection is of any value, and even this should be guarded by ample restrictions, and by the power of appeal; while the putting of absolute and arbitrary power into the hands of officials whose competence or honesty are questionable simply puts a premium upon oppression and extortion.

THE Commission just created by the Massachusetts Legislature to study the question of the extension of the powers of municipalities to take land by eminent domain has an interesting task before it. Under the present laws, a city which desires to widen an existing street, or lay out a new one, can take only just so much land as is requisite for the street itself, leaving the abutters, whose lots may be cut away so as to spoil their value, to make the best of the situation. This rule has its inconveniences, both for the abutters and the municipalities, and it is proposed to give municipalities authority to take, under competent advice, land outside of actual street-lines, which, when the street is laid out, can be disposed of to advantage in connection with other lots, or may be sold under restrictions which will improve its value, and enhance the beauty of the street itself. As an illustration of the advantage to the public of a more extended authority of this kind, the Rue de Rivoli, in Paris, will occur to many of our readers. This was once a narrow, unattractive passageway, bordering the north side of the palaces of the Louvre and the Tuileries, and the garden of the latter. With characteristic comprehension of the requirements of the case the Parisian municipal administration, about a hundred years ago, took advantage of the authority granted by the French law, and seized all the estates abutting on the north side of the passageway. Enough was then cut off from the front of the estates to widen the passageway into a spacious street, and the remainder of the land, now enormously enhanced in value, was sold, under restrictions limiting the levels of cornices and string-courses, the proportions of fronts, and the disposition and proportion of the arcade which extends the whole length of the street at the sidewalk level. The result of this operation was not only to produce the beautiful street which every tourist admires, but, by the enforced uniformity of the north side, to add greatly to the effect of the more broken mass of the palace opposite; and it is interesting to observe that, after the lapse of a century, notwithstanding the restrictions, which apply to new buildings as well as to old ones, the locality is as much sought after as ever.

IN the case of the newer Boston parks, a feeble control has been indirectly obtained over abutting buildings by means of a contract, permitting the owners of such buildings to use the park drives for access to them in consideration of observing

certain specified restrictions; but, as an abutting owner could easily free himself from these restrictions by entering his house from a side street, or in some other way, they are, necessarily, of a very mild character in comparison with those which might be imposed in an actual sale of the lots. Taking, for example, Audubon Circle, in Boston, one of the most painful examples, even in this country, of wasted opportunity, nothing would have been easier, under such a law as is now proposed, than to reserve the land for a hundred feet in depth around the perimeter of the circle, and sell it under restrictions as to the architecture of the buildings erected upon it, similar to those which have made the Place de l'Étoile one of the most magnificent spots in Europe. It is true that the diameter of the Place de l'Étoile is about twice that of Audubon Circle, but the latter is not much smaller than the Rond-Point of the Champs-Élysées, and might easily have been made even more charming. To architects, who mourn sincerely the abortive attempts at something like civic architecture which they continually meet with in this country, the proposed Massachusetts law seems to offer a possibility of better things for the future; and the profession can, we imagine, be depended upon for intelligent and earnest support of the movement.

THE project for a system of underground freight lines in Chicago seems likely to be carried out, under rather curious circumstances. A few days ago, the grant to the Illinois Telephone and Telegraph Company, which permits it to maintain a system of wires in the city until the year 1939, was enlarged, by vote of the City Council, so as to authorize it to build and maintain, during the same period, an underground system of freight lines in any of the streets and alleys of the city, and to carry its wires through any tunnel so built, the condition being added that fifty miles of tunnel should be constructed, and in operation, within ten years. The passage of the ordinance seems to have been rather a surprise to the citizens, but it is doubtful whether an excellent project could have been put more judiciously in the way of being carried into execution. The telephone company is understood to have plenty of money behind it, and has a serious interest in providing a safe and convenient means of carrying its wires about the city, so that whatever is done is likely to be well and thoroughly done; and, for its own sake, it would make the freight service as satisfactory as possible to its subscribers.

IT may be observed that the difficulties attending a great extension of business, to which Mr. Carnegie, with his usual good sense, has often called attention, are not without parallel, even in the modest field of architects' offices. We have heard of an office, in which half a hundred men, or more, were constantly employed, where it was quite customary for the draughtsmen, who received double pay for night work, to sleep, or otherwise amuse themselves, during the day, in order that they might be obliged to finish their drawings at night. It is obvious, therefore, that, as these worthy youths got paid for doing nothing in the daytime, and then got paid double for doing at night what they ought to have done during the day, what work they did, cost the architect who employed them three times as much as it would have cost an architect with honest draughtsmen, and took twice as long to do. As draughtsmen's wages form much the largest item of expense in most offices, the effect of service of this sort upon the annual balance is very material, and the complaint of some of the busiest American architects, that the balance of profit at the end of their business year is very meagre, is probably justified. It will be said that such unfaithfulness on the part of draughtsmen is impossible and inconceivable; but young men are thoughtless, and easily persuaded by self-interest, besides being often really sleepy in the daytime, so that bad example, and lack of efficient supervision, may produce results of which the men themselves are hardly conscious. Moreover, the modern American practice, made necessary by the variations in business, and the hurry with which work is done, of employing draughtsmen for a month or so, and discharging them as soon as the immediate occasion is past, tends strongly to make them indifferent to the interests of the office, and to look out for their own, even at the cost of some reproaches of conscience for disloyalty to an employer who, after all, has, probably, no personal interest in them, and whom they may never see again after their short engagement is over.

THE PREVENTION OF LOSS BY FIRE IN THE UNITED STATES OF AMERICA.¹

THE problem presented to the underwriters of the United States and to the community as a whole is totally different from any problem that could be found in any European country, especially in Great Britain.

First, the climate or climates of the United States vary from those of Europe in matters that have an important bearing upon the construction of buildings. In this essay I will omit the conditions of the extreme South and of the extreme North, dealing with the great section which extends from the Atlantic to the Pacific, between parallels of latitude 35° to 40° N. In this section will be found the larger part of the population, the greater number of factories and workshops, the principal cities and public buildings, and by far the greater number of the public-school buildings in which the sessions of the common free schools are held.

Within this section there are very great variations between summer and winter, the common range of the thermometer being from 30° below zero Fahr. — (34° Cent.) — sometimes lower — to 90° Fahr. + (32° Cent.), and sometimes higher. There is also a great variation in the constant of humidity. On the whole, the entire section may be considered dry as compared to the average of Great Britain until we reach the extreme western coast, where the climate of Oregon and Washington more nearly resembles the humid climate of Great Britain.

The next variation from European conditions is to be found in the huge abundance of timber, both resinous and hard wood, and the relative scarcity of good building-stone in the earlier period of the history of the country. As yet no building-stone has been discovered corresponding to the stone which is so much used in France and Belgium, which can be cut and carved like cheese, but hardens like iron on exposure to the atmosphere for a short period. It therefore happened that the best material for the construction of dwelling-houses in the early stages of the growth of towns and cities and throughout the country districts was wood, disposed in a suitable manner and properly finished within and without, rather than brick or stone. It is also true that when these latter materials are used in the ordinary way, that is, without excess of cost in building thick walls with air spaces in the walls to prevent ill effects of cold, heat and dampness, they are alternately affected by heat, cold and dampness in excess, from which properly constructed wooden buildings are free. In the extreme cold of winter brick and stone walls become chilled, presently gathering humidity from the atmosphere within the dwelling or building, making the house very damp and difficult to heat; whereas, in the hot summer, brick walls heat very rapidly and become intolerable unless expensively constructed with air-spaces. On the other hand, wood is well known to be among the best of the non-heat-conducting mediums, and when disposed in thick sections of heavy mass the building of wood or timber, with properly constructed roof, is warmer in winter, cooler in summer, more easily heated and ventilated, and in every way a more sanitary building than any other kind yet devised except at very heavy relative cost.

The typical dwelling of the early settlers was therefore the log cabin, the most comfortable and suitable dwelling that could have been devised or constructed at any moderate cost within the means of the early settlers. The next typical dwelling-house, built by the richer citizens when the various Colonies began to prosper, was constructed in what is now known as the Colonial style by well-trained mechanics who brought their conceptions from England. In the early period these dwellings were constructed of oak timbers, heavily framed, covered-in with very thick boards, nailed on with wrought-iron nails; often filled in between the wood and the inner plastering with brick and then finished in a very solid manner, often, in principal rooms, with panels in the old English style. These broad, well-proportioned Colonial houses left nothing to be desired in comfort, convenience and safety at the standard of that period and under those conditions. Many still exist, some of them over 200 years old. One part of one of them in my own town is about 250 years old. After passing through a great variety of stages of very bad design, the best architects of the country are now bringing their clients back to this old Colonial type. It is restful to witness the increasing number of these dwellings scattered around amid the crazy roofs and bad imitations of European styles with which so many of our towns and cities are infested.

This solid method of construction, both of town and country buildings, however, gave place to a very dangerous type of building from the underwriter's point-of-view, when the circular saw was applied to cutting up the solid timbers into plank, joist and scantling of various kinds, which have been put together in what has sometimes been called basket-framing, leading to the construction of buildings of a cellular type; the light frames being put together in such a way as to be very firm and strong by bracing and boarding on the outside, or covered-in by brick walls in cities; the plastering within on wooden lath and placed on the face of the inside of the frame; partitions constructed in the same way and floors of the same kind, so that the result is a building pervaded with cells of wood very difficult to cut off from each other, communicating with a hollow ceiled roof of the same type of construction, so

that the largest possible loss by fire is assured from the least possible cause.

The change which has been brought about in factory construction, under the influence of the Factory Mutual Underwriters, has not been in giving up the use of wood or in any effort to construct fireproof mills or workshops, but in reverting, one may say, to the heavy timber construction of the Colonial period and the disposal of plank and timber within brick or stone walls in such a way that there may be no concealed spaces through which fire may pass out of reach of water. In that way and by evolving suitable safeguards and means of protection, the whole system of constructing the textile factories, paper-mills and workshops has been rendered safe and suitable. The losses by fire within the risks which are under the supervision of the Factory Mutual Underwriters have been, in the older companies, for fifty years less than fifteen cents per year on each hundred dollars (.0015 per centum) of insured property; and during a period of more than seven years the losses within these risks have been less than four cents per year on each hundred dollars (.0004 per centum) of insured property, or about one-fifteenth part of the loss on insured property outside their range. Their influence is now pervading sections of the country which it has only lately reached, and a profound change is coming over what may be called industrial architecture, since the prevention of loss by fire in factories and workshops of slow-burning construction has been made an applied science, of which the rules and practices are easily mastered.

Having drawn attention to the different conditions which govern architecture and building in the United States, as compared with European states, we may now take up other conditions. It would have been a misfortune had the people of this country adopted more durable methods by constructing city buildings, factories and workshops of a more permanent kind than they did construct; such buildings would have been of course at a much heavier cost, they would have become an encumbrance upon the land, and yet of such solid construction that they might have been incapable of being converted to the right use of modern mechanism. It is only about thirty years ago that a most skilful and competent mill-engineer, under whose supervision some of the largest textile factories had been constructed, made the remark that it was not judicious to plan any factory building for a duration of more than twenty-five years except as to the foundations. Had he made that remark a few years later he would not have excepted the foundations. The textile factory and many other industrial buildings constructed fifty years ago were not over 50 feet, often less, in width, and some of them were eight or nine stories high. The next type was a factory or workshop 60 feet in width, five to six stories high. Neither type of building is fit for modern conditions, and no person could run modern machinery with any profit whatever in the old type of narrow and high factory building. The modern textile factory is seldom more than three stories in height for carding and spinning; one story for weaving. Wherever there is room machine-shops are built of one story, and many other industrial buildings are now being constructed in a similar way.

The diffusion of light by ribbed or prismatic glass assures an even daylight over very wide areas, with freedom from glare near the windows.

The rules and methods of slow-burning or mill construction and for the diffusion of light are now being established throughout the United States beyond the area of the influence of the Factory Mutual Fire Insurance Companies, by the distribution of documents from the Insurance Engineering Experiment Station now beginning its work under the direction of the writer.

We may now take up the growth and construction of towns and cities. In that, again, a rapid construction of wooden buildings for temporary use has been and still is necessary for the housing of the population. Throughout the middle and the far West, where public lands have been disposed of in quarter-sections of 160 acres each, towns have been planned on rather a grand scale with a view to future growth into cities. In very many cases that growth has been attained within a very short number of years. The first buildings, hastily constructed of wood, soon give place to a better class, and if the town grows, a wider area may be covered with wooden buildings detached from but very close to each other, the only conspicuous building of a durable kind being the public common school-house, for the construction of which reservations have been made from the public land. Presently the detached wooden buildings give place to brick blocks of a more permanent character, and yet not suitable for any very long duration. In the older cities of the East, narrow streets may be bordered by alternating very old wooden buildings and modern structures, safe or unsafe as the case may be.

Hence comes the necessity for very completely organized and efficient fire-departments, and yet occasional conflagrations occur; witness the great fires in Chicago and Boston. These conflagrations were not unmitigated evils. They were disastrous to individuals and to part of the insurance companies, but they cleared away a great ruck of unsafe and unsuitable buildings, made the way for readjusting lines of streets; and both in the end worked improvement in the cities at the cost of the individuals who suffered. The Boston fire, however, did not discriminate wisely. It approached quite a large section of old and dilapidated buildings, occupying land leased nearly 100 years ago upon a ground rent — this lease is so near its termination that it is for the interest of the owners not to

¹ A paper by Edward Atkinson, LL.D., Ph.D., President of the Boston Manufacturers' Mutual Fire Insurance Co., Boston, Mass., U. S. A., prepared for the International Fire Prevention Congress, held in London, Eng., July 7-10, 1903.

remove these old buildings, but to get all they can out of them, so that they remain a blot and menace in the centre of the best business district. Had the Boston fire exerted sufficient discrimination to cross a street and to wipe out that section on the leased land, it would have been of yet greater benefit to the city of Boston. These long ground rents are very uncommon. They are now prohibited in many States, and where they exist are obstructive to the public welfare.

It thus happens, that what may be called unsafe methods of construction have been both necessary and expedient in the progress of the development of the country, and that more permanent buildings which would have absorbed a much greater part of the small capital available would have been an encumbrance rather than a benefit. The methods of construction of the country have, therefore, adapted themselves to the materials, to variations in climate and to conditions of growth. True types of architecture, like the old Colonial dwelling, have occasionally been evolved, while very many bad types have been practised in the effort to import architectural designs and methods from European schools, and to work them into buildings for which they were unfit.

Again, American architecture in cities is now being diverted from true lines of development and of art by the construction of self-supporting steel-framed buildings of many stories in height, commonly called skyscrapers, to which a few words will be given later.

Such being the quality and the conditions of the general average of industrial buildings, shops, warehouses, etc., constituting ninety-five per cent of the insurable value of property in the United States, outside the lines of the Factory Mutual Companies, what are the conditions to which the prevention of loss by fire can be applied? They are either the incapacity of architects and builders to apply conditions of safety to the construction of ordinary buildings, or the yet greater incapacity and unwillingness of owners to change from the bad methods even at the instance of an intelligent architect. Faults are committed and re-committed by owners, which might be remedied without increase of cost and very often at less cost, if it had not become the habit of owners and occupants to consider their duty ended when they had negotiated a policy of insurance covering whatever risk, often avoidable at a lessened cost, they might chance to commit. The next element of danger is the gross and criminal carelessness of the occupants of such insured premises.

The ash-heap of the United States averages one hundred and fifty million dollars (\$150,000,000 = £30,000,000 sterling) a year, two-thirds of which is due in about even proportions to the inattention, incapacity or negligence of owners, occupants, builders and architects alike.

Or, to put the case in another way, the ash-heap, averaging one hundred and fifty million dollars (\$150,000,000) a year, which might easily be reduced by one-half; excess of premiums and heavy cost of insurance, amounting to at least eighty million dollars (\$80,000,000 = £16,000,000 sterling) a year; the excess of water-supply and cost of fire-departments, which may be estimated at twenty to fifty million (\$20,000,000 to \$50,000,000 = £4,000,000 to £10,000,000 sterling) more, makes the aggregate remediable excess of cost of fires in the United States at least two hundred million dollars (\$200,000,000 = £40,000,000 sterling) a year, all of which may be saved. This may be attributed mainly to the restless energy and severe work given to attaining the main point of large production from resources as yet only beginning to be worked upon, and their distribution, to the neglect of the lesser elements and close economy in the small details, and to the total lack of any conception on the part of the owners and occupants of buildings, that they themselves are the only persons who can prevent loss by fire, by attention to construction and suitable safeguards; fire-departments being only capable of dealing with the fires when they occur, and underwriters being only capable of showing the way and giving advice by which the heaviest losses may be saved.

The safeguards which are now being introduced, notably the automatic sprinkling-system, might, in the judgment of the writer, abate more than one-half of this annual loss. The larger part of the losses are in the large workshops, factories, warehouses, and shops for the distribution of goods. They occur in a relatively small number of fires, each of large proportion. They occur, in by far the large majority of cases, in buildings which, although not good models, are capable of being well protected by automatic sprinklers, by standpipes and hydrants at vantage-points and upon the roofs, so adjusted as to be worked by the public fire-department, and by care in occupancy.

We now come to the position of underwriters, other than the Factory Mutual Underwriters, in this matter. Twenty years ago, or thereabout, it was thought to be the function of the stock underwriter or manager of a stock insurance company to take risks as they might happen to be at a rate which it was assumed would cover the risk, leaving a margin of profit. This system worked very well down to the date of the Chicago fire, but under it no provision had been made by a large part of the insurance companies for the hazard of an extensive conflagration; hence the bankruptcy of very many insurance companies. An advance in rates was made, but as yet no system of inspection was established before the Boston fire, and that, again, rendered bankrupt nearly every insurance company in Boston and many others. Shortly after, the underwriters, having found out that betting on bad risks, even at high rates, was an unprofitable business, began in Boston a system of inspection, putting conditions

upon risks, re-rating, and establishing premiums according to compliance with conditions.

This system has been extended throughout the country, elevating the profession of the underwriter and tending to the greater security of the community and promising, hereafter, greater immunity from large losses. In fact, a large reduction in the proportion of loss to property insured has been made in recent years. The losses are or may be larger in the aggregate, but the property calling for contracts of indemnity against loss by fire (now \$25,000,000,000 = £5,000,000,000 sterling insured) has increased by such leaps and bounds as to make the proportion of loss to the aggregate hazard somewhat less than it was a few years since.

In this way the lines of future improvement are well marked. The different unions and combinations of the stock underwriters have established testing laboratories notably in Chicago, where they are dealing with very many problems that do not arise with the Factory Mutual Underwriters, and with some of those on which they are working in harmony with us.

On the other hand, the right methods of building factories and workshops of timber, stone and brick have been fully established, and the methods of protecting by safeguards have been brought to a final condition in the present state of the art.

The invention of the self-sustaining steel frame building, developed in the construction of what are known as skyscrapers, has brought an entirely new problem before the underwriters as well as the engineers. In the first instance it was assumed that because a building was made of incombustible material it might be considered indestructible by fire, with very slight protection to the metal from heat. The Factory Mutual Underwriters distrusted this theory and have, with rare exception, kept unprotected steel beams from being used to support plank floors, and have, in recent years, caused cast-iron posts, formerly used in the support of factories, to be disused, the preference being given to squared wooden posts.

With the increasing cost of timber and possible scarcity of large logs it became expedient for the representatives of the Mutual Underwriters to be prepared for so-called fireproof construction. To that end the Insurance Engineering Experiment Station has been established under the charge of Prof. Charles L. Norton, and under the general direction of the undersigned, for testing both by fire, by laboratory experiments, and by lapse of time all the different methods of so-called fireproof construction and all the fire-resistant and fire-retardant materials for inside finish. Up to this date they have published five reports.

The experience of the underwriters who insure the steel-framed buildings has not justified the great confidence with which the work was undertaken. Very destructive fires have occurred in buildings of this type, which have been filled with combustible contents. In some cases it has been the judgment of the appraisers that the total loss on contents of very large value has been due to the resistance of the building; whereas, in buildings of ordinary construction which fell after a fire of moderate duration, there have been large salvages on damaged goods.

Several of the methods of protecting steel from heat have failed, and while the building has stood well and has, I believe, in all instances been capable of repair, there has been much damage by heat, especially in the upper stories. It has proved that the prevention of loss by automatic sprinklers is as necessary in an incombustible building as it is in any other. A large portion of the biggest department-stores are now being equipped. Other fires in incombustible buildings, causing very little damage, have generated so much suffocating smoke as to make them hazardous and to lead toward the danger of a panic.

But beyond this question of fire-hazard is the yet more important problem of corrosion, a factor which at the beginning attracted little or no attention. It, unfortunately, happens that the type of steel used in the construction of buildings is more subject to rapid corrosion than any other type of metal derived from iron ore. Whether or not the skyscrapers will be safe for any considerable period of time, say for a generation, is now an open question. How to protect steel is being made the subject of the most exhaustive investigation, and will be one of the most important subjects dealt with by the Insurance Engineering Experiment Station.

It may happen that we passed through the age of unbaked clay to stone construction covered-in with timber roofs, then to timber, brick and stone in combination; in this country, through the age of the log house to the period of plank boards and scantling, or combustible architecture, so-called; then to the period of iron, used mainly outside, filled-in with brick for walls, iron posts and beams within; thence to the age of steel in the present type, from which we may pass on in the upward spiral again to the age of clay in its various forms of brick, concretes and cements, in that way combining stability, durability and safety from the danger of fire from within or heat from without.

If the foregoing explanations of the condition of the United States in respect to loss by fire are sustained, the general conclusions may be stated as follows:—

First.—Entails upon land and succession by primogeniture are either forbidden by law or by common practice. Estates in land as well as in personal property are customarily distributed in equal proportions among children without regard to sex. Settlements in trust are limited in all States, I believe, and might perhaps be more strictly limited with advantage. Spendthrifts and incompetents can

only be protected by trustees through about one generation; after that the tools of production, whether in land or capital, fall by distribution to those who may use them best.

Second.—Public buildings are now being or have been constructed, with more or less regard to duration, many of them for long duration. Factories, workshops, railway termini, industrial and commercial buildings are and have been built with a view to short duration, in order to give place from time to time to buildings that may be adjusted to the improved conditions of each generation or shorter period. Dwelling-houses in cities have been constructed with a view to longer duration, but with scarcely an exception the sites of dwelling-house districts have within one or two generations passed over to use for business purposes. In many cities this is now going on at a more rapid rate than ever before. Dwelling-houses of the best class, capable of useful occupation for fifty years, are being pulled down to make way for the expansion of trade and commerce. The adjustment of buildings to the purposes of each generation is almost as necessary and almost as rapid as the changes in the mechanism which is put into operation in industrial buildings. The factory or workshop which does not throw out mechanism, perhaps but half worn, in order to adopt the latest improvements, is sure to be left in the close competition on the very small margin of profit which suffices for the modern method, and of late the buildings must often be displaced as well as the machinery.

The former wasteful methods of leaving agricultural machines to rust in the fields during the winter has given place in many cases to a more intelligent method of combination among a few farmers, to buy each year's machine and wear it out in a single season, or, perhaps, in two seasons, in order to be ready to take over the better one which is sure to come in a very short time.

Workmen with very few exceptions also adjust their methods to these constant changes. The efforts of the small proportion of the workmen who belong to unions to limit the applications of inventions are futile.

In other words, the term "fixed capital" has little application even to the buildings and machinery in use in the United States. The inventor is the most destructive agent, and in this work fire may be said to cooperate to the grave loss of the individual or the community for the moment, but helping on and opening the way to further improvement. "There is nothing constant but change," and on the record of fifty years or more for which we have complete and adequate data, in spite of the destruction by fire and the absolute loss for the moment to the community—in spite of careless methods in construction, yet through the constant application of modern science and invention to all the arts of production and distribution, the working people of the United States—using that term in its limited sense, and designating only those who do the manual and mechanical work of the nation, have secured, decade by decade (subject to temporary fluctuations of little moment) a constantly increasing share or proportion of a constantly augmented product.

It may not have been wholly the purpose of your request to have me submit this paper, that I should present the general conclusions, but one who regards the loss by fire as, in one sense only, one of the factors in the development of the social conditions of the United States can hardly fail to deal with the whole subject in its broad aspect rather than on its strictly technical side.

The amount of insurance now carried by the Factory Mutual Fire Insurance Companies is in round figures twelve hundred million dollars (\$1,200,000,000 = £240,000,000 sterling), of which 75 per cent, more or less, is covered by the older companies within very strict limits as to the kinds of risks insured at the highest standard of construction and protection. The younger companies are rapidly extending the work over other classes of risks, bringing them by successive measures to very full protection by automatic sprinklers and other safeguards.

The series of documents mainly issued by the Boston Manufacturers' Mutual Fire Insurance Company, of which the undersigned is President, during the last twenty-five years—of late supplemented by documents issued by the Associated Companies—have been published for the purpose of bringing construction and apparatus to a fixed standard.

First.—General plans and specifications for the mill or slow-burning construction of factories, workshops and storehouses.

Second.—The lay-out of reservoirs, pumps, pipes and hydrants in due proportion to the requirements in each case.

Third.—The lay-out of standard protection with automatic sprinklers, sizes and proportions of pipe and distribution of heads.

Fourth.—Steam fire-pumps constructed at the standard established mainly by John R. Freeman, C. E., now one of the executive officers of the Factory Mutual System.

Fifth.—Standard valves, meters and by-passes for water-supply; and standard air-valves used in connection with the automatic dry-pipe sprinkler-system, for the protection of storehouses and other buildings that cannot be heated in winter.

Sixth.—Glazing for the diffusion of light with ribbed or prismatic glass, adapted to the special conditions of each building or section of a building.

Seventh.—Standard fire-resistant doors and frames, of wood encased in tin.

Eighth.—Standard of wired-glass windows and frames, often approved where light is needed, and often accepted in preference to movable shutters.

Ninth.—Standard of the fire, flash and viscosity tests of mineral lubricating oils.

Tenth.—Standard of mineral illuminating oils and of lamps in which such oils may be used for lighting.

Eleventh.—Standard lanterns for the use of watchmen or mechanics employed in night work, both for the burning of sperm oil and kerosene oil.

Twelfth.—Standard for the lay out and safeguards for applying electric power or light.

Thirteenth.—Standard for housing hose and fire-appliances in mill yards, with specifications for the equipment of such houses.

Fourteenth.—Standard general organization for mill fire-departments.

Fifteenth.—Standard forms for the regular self-inspection of the insured mills and works, subject to variation according to the nature of the industry.

Lists are printed, changed from time to time as occasion requires, of a sufficient number of the makers of high repute of all the types of apparatus above named, and of engineers and mill contractors, in sufficient number in each department to maintain fair commercial competition, but upon whom full reliance may be placed by our members to maintain the Mutual Underwriters' standard in all the work or apparatus which they may supply. In this way assurance is given, especially in respect to steam-pumps, hose and other fire-apparatus, that there will be no attempt to impose what may be called cheap and nasty apparatus upon buyers, while buyers will be assured that the Underwriters' standard will be maintained at fair charges for the service. Our members are also relieved in great measure from the pressure of vendors of patent oils, belt-dressings, lighting and heating apparatus, new types of sham materials and the like, because the vendors know very well that before any of their nostrums are bought or even accepted for trial, samples will be sent to the laboratory of the Mutual Underwriters, where many frauds and dangers have been exposed.

A physical laboratory is maintained by the Associated Factory Mutual Companies, to which any kind of oil, hose or other material may be sent for physical tests, chemical tests being made at the Massachusetts Institute of Technology. As soon as the requisite buildings have been constructed, fire and heat tests will be made by the Insurance Engineering Department in respect to all so-called fireproof or fire-retardant materials that may be used either for the protection of wood or steel or in the construction of buildings. It may be added that the cost of making surveys, lay-outs, inspections, special and regular, including the cost of making and executing plans, of which an example is sent herewith, and for the services rendered by the Bureau of Inspections on joint account and at the joint expense of the Associated Mutual Companies, is covered by a charge of one hundred and fifty dollars (\$150) on each million dollars of insurance written.

The development of an applied science for the prevention of loss by fire in cotton, woollen, paper and silk mills, cordage factories, machine-shops covering large amounts of woodwork, cotton, hemp and jute warehouses and the like, all subject to special or extra hazards, in some respects subject to almost explosive conditions, has not been based on any preconceived or *a priori* plan. The system of Mutual Insurance originated with the late Zechariah Allen, of Providence, R. I., in 1835, making slow headway down to 1850, when the Boston Manufacturers' Mutual Fire Insurance Company, of which the undersigned is the chief executive officer, was organized. From that date the conduct of the work was on what might be called a purely empirical plan; occasional inspections by men who had been trained in mill work or in the management of mills without special scientific attainments. This continued until about 1875, when it became manifest to the undersigned, then an active director, that unless new safeguards and new methods were devised to meet the increasing hazard of wider areas, greater concentration and proximity of factories, of mineral lubricants, new and dangerous chemicals in print-works and dye-works, and, presently, electricity, there might be a calamity and call for an assessment which would check and might destroy the whole mutual system, insuring in all the companies, in 1879, less than two hundred million dollars (\$200,000,000 = £40,000,000 sterling). In that year the writer became President of the Boston Manufacturers' Mutual Fire Insurance Company. He began by first investigating the automatic sprinkler, and with the support of only two manufacturers who had adopted it on its merits, he pressed the adoption of the automatic-sprinkling system upon unwilling and incredulous manufacturers. It took fifteen years to bring the protection of the main mills and works nearly to a conclusion.

In 1895, the most destructive fire to which the companies had ever been subjected, originated in what is called the spontaneous combustion or slow oxidization of the wooden lagging of a ten-foot cylinder of a compound engine in a room for which sprinklers were under contract but had not been placed. Under conditions that might never occur again, the loss of over a million dollars was distributed among the Mutual Companies. In that year, however, nearly complete protection by sprinklers in all main mills and works was brought to a conclusion; since that date, 1895, the losses by fire have been less than four cents per \$100 (.0004 per centum) each year, the larger part of this small loss occurring in unsprinkled storehouses, which will all be under sprinkler protection before the end of the present year.

In the interval, as other new causes of danger have arisen, skilled experts have been called into the service in every branch of physical science, except in electricity, in which department at the beginning there were no skilled experts, and the fire-hazard was an unknown quantity. A well-bred engineer was, therefore, brought into the service to study the fire-hazard of electric-lighting; rules for the instalment of electric plants were established, brought to the attention of all the makers of electrical apparatus, and made the condition on which they could put their plants into the factories insured in the mutual system. The rules have been expanded to meet new conditions and new inventions, but have never been materially changed.

The whole subject of lubrication with mineral and mixed oils was made the subject of a complete study. A standard was established, and wherever volatile oils were found in use they were condemned. The Standard Oil Company was induced to change its whole method of distillation, adjusting patent contests, and presently, within a year, putting on to the market such excellent lubricants at so low a price as to cause all the dangerous oils to disappear.

Each subject has been taken up, put under the charge of thoroughly trained engineers and experts, until at the present time the science may be called complete in its application to the special classes of property insured, and to the buildings constructed on the slow-burning principle. Of this, the writer has merely been the executive head charged with the selection of most of the experts, who are now his coadjutors, and bringing about a combination which, as has been stated, in the so-called senior and junior companies now covers risks to the amount of twelve hundred million dollars (\$1,200,000,000 = £240,000,000 sterling) — a very small part, possibly five per cent, of the insured value of the property of the United States.

I may be permitted to add that in the judgment frequently expressed by many of the members of the mutual system, it has performed service in the investigation of all the subjects that have been named, and in saving wasteful expenditure on oils and other material, or in the construction of buildings, more than equal to the cost of the service, even if there had been no contract of indemnity or policy of insurance granted by the companies, and their work had been limited to the investigation and inspections of which record has herein been made.

EDWARD ATKINSON.

A HOSPITAL WARD.¹

THERE are several instances known in new wards constructed upon the latest principles of failures which have been absent from the older and entirely out-of-date buildings, and the reasons have been — in the cases with which I am personally acquainted — not far to seek. The old wards were known to be dangerously unclean, and special precautions were therefore taken to counteract this condition. The new wards were so very bright and clean that anything but perfunctory cleaning was scarcely thought necessary. In the old wards the windows were kept open, and the very walls, innocent of plaster, were porous enough to be an assistance to ventilation. In the new, it appeared that the provision of air inlets in the walls was thought to obviate the necessity of opening the windows.

Another example of this neglect of well-worn principles occurs to me, although it is not directly connected with a hospital ward. The drainage of a certain building was relaid upon modern principles with manholes at every branch and change of direction. The old drains were always well flushed periodically, and thus kept fairly clean. The new drains were supposed to act forever without such assistance. Five years after they were laid, when superintending some repairs, etc., at the building, I made a general examination of the system, and was compelled to use a crowbar to open up the covers of the manholes, which had never been touched since the drains were first laid. The building owner in this case had not realized that manholes were merely constructed for more easy access to and inspection of the new drains than was possible with the old.

One other example — and this was in connection with a ward. The whole of the inlet ventilators were expensively constructed with pipes glazed internally. On revisiting the hospital a year later I found these flues black with dirt. They were never cleaned.

Are not we who build hospitals apt at times to forget the principles upon which we design certain details? It is an accepted principle, for instance, that all angles, internal or external, should be well rounded, yet not many years ago I remember an architect drawing the attention of a class of students to the hollowed skirting between the walls and floors of his wards; then proceeding to point out an arrangement he had devised for preventing the beds being pushed against the walls. This consisted of a square fillet nailed to the floor within half an inch of the skirting — i.e., he had carefully done away with one internal angle to the floor and added two!

I have heard, too, of air-inlets constructed as I have described above, and closed at one end with a fixed grating, which effectually prevented any cleaning.

After all, the great principles to be kept in view in the details of a hospital ward are few and simple, and one of them — not the least important — is the avoidance of all sharp internal angles, deep-cut mouldings, and other not easily cleaned lodgments for dust and dirt, those harbors of disease germs and a source of pollution to the air of the ward. It will be sufficient, in so short a paper as this, to deal mainly with this principle.

Floors.—It may be taken for granted that whatever difference of opinion there may be with respect to the walls, we shall all be agreed that the floor of a ward should be laid on a solid foundation, and that the surface should be as impervious as it is possible to make it. Also that it should be smooth and free from holes or crevices likely to retain dirt or dust. For this reason no one thinks nowadays of using plain jointed soft-wood floors, because in addition to being absorbent the material is bound to shrink, and thus leave any number of crevices for the secretion of dirt and dust. Floor sweepings well wetted and impregnated with soap make a horrible compound.

Modern floors are of several kinds, which vary according to the fancy of the particular architect or the managers of the building. They comprise the following, viz, hardwood block floors, hardwood tongued boards laid in narrow widths, secret nailed and polished; asphalt, terrazzo, patent composition floors such as Eubecolith, etc.

The hardwood floors are most frequently made of oak or teak. Hitherto I have myself adopted kiln-dried maple in very narrow widths. In addition to being an exceedingly hard and unwearable floor, its light color shows up dust much more easily than dark woods, and this, to my mind, is an important detail. It would seem to be very desirable that dirt should always proclaim itself, but those who are immediately responsible for the cleanliness of the floors are, it is to be feared, not always of that opinion.

The most usual finishing to wood floors is beeswax and turpentine highly polished. I believe that if this is regularly wiped over with a wet rag and as regularly polished, it is a very good surface; though no doubt it is desirable to have the surface entirely cleaned off and renewed at intervals.

Terrazzo floors are much advocated on account of their supposed impermeability. I do not think them quite so impermeable as they are supposed to be. After all, the main part of the material is cement, and it is well known that both cement and marble chips are fairly absorbent materials. Indeed, the comparative impermeability of this floor is due to the high polish it receives when first laid, and that is very soon worn off. Perhaps these floors are best treated by being polished with beeswax as for wood floors. Even so, they are very hard to the feet, and the mottled color too easily conceals dirt.

Asphalt is, no doubt, the most impervious of floor materials, but it is of a dark, uneven and bad color, and is therefore seldom used.

My experience of patent composition floors has not hitherto been so fortunate as to enable me to commend them highly. They have some undoubted virtues, however, and the material is more impervious and less subject to the action of acids than any I know. Unless very carefully laid, they appear to be liable to swell and crack. The material can be colored, and when polished the surface is excellent.

Skirtings.—The skirting, if it can be so called, to the floors should be rounded so as to form a good hollow. The most usual radius is from 2½ inches to 3 inches. Latterly I have used 1½ inch only, which is quite sufficient for its purpose, and can be carried round projections more easily than is possible with the larger radius. All that appears to be necessary is to have such an angle as will permit of the whole surface being easily and rapidly cleaned and prevent stagnation of air. It is best formed of the same material as the floor. I have, however, seen hollowed glazed bricks used, but there are too many joints, and the edges of the bricks are not generally even.

Wall-surfaces.—There are practically two opposite principles which govern the material of which the wall-surfaces should be composed, and these are derived from views on that much-vexed subject — ventilation. It would be rather trenching upon this subject, which is large enough for separate treatment, to attempt to discuss whether the walls should be porous or not.

It is safe, however, to assert that at the present time, for hospital-ward walls, at least, impervious walls are mostly in vogue. If we adopt this principle, the next most important consideration is that the surface of the internal faces should be easily cleaned and kept clear and free from dust. In some modern treatment of walls we have, I think, somewhat overlooked this principle, although on the surface it appears to have been carefully studied. I refer to the growing practice of lining the ward walls with tiles. The use of tiles has no doubt given us a more impervious and even surface over a large area, but it is discounted by the numerous joints which no care nor skill in the fixing can make smooth, except in a limited way. The ideal surface would no doubt be an unbroken and polished surface such as obtains on tiles, affording no ledges for the lodgment of dust; but this has been fairly well achieved by the use of enamel paint upon hard trowelled cement surfaces.

It is scarcely possible to obtain a more generally smooth surface than with trowelled cement — Keene's or sirapite, for instance. These can be brought to a polished surface. It is difficult, if not impossible, however, to obtain a really even color. Although enamel paint can be used with decorative effect, pictures would still be required to decorate the walls, and the ordinary framed picture is a veritable dust trap. Therein tiled surfaces have the advantage of painted walls, as they can be decorated with permanent pictures painted on the surface. It would be, of course, too costly to renew pictures every time the ward walls required to be repainted.

It would be possible to cover permanent wall-paintings with glass let in flush with the wall-surface, and I am not sure that this has not been done.

Ceilings.—There can be no question that ceilings should be non-porous, and they are best painted.

Windows.—As to the best form of window for a hospital ward, there appears no general agreement. The most usual is the ordinary

¹ A paper read by Mr. A. Saxon Snell, F. R. I. B. A., in the Section of Engineering and Architecture at the Congress of the Sanitary Institute, Bradford, Eng.

sash window with a hopper above opening into the ward, with spandrel sides to prevent down-draught. It would appear, however, that its forms and construction involve the many angles, crevices and hidden voids which in other parts of the ward we strive so much to avoid. Casement windows with solid frames are at least not open to this objection, though no doubt their advantages in other directions may be questioned.

At Willesden Parish Infirmary I have used casement windows brought down to within 12 inches of the floor, and with hopper next the ceiling. The casements open inwards, and thus form a protection for the bed. It is possible also by opening the windows to their fullest extent to fairly flood the wards with air.

At Charing Cross Hospital, I am adopting a form somewhat similar to what I believe is known as the "Middlesex" window, owing to the alleged fact that it was first used at that hospital. There are five sashes of equal size in the height of the window, all of which (excepting the lowest) are hung on centres and controlled by one rod and lever. The sashes close one upon another, and there are therefore no transoms. The lowest sash is separately hung on the bottom rail. It is obvious that a window so constructed can be opened to a much larger extent than is possible with the ordinary sash window. I should add that all except the controlling lever or the opening apparatus is fixed on the outside of the window.

If it is possible to fix the glass of the sashes quite flush with the inner surface of the sashes, a great advance will be made.

Doors.—Nothing much can be said with respect to doors in a ward. They should be made wide enough to allow of the passage of a bed. It is desirable that the upper panels should be glazed with clear glass, and that because of a principle to which I shall refer later on.

The whole question of the material for joinery might be considered here. Hardwood throughout is generally adopted, where the question of cost is not vital—hardwood oiled or French polished. Its comparative freedom from material shrinkage and its harder or less absorbent surface are great advantages; but here again I think that enamel paint is not much, if at all, inferior.

I am hoping in time to obtain what I may call solid joinery, *i. e.*, built up without panels with the inevitable sharp internal angles which can only be kept clean at the cost of great labor. Of course, it is possible to have solid or flush panels, but shrinkage soon shows up the joints, which then become dust-traps impossible to clean.

There are some Canadian doors now made of which the principle of construction could, no doubt, be applied so as to successfully overcome this difficulty. They are made up of quite small sections of wood very closely fitted together, and sheathed with hardwood beautifully dovetailed on, and the whole is pressed and almost welded together by hydraulic pressure. At present they are made to imitate the ordinary panelled door, but one is being made for me now—as an experiment—of solid soft-wood, sheathed all round in oak.

Furniture.—It is in the furniture and fittings of wards, for which the architects are responsible, that there is a general falling away from the principles of construction we are considering; although I am bound to add that some very notable improvements have been made in late years in the construction of chairs, tables and bedside lockers. The last-mentioned especially call for consideration if only because they are less under observation and control than the furniture which stands out in the open. The tops are now usually of glass or marmore, and if it were only possible to get rid of the closed cupboard it would not be difficult to design them generally so that every part could be readily and easily cleaned.

The mention of cupboards reminds me that these fittings are generally objectionable and should be as far as possible banished from the ward. One at least is, of course, necessary for holding surgical and medical appliances, lint, medicines, etc., but this should not, as is frequently the case, be placed or built against the wall. It should stand out in the centre of the ward, and should be constructed of hardwood, framed and glazed all round and on top and fitted with glass shelves. I am not certain that such a fitting commends itself to all nurses. Sometime since a nurse complained to me that it cost her much labor and trouble to put away anything in these fittings, because, in effect, anything in the nature of disorder, or want of absolute cleanliness, could not be concealed even from her own sense of order—not to speak of the doctor on his rounds. I am sure that you will agree with me that therein lies its great virtue.

Fixed or heavy tables and chairs are to be avoided. It is quite possible to make a light table rigid.

Stoves.—I collect every reference in the building press to hospitals, new and old, and a great number of the smaller paragraphs are, I find, inserted by makers of particular ward-stoves which have been used in the building. There is no reason to doubt that they are excellent stoves for many purposes, but as they are built of iron plates and grilles, and plentifully adorned with mouldings, etc., they would appear to be entirely unsuitable to a hospital ward.

One or other of the forms of stoves which is built up with plain firebrick and bricks or tiles is far preferable. There is a greater amount of heat given out by radiation and far less by conduction, and there are few lodgments for dust and dirt. Some of these brick and tile stoves are honeycombed with ventilating flues for heating air, which is conveyed by long horizontal flues from the outside. They would not appear to be open to objection, as they are so constructed as to be easily kept clean.

Heating and Ventilation.—It is not the purpose of this paper to

deal with such large and controversial subjects as heating and ventilation, or to enter into any discussion upon the relative merits of natural or mechanical ventilation.

It is only necessary to remind you that whatever pipes or fittings are used, they should be so placed and constructed as to be easily kept clean. If possible, too, all controlling valves and pipes are to be kept out of the ward.

Flues of any sort, whether in the floors or walls, should also be so constructed, with movable gratings and covers, so as to allow of easy access for cleaning and disinfection.

Lavatory Basins.—Until quite recently a fixed lavatory basin was, I think, regarded as quite inadmissible in the ward itself, but the inconvenience of hand basins and the great improvement in the construction of fixed lavatories have combined to overcome the objection to their being in the ward. Of course, they are only for the use of the medical staff and the surgeons. The first hospital in which I saw them was one which is not even yet finished, and which has claims to being considered of the most modern design and construction. The basin was, however, of quite an ordinary pattern, and fixed close against the wall, but I regret to add that, underneath, the supply, waste, overflow and anti-siphon pipes—all on the surface of the wall—reminded one of Medusa's head.

While dealing with these fittings I should like to refer to the deceptive character of so many sinks and basins in the market, which are designed especially for hospital purposes. They are beautifully designed to avoid anything in the nature of dirt crevices or mouldings on the surface, and so far only as they can be obvious to the casual observer. But the glazed surface and rounded angles are confined to the top and sides. Underneath they are rough, angular, and full of pockets which are never likely to be cleaned from the day they are fixed. Much improvement is being effected by a few manufacturers to meet the persistent demands of those who value cleanliness and virtue in the unseen parts as in those seen.

One other detail I have to refer to, and that is the necessity of what I may call "openness" in every part of a ward and its adjuncts. It would seem desirable that in a general way both patients and nurses should always be under observation, or at least liable to be observed at nearly all times by the superior officers. If that appears to be objectionably stringent, I may add that it is not at all necessarily so.

I need scarcely say that I exclude the bath-rooms and ward conveniences, but certainly the duty-room and ward kitchen and separate day-rooms should always be more or less open. My own practice is to make the side next the corridor leading to the ward of glazed partitioning.

When patients know that they cannot escape even casual observation, they are more likely to behave themselves correctly, and the nurses themselves do their duty none the worse for the lack of opportunities of concealment.

It is better, too, that nurses should always be employed when on duty for shorter hours, than that the weariness of long hours should lead them to lounge or neglect their duties when occasion offers.

ILLUSTRATIONS

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

HOUSE OF A. W. MEYER, ESQ., KANSAS CITY, MO. MESSRS. VAN BRUNT & HOWE, ARCHITECTS, KANSAS CITY, MO.

LIBRARY IN SAME HOUSE.

DRAWING-ROOM AND STAIRCASE IN SAME HOUSE.

MANHATTAN CONGREGATIONAL CHURCH, NEW YORK, N. Y. MESSRS. C. W. & A. A. STOUGHTON, ARCHITECTS, NEW YORK, N. Y.

Additional Illustrations in the International Edition.

ENTRANCE-FRONT: HOUSE OF A. W. MEYER, ESQ., KANSAS CITY, MO. MESSRS. VAN BRUNT & HOWE, ARCHITECTS, KANSAS CITY, MO.

DINING-ROOM IN SAME HOUSE.

MONUMENT TO CHARLES GARNIER, PARIS, FRANCE. M. J. PASCAL, ARCHITECT; MM. THOMAS, GERMAIN AND CARPEAUX, SCULPTORS.

This plate is copied from *La Construction Moderne*.

CHÂTEAU DE LA CORDELIÈRE. M. SANGER, ARCHITECT.

This plate is copied from *La Construction Moderne*.

BREWERY BUILDING, MUNICH, BAVARIA. PROF. FRIEDRICH VON THIERSCH, ARCHITECT.

This plate is copied from *Architektonische Rundschau*.

NOTES AND CLIPPINGS

THE DESIGNER OF THE CRYSTAL PALACE.—A correspondent of *T. P.'s Weekly* writes: "In your review of Mr. Graves's *'Life of Sir George Grove'* it is incidentally mentioned that Sir Joseph Paxton originated the Crystal Palace building, taking as his model the Victoria Regia House, at Chatsworth, which 'the Duke of Devonshire ordered him to build.' Now Paxton was a gardener, and though he subsequently acquired a good deal of experience and knowledge in connection with the Great Exhibition of 1851 and the Crystal Palace, at the time the Regia House was contemplated, he had neither the experience nor the technical knowledge to design or erect what then was quite a novel form of construction. As head gardener at Chatsworth, Paxton had come into contact with the actual builder of the conservatories there, one Francis Clark, a Birmingham manufacturer, who was the first man to think of, design and construct a hot-house or conservatory where cast-iron took the place of wood in such structures. On receiving the orders of the Duke, Paxton put himself into communication with Clark, and a meeting was arranged at an inn midway between Birmingham and Chatsworth, where the matter was discussed, Clark roughing out a design of the proposed Victoria Regia House on a sheet of blotting-paper, which he took away with him and elaborated at his works in Birmingham. It is quite correct to say that the Great Exhibition Building, subsequently the Crystal Palace, was modelled on the lines of the Regia House, but how far Sir Joseph Paxton was responsible for the detailed constructional ironwork it is difficult to say; but he would have been a most remarkable man if he prepared the drawings for so complicated a structure. Among engineers it has always been considered that while Paxton gave the general idea to the scheme, it was Henderson, of Derby, subsequently one of the contractors for the building, who thrashed out the details. Regarding Francis Clark, he built many small hot-houses and conservatories in and around Birmingham before he was consulted by Paxton. As a business venture, however, the construction of these novel buildings was a failure. Clark was more of a philanthropist than a commercial man, and looked more to the success of his work than to making money out of it, and eventually he lost his all in the venture, and in the early fifties went to South Australia, where he died a few years after his eldest son established the well-known *Adelaide Register* newspaper. The family were well known in that city for their philanthropy and interest in all questions relating to the amelioration of the condition of the working classes. No doubt there are some of Francis Clark's family still living, who could corroborate this statement. The only man of that generation now living is the venerable Follet Osler, F. R. S., who was a great personal friend and benefactor to Clark. If any doubt exists as to the latter's share in the construction of the Regia House, it would be set at rest by examining the structure, as it was Clark's custom to cast his name on the girders. I had these facts from my mother, who was a cousin of Clark's, and knew the whole circumstances, as she was a frequent visitor to his house in Birmingham, and after his failure and departure to Australia it was the frequent subject of conversation among his relatives and friends that while his original ideas had been adopted for the then wondrous Crystal Palace, he should have died poor and unknown in a far-distant land, while honors were showered upon those who adopted them."

DANGERS OF LAWSUITS.—The uncertainties of lawsuits are well illustrated by a case which recently occurred in an action for damages to perform a contract in the construction of a machine. Richard Roe agreed to build one for a certain sum from plans furnished by John Doe. Pending its completion the latter sold the machine to a third party. When the machine was finished it was found that Richard Roe had departed from the plans in several instances, so that it failed to do its work properly. John Doe demanded that it be remade so as to complete the contract satisfactorily, but this was refused by Richard Roe. The third party, in consequence of the defects, also refused the machine, so suit was brought against Richard Roe for damages amounting to a round sum. The case came to trial before a jury, who awarded a verdict in favor of John Doe for the full amount claimed, with interest from the date of the delivery of the machine to the third party. The case had been dragged through the courts nearly four years, and it then assumed a curious aspect. Richard Roe owed John Doe for failure to perform a contract; John Doe owed the third party the sum he had paid for the machine, which had been in the possession of the third party the whole time. A few days prior to the verdict and while the case was on trial the third party got tired of seeing the machine about, so he sold it to a junk man and put the proceeds in his pocket. By this act he acknowledged and accepted the machine as his property, to do as he pleased with, and thereby cut himself off from recovering anything from John Doe. The lesson conveyed by this case is one of interest to all, for it shows the danger of interference, by persons not interested, with lawsuits in course of settlement. The third party was not in the case at all, in this instance, his remedy being in a separate suit as against John Doe, but he undertook to settle the case himself, with the result noted. Property in litigation must be let alone until the title is conclusively settled. — *Metal Worker*.

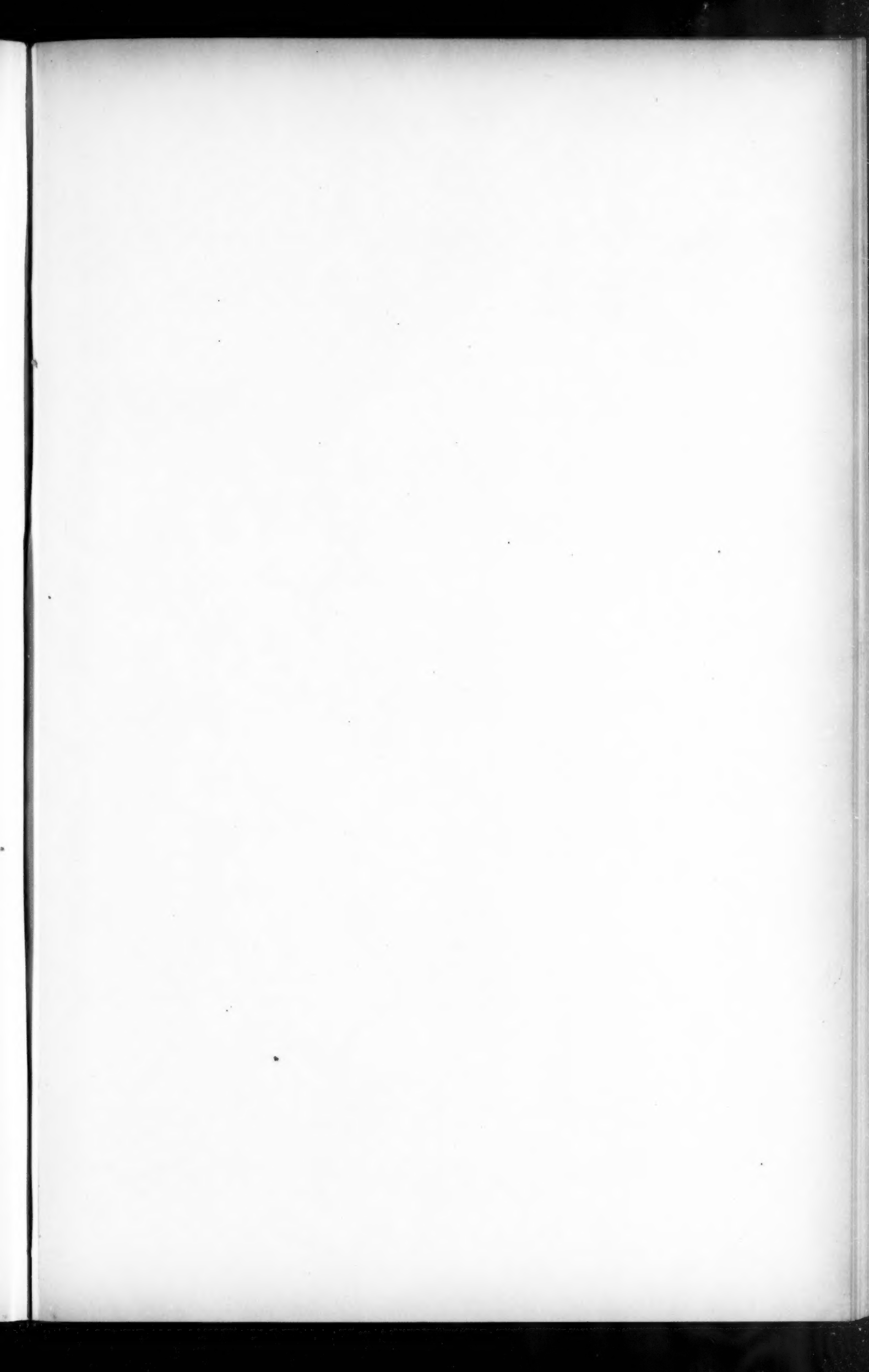
CLAYS AND CLAY INDUSTRIES.—The United States Geological Survey is about to publish, as Professional Paper No. 11, "The Clays of the United States East of the Mississippi River," by Dr. Heinrich Ries. He discusses briefly the origin, physical and chemical properties, methods of mining, purification, commercial value and uses of clay, and the geologic distribution of clays east of the Mississippi according to their rock derivation; and then he takes up the distribution of clays

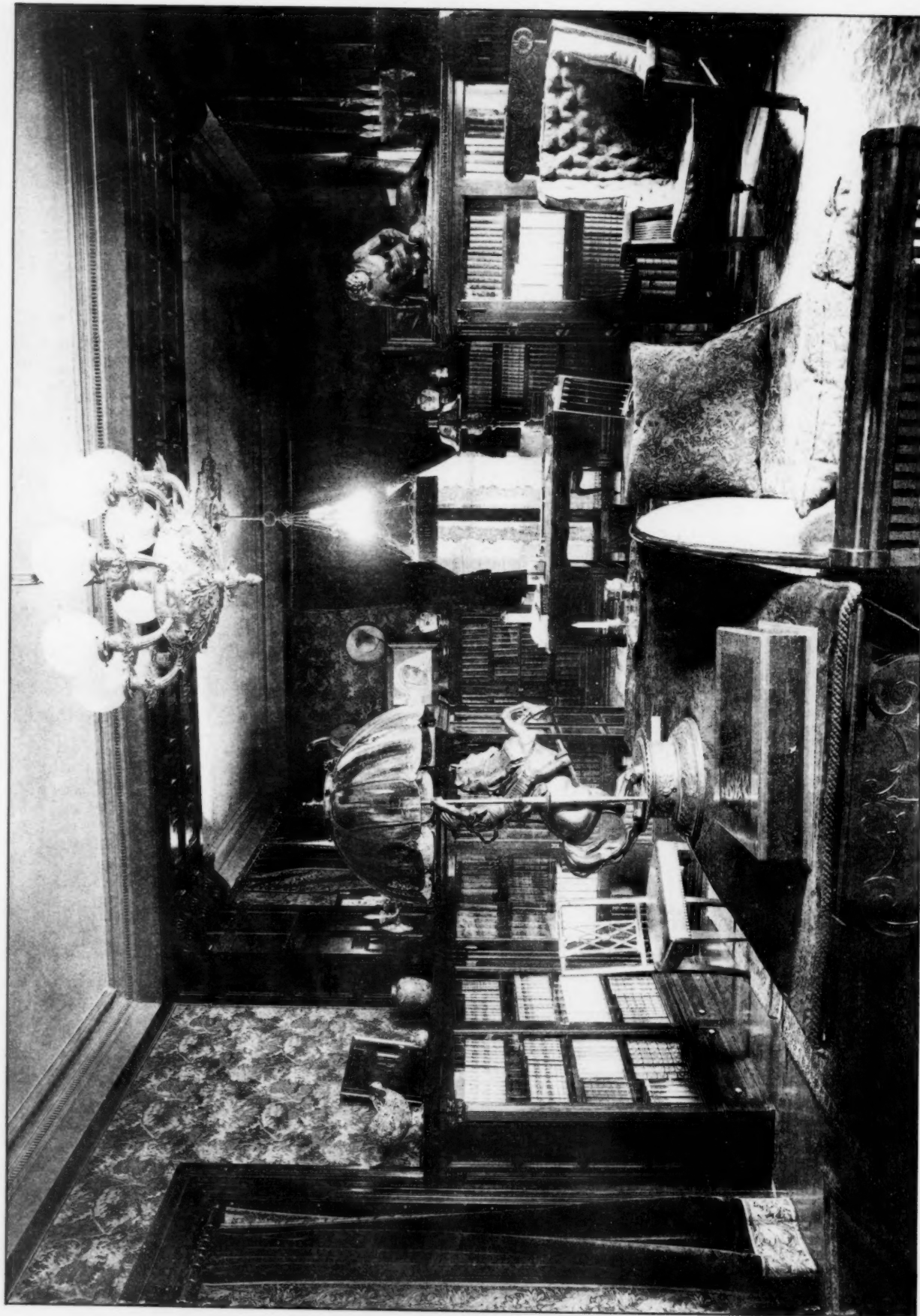
by kinds, and the description of clay deposits by States. He concludes with a summary of the clay-working industry east of the Mississippi, touching in turn and by States on the manufacture of common brick, pressed brick, fireproofing, roofing-tiles, terra-cotta, enamelled brick, floor-tiles, glazed tiles, vitrified brick, drain-tile, sewer-pipe, fire-brick and pottery. The largest brick-making region in this country is the Hudson River Valley in New York State, where nearly a billion brick are made annually. Pennsylvania leads in the production of pressed brick. Most of the terra-cotta comes from New York, New Jersey and Illinois. — *Exchange*.

THE BISMARCK MONUMENT, BERLIN.—The memorial to Bismarck in the new cathedral near the Castle in Berlin has been completed in the clay by Reinhold Begas and is accepted. It will stand against a wall between two square engaged pillars with florid Ionic capitals. The centre of the panel shows a seated and draped Bismarck on a pedestal. Immediately in front is an ornate sarcophagus with low-relief on its long front. It rests on big lions' feet. To the right of the sarcophagus is a half-draped youth, a male "Fame," who holds a long trumpet with his left hand to his lips and with the right raises a drapery from the tomb. To the left is another half-draped figure, a female, "Muse of History," who leans her left elbow on the foot of the tomb and with her right hand props a panel and scroll against her thigh, bending her head down to read. Under the flowing drapery of Bismarck one sees that he is clad in a suit of mediæval armor. His right fist is against his right knee, his left hand lies on his left knee. The head is turned slightly to his right and the observer's left as he looks out with an imperious air. The pose of the figure suggests the "Moses" of Michael Angelo. The three figures make an agreeable pyramidal mass, in which the action is in the lower figures. Possibly the abrupt upward slanting line of the arm and trumpet of "Fame" interferes a trifle with the design, but the monument is another proof that Begas still holds powerfully the post of dean of German sculpture. On the tomb front an enthroned Germania is carved, who is receiving the crown from the federated German princes. There is nothing here to recall Wilhelm of Prussia—just Bismarck and Germany. — *N. Y. Times*.

DEVELOPMENT OF THE GAS-ENGINE.—Of late years the size of gas-engines has much increased. Many makers are now building machines of 2,500 horse-power, and are ready to double this efficiency. The development of large gas-engines is closely connected with the evolution of the fuel-gas processes, and it is noteworthy that the first gas-engines in England above 400 horse-power were operated with producer-gas, while many of the large gas-engines in Europe have been built for use with blast furnace gas. In August, 1902, two English firms had under construction over fifty gas-engines varying in size from 200 to 1,000 horse-power. A classified list of engines made or making shows 327 such, with an aggregate horse-power of 182,000, or about 560 horse-power per machine. The last volume of the United States census reports 18,500 combustion engines in the country, with a total capacity of 165,000 horse-power, or only about 9 horse-power on the average. This state of things is not likely to last long. One American firm has already sold over 40,000 horse-power of large engines, most of them of 2,000 and several of 1,000 horse-power. Another has recently built two 4,000 horse-power gas-compressors and a number of 1,000 horse-power gas-engines. The gas-engines of the large sizes are extensively used for generating electric light and power, but there is a decided tendency to employ the smaller sizes direct as motors. Cheap fuel-gas processes will bring the gas-engine to replace the electric-motor for very many purposes, and we may look for development along these lines in the near future. — *Journal of the Franklin Institute*.

THE LATE JOHN DONOGHUE, SCULPTOR.—The tragic end of John Donoghue, the sculptor, recalls the gallant struggle he made in Rome to embody in a gigantic statue a cosmological idea—"The Spirit of the Abyss"—and the extraordinary adventures the colossal figure had while the sculptor was trying to get it to Chicago for the World's Fair. Donoghue conceived the design on so tremendous a scale that nothing would do for a studio but one of the old Roman baths. He was from Chicago himself, and knew the love of his fellow-townsmen for everything that is big. To those who deprecated the size of the winged brooding figure he replied with invincible optimism that Chicago would find a place for it, even if it had to stand without the grounds of the Exposition. Perhaps he was right in his belief; he claimed that a site had been granted. But when the transport from the United States reached Italy to take away the work of American artists Donoghue was not ready, and the ship had to sail. Then he determined to get it over as freight by an ordinary steamer. It was too large for the railway, and had to be sawed into sections. At last he got it to Genoa and aboard of a steamer, but there was no one to guarantee payment for the freight. Even then, Donoghue's pluck did not fail him. With the lightheartedness which in the course of his career gained him so many friends, he paid that freight with promises, and returned to New York to await the coming of his statue. But here his luck turned. "The Spirit of the Abyss" was, indeed, unloaded on a dock in Brooklyn, but no one could be induced to take it out of pawn, and so it perished. One must not suppose, however, that this blow saddened or soured the buoyant spirit of the sculptor of "The Dancing Sophocles." Only during recent years, when he found that his designs were not successful, did he lose heart and give up the struggle. His early sketch, "Hannibal swearing at the Altar Vengeance on Rome"; his "Sophocles dancing Nude at the Triumph for the Battle of Salamis," and his "Athlete," modelled from the pugilist, John L. Sullivan, were sculptures that gave warrant of greatness. All that Donoghue seemed to lack to attain substantial success was steadiness in labor. A vein of self-indulgence was perhaps the only serious flaw which caused so much promise to fail of attainment. — *N. Y. Times*.

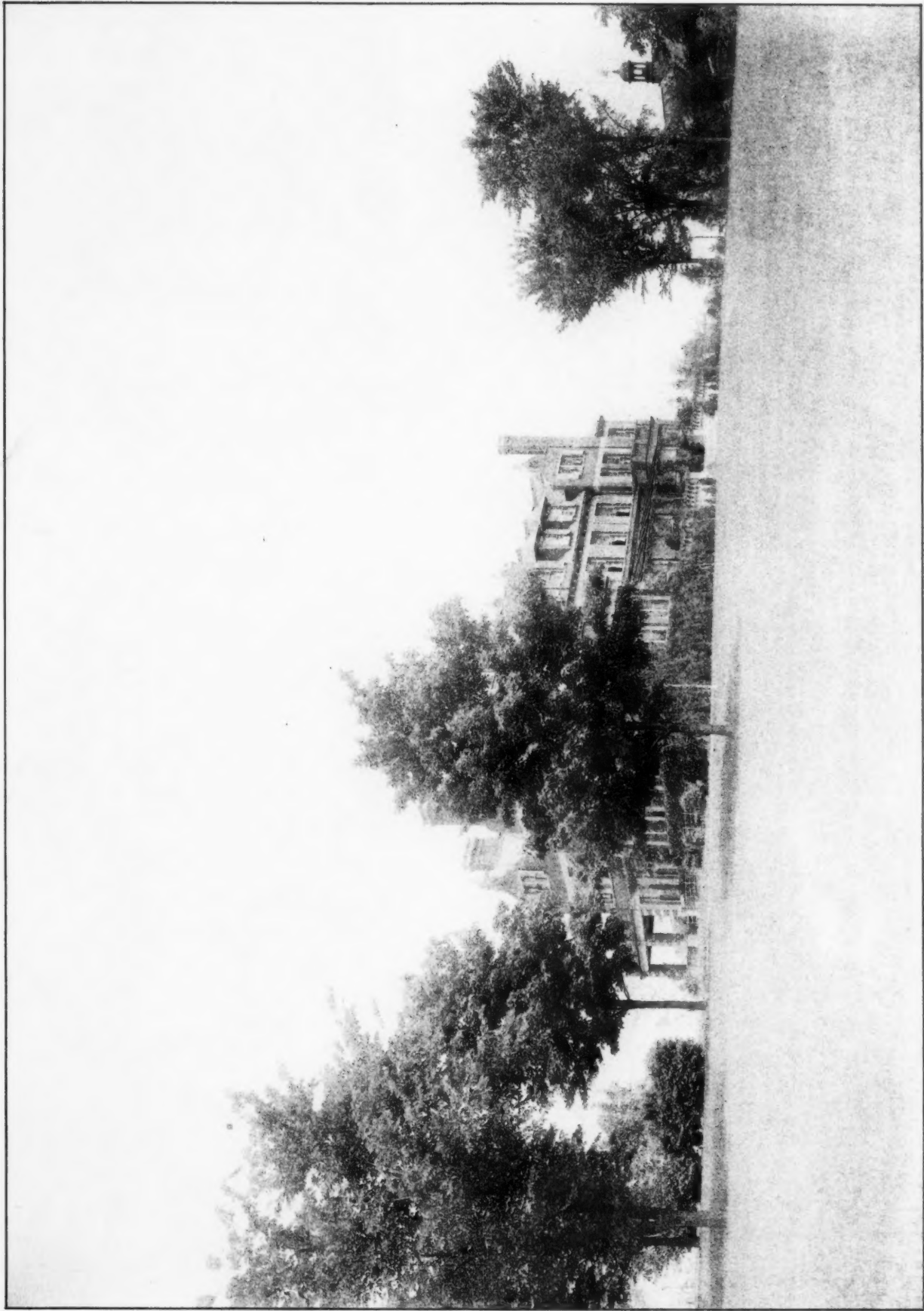




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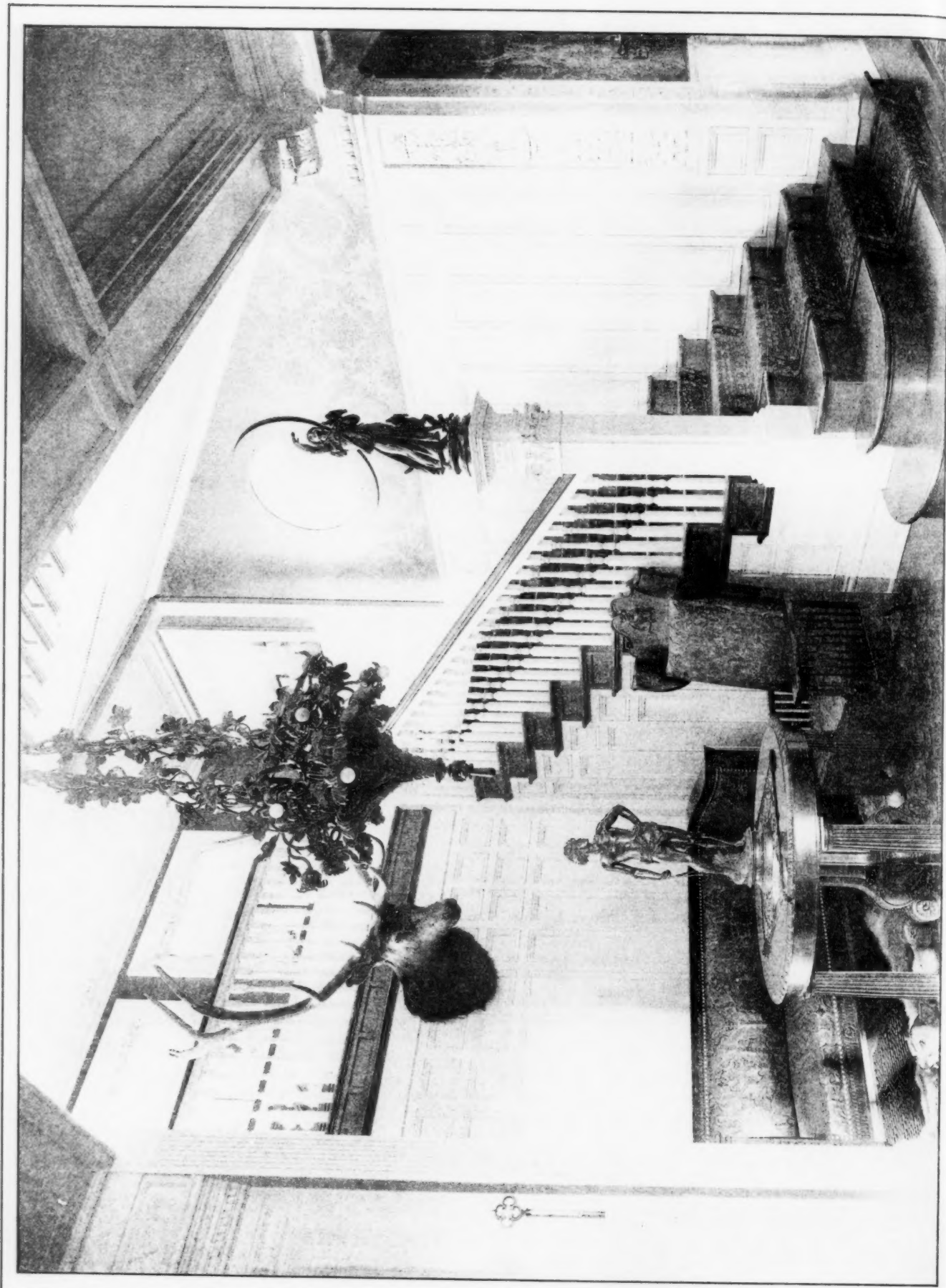


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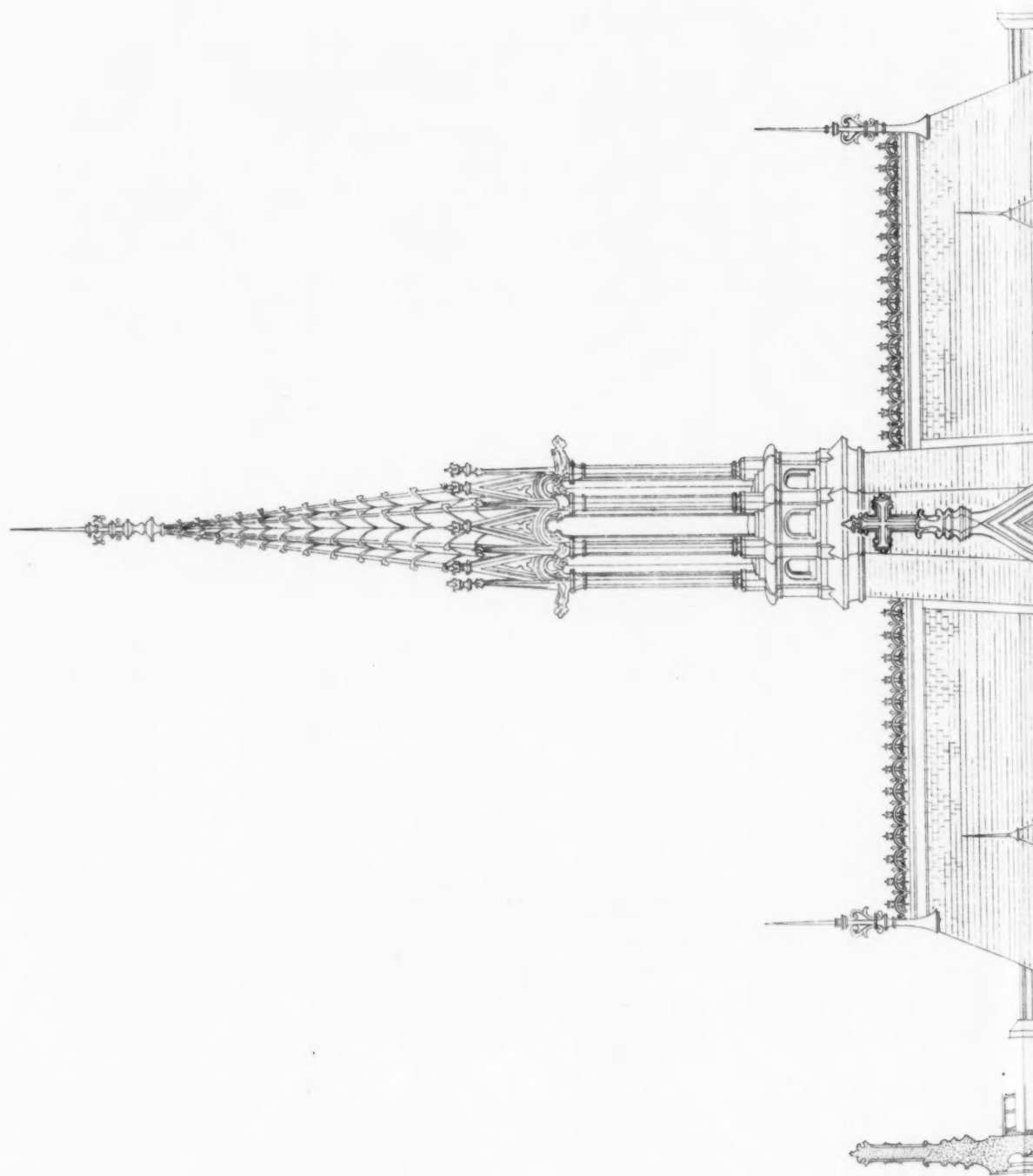


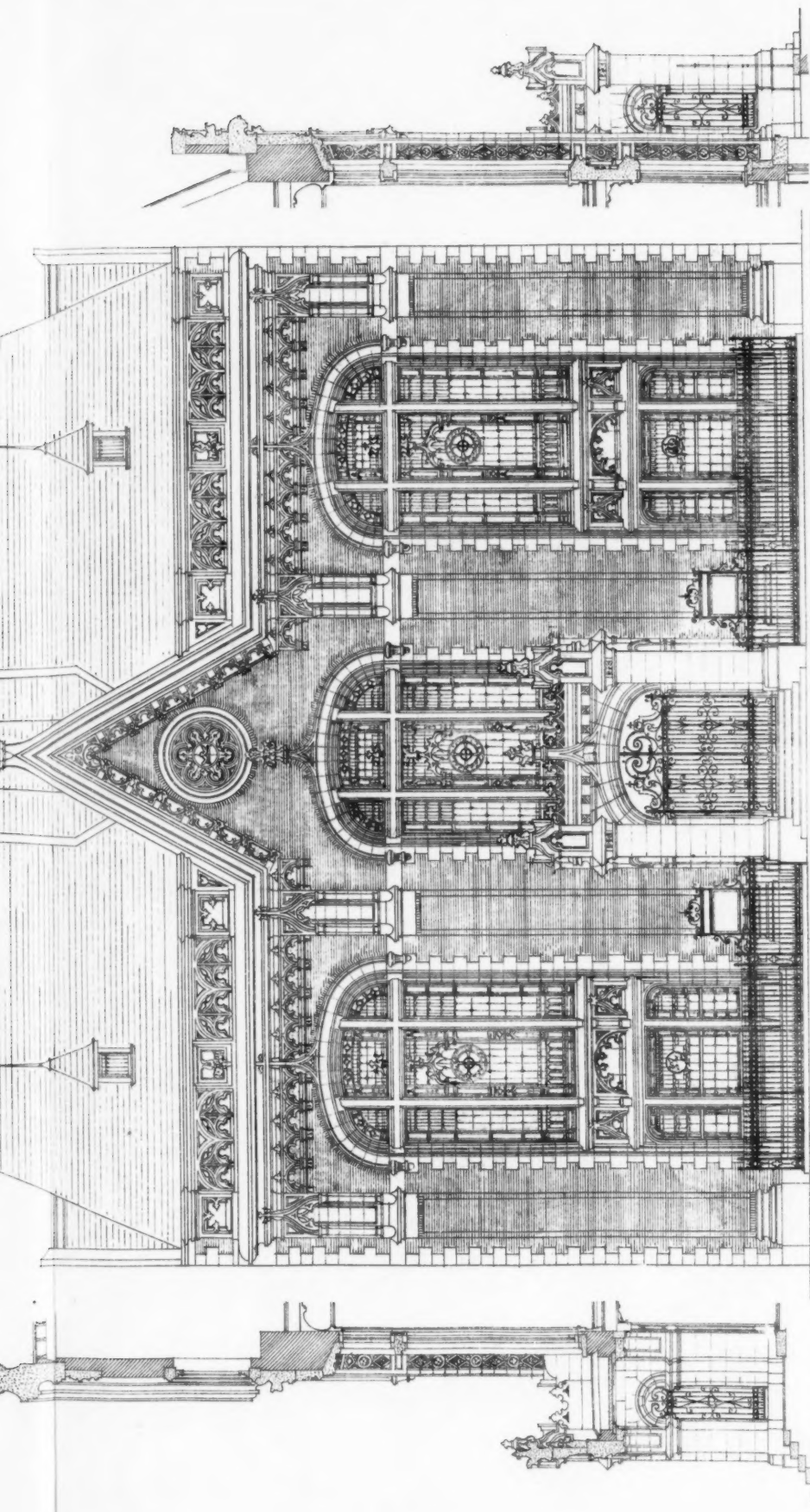
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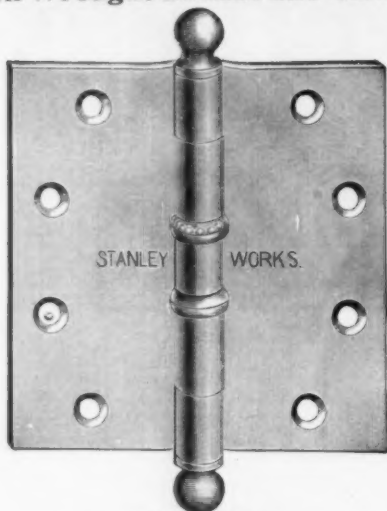
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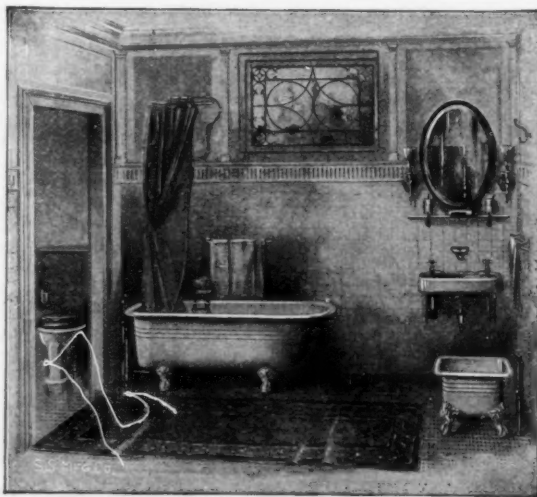
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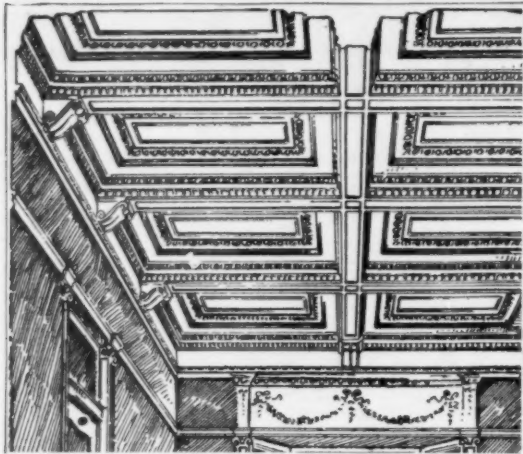
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CODE OF PRACTICE FOR SUB-ESTIMATING AND SUB- CONTRACTING

Adopted by the Master Builders' Association of the City of Boston, Aug. 2, 1894.

ARTICLE I.

Obligation of Principal Contractor to Sub-Contractor.

A principal contractor is under obligation to treat upon an equal basis all estimates which he "receives" prior to putting in his own bid. Estimates must be considered as "received" when they come into a principal contractor's possession, either by his direct solicitation or by being accepted by him. The opening of a bid, knowing it to be such, constitutes receipt of the same.

A principal contractor is under no obligation to use a bid which he has not solicited, accepted, or received, but if he does not wish to use the estimate of a sub-bidder he should decline it, if proffered personally, or should return it unopened if sent to him by mail or otherwise. The retention of a bid should be construed as a receipt of the same.

A principal contractor, when making up his estimate, is not entitled to receive bids from sub-contractors if he is at the same time making himself their competitor by figuring their portion of the contemplated work. It is legitimate for a principal contractor to figure all portions of work, depending upon no one for what are usually known as sub-estimates, but it is not legitimate for him to receive bids from others for sub-work if he is himself figuring those portions independently.

ARTICLE II.

Award of Sub-Contracts.

The principal contractor having been awarded a general contract should immediately award the sub-contracts to the lowest bidder in each branch.

ARTICLE III.

Penalty for not Awarding Contract to Lowest Sub-Bidder.

A principal contractor failing to award a sub-contract to the lowest sub-bidder to whom he is under obligation as previously provided should be liable to pay damages to the said lowest bidder, in amount not less than ten per cent of the amount of the estimate.

Payment of such damages will not relieve the principal contractor from liability to discipline under provisions of Article X of the By-Laws of this Association.

ARTICLE V.

Payments to Sub-Contractors.

Unless the contracts made with sub-contractors otherwise provide, payments during the progress of the work should be made by the principal contractor to the sub-contractors upon the same basis of payment, in relation to amount of work performed, as is prescribed in the contract made by the principal contractor with the owner.

Final payment to a sub-contractor should be considered as due at the expiration of thirty days after the completion of his work and its approval by the architect or owner, unless otherwise provided by the sub-contract or agreement.

ARTICLE VII.

Obligation of Sub-Contractor to Principal Contractor.

Should a sub-contractor refuse to contract at the amount of the estimate he has given to a principal contractor who has used the said estimate in good faith, he then should be liable to the said principal contractor for damages in amount not less than the difference between the amount of the estimate which was submitted by him and the amount at which the principal contractor may be obliged to contract the work.

Payment of such damages will not relieve the sub-contractor from liability to discipline under provisions of Article X of the By-Laws of this Association.

ARTICLE X.

Bids to Architects or Owners.

When bids for separate departments of work on a building are solicited by the architect or the owner, they should be submitted with the understanding that they are direct estimates, for which direct contracts are to be made by the owner with the lowest bidder, and no other disposition of such bids should be permitted without consent of the bidder submitting the same.

Sub-bids should be given only to the principal contractors who are estimating the work in question, and should not be left with architects or owners for the inspection and information of principal contractors. Sub-contractors must understand that bids thus left with architects or owners are in great danger of losing their confidential character, and that if they so leave them they cannot claim protection or redress under the first article of this Code.

SUGGESTIONS.

Members of this Association having sub-contracts to let, or material to buy, should, as far as may be consistent with business principles, deal only with members of the Association, or at all events give their fellow-members an opportunity to compete, and then give them the preference, other things being equal.

All bidders should take cognizance of the danger they may be subjected to through the practice, so prevalent in some architects' offices, of making change in plans or specifications, or in both, during the progress of estimating. Correction of this pernicious practice can only be obtained through refusal by contractors to estimate under such conditions.

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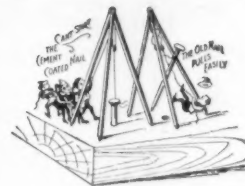
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Carpenters' Hall, Philadelphia, Pa.	" 1770
Independence Hall, Philadelphia, Pa.	" 1729
Faneuil Hall, Boston, Mass.	" 1741
and others.	

CHURCHES

King's Chapel, Boston, Mass.	Date 1749
Seventh-day Baptist Church, Newport, R. I.	" 1729
Christ Church, Alexandria, Va.	" 1767
Christ Church, Philadelphia, Pa.	" 1727
St. Paul's Chapel, New York, N. Y.	" 1764
Old South Church, Boston, Mass.	" 1729
First Church, Hingham, Mass.	" 1681
St. John's Chapel, New York, N. Y.	" 1803
First Congregational Church, Canandaigua, N. Y.	" 1812
St. Peter's P. E. Church, Philadelphia, Pa.	" 1758
Gloria Dei Church, Philadelphia, Pa.	" 1700
and others.	

IMPORTANT HOUSES

Fairbanks House, Dedham, Mass.	Date 1636
Royall Mansion, Dedham, Mass.	" 1737
Philipse Manor House, Yonkers, N. Y.	" 1745
Tudor Place, Georgetown, D. C.	" 179-
Mappa House, Trenton, N. Y.	" 1809
Woodlawn, Va.	" 1799
Mount Vernon, Va.	" 1743
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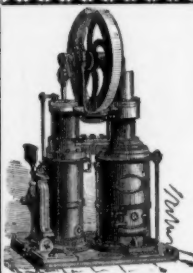
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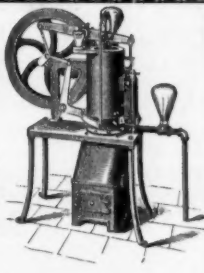
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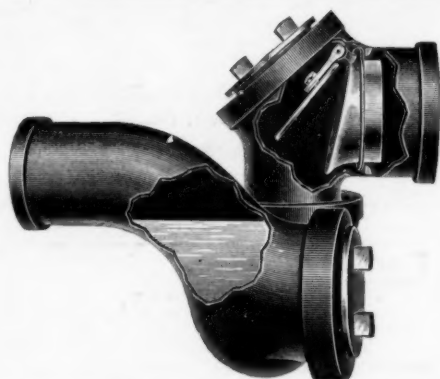
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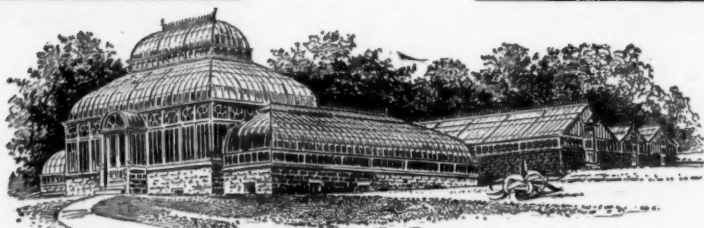
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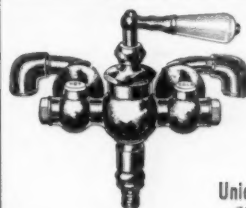
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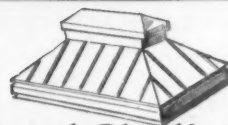
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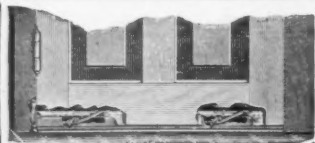
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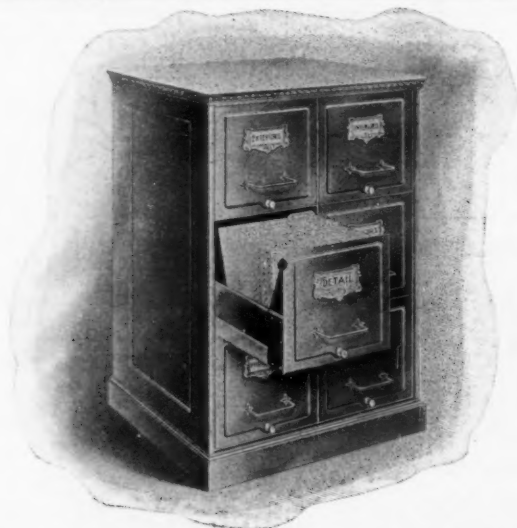
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The Bill prays for a preliminary writ of injunction, to be continued during the pendency of the suit, and upon the final determination thereof to be made perpetual, and also demands an accounting and damages.

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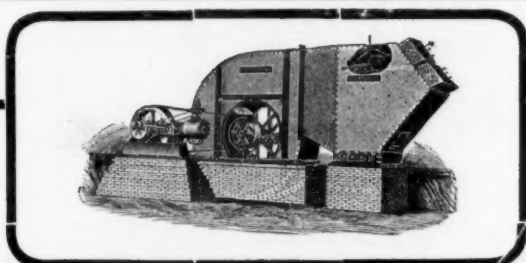
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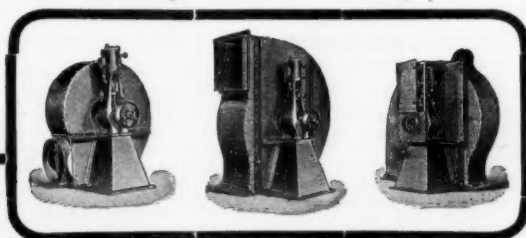
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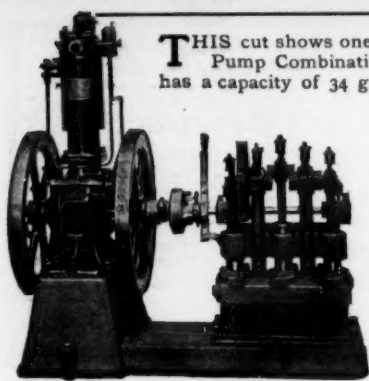
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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Sons, Kalamazoo, \$89,750, the next being \$93,000. The plans will be modified by the Board of Supervisors at its next meeting so that the edifice may be put up within the designated figure.

Dayton, O.—The Erie Railway Co. is to build a new freight depot, 32' x 300', at 1st and Webster Sts. The cost will be upward of \$150,000.

Geneva, N. Y.—William Smith, a millionaire nurseryman, is to found and endow a college to be known as the William Smith College for Women. The institution will be on a site of 30 acres in one of the most beautiful sections in the outskirts of the city. The plans call for one building to cost \$150,000.

Greensburg, Pa.—Wm. Miller & Sons, of Pittsburgh, have been given the contract for the erection of the new Westmoreland County court-house. The building is to cost \$878,000.

Grove City, Pa.—The contract for the Odd Fellows Home, the corner-stone laying of which took place recently, has been let to H. Q. Hines, of Stoneboro, for \$30,000.

Hartford, Conn.—An apartment-building will be erected on the old Mark Howard property, having a frontage on Asylum St., opposite the Deaf and Dumb Asylum, and another to the south on Farmington Ave., nearly opposite the Farmington Ave. Hotel. The plans are now completed, and the contract for its erection will be awarded very soon. The building will be built of brick and stone, and will have handsome facades on the Asylum and Farmington Ave. fronts. It will be seven stories high on Asylum Ave. and eight stories on Farmington Ave., and will cost \$150,000.

Haverhill, Mass.—The proposition to erect a new high-school building is being agitated.

Holly Springs, Miss.—New buildings will be erected at the North Mississippi Presbyterian College to cost \$30,000.

Huntsville, Ala.—Th's place is bidding for the Freedman's Agricultural and Mechanical College for Negroes, to be established in the south. Deatur has offered 140 acres of ground and \$2,000 for the school, which is to be established at a cost of \$300,000.

Indianapolis, Ind.—Architects who wish to submit plans for the new Board of Trade Building have begun work on them. The only limitations and instructions given are the dimensions of the building and that it must not cost more than \$165,000. It will take several weeks for the architects to make their drawings.

Lynchburg, Va.—It is reported that the following are the improvements contemplated by Sweet Briar Institute, and ordered by its Bd. of Directors at a recent meeting: "A president's house, 4 professors' houses, laundry, infirmary, creamery, cold storage, power plant, etc., sewage disposal, pavilion and arcade, electric lighting, heating, plumbing, water

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

works, dam for lake, and macadamized road to station, at a cost of about \$100,000. Engr. in Charge is L. S. Kandolph, of Blacksburg.

Marblehead, Mass.—The new primary school to be built on Rowland St. from plans by Kilham & Hopkins, Boston, will be completed about January 1. The building is to be of brick, with limestone trimmings and slate roof, and will cost \$35,000.

Milwaukee, Wis.—It has been decided at a meeting of those interested in the Davidson hotel property, that the annex which was destroyed by fire on the night of June 26 will be rebuilt. The cost of the rebuilding is estimated by Joseph Uhrig, of Chicago, representing the Tollman estate, Nathan Hamburger, and Architect A. C. Clas at between \$55,000 and \$60,000.

Minneapolis, Minn.—Ground was recently broken for the new residence of Swan J. Turnblad, publisher of Svenska Amerikanska Posten, at Park Ave and 26th St. A building permit for the stone dwelling and barn has been issued and calls for an expenditure of \$50,000. The building will not be ready for occupancy for a year and a half.

Montgomery, Ala.—Schloss & Kahn have secured permit for the erection of a three story brick business building on Coosa St., between Bibb and Tallapoosa Sts. The building will cost \$20,000.

Newark, N. J.—The International Egg Carrier & Paper Co. has been organized in Chicago, with a capital of \$500,000, to manufacture paper and to make egg carriers from paper pulp. The company will be brought to this place through the interest of the Newark Board of Trade, which organization will provide a three-acre site for building.

North Vernon, Ind.—Ground has been broken in this city for a new school-building that is to cost about \$28,000. The North Vernon Pump and Lumber Co. has the contract for the construction of the building, which is to be completed by January 1, 1904.

Peabody, Mass.—Contracts have been awarded for building the new high-school building as follows: J. W. Balcomb & Co., Salem, carpenter work, \$36,530; I. F. O'Donnell & Co., Dedham, mason work, \$31,923; Etna Engine Co., Springfield, heating and ventilation, \$7,480; M. E. Lynch, Peabody, plumbing, \$3,000; making a total of \$74,933 exclusive of about \$17,000 already expended for foundation work.

Peoria, Ill.—Announcement is made of two notable building projects. Mr. Dechman will erect flats at Main and Flora Aves., to cost upwards of \$50,000, and Frank Whiting will erect ten houses on Bradley Ave., costing about \$4,000 each.

Philadelphia, Pa.—William Steele & Sons have been awarded the contract for the new building for the Northeastern Warehouse Co., at 3d St. and Sedgely Ave. It will be a five-story brick structure, 157' x 194', and will cost \$150,000.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

The contract for the Forrest Laundry to be built at Camac St. and Columbia Ave., from plans by Hallinger & Perrot, architects, has been awarded to George Kesler. The building will be fireproof, four stories high, with a basement, 50' x 160' in dimensions, and will cost \$54,000.

Pittsburgh, Pa.—John Russell has let a contract to John McSorley for the erection of a \$68,000 brick apartment-house at Summerlea and Ellwood Sts., 20th Ward. The building will be three stories high and will cover 87' x 100'.

Bair & Gassam Mfg. Co. will erect a warehouse at 29th and Smallman Sts. Struthers & Hannah, 4 Eighth St., architects. Will be a four-story structure, 120' x 120', and cost \$75,000. Steel construction. Architects are now receiving bids for construction.

Richmond, Ind.—Dan. G. Reid, of New York City, has had plans prepared for an edifice for the United Presbyterians to be erected here, at a cost of \$100,000.

Richmond, Va.—Messrs. Noland & Baskerville are working on the plans of the synagogue. The cost of this structure, to be the new home of the Beth Ahaba congregation, will be \$45,000.

Salem, Mass.—Mrs. Emma S. Almy, who recently purchased the Sullivan estate at 305 Essex St., is to remove the cottage house now there to a site on Lincoln Ave. and will have her own mansion, which is located farther down Lafayette St. moved to the estate. The mansion will have to be moved in two sections on account of its size.

South Milwaukee, Wis.—F. Gastra, of Kenosha, has drawn plans for a school to be erected here, at a cost of \$150,000.

Springfield, Mass.—The plans for the new engine house call for the largest and finest building of the kind anywhere in New England, the contract price being \$90,000. It will be entered from two directions from the main line, one track coming down from near the signal tower, and a double track from a point some 50 feet from the corner of the carshop, entering almost at right angles with the other track. The house will contain 42 stalls for engines, each stall being 80 feet deep. The company is also contemplating the erection of a second and similar engine-house a short distance up the track from the new one, and plans for it have already been sketched. The two will be connected by track so that engines may pass from one to the other.

Stockton, Cal.—It is stated that the Stockton Lodge No. 218, B. P. O. E., will erect a five-story building at Weber Ave. and Sutter St.; estimated cost, \$100,000.

Tiffin, O.—Bacon & Huber, The Spitzer, Toledo, are reported to be preparing plans for a five-story hotel to be erected here, at a cost of \$150,000.

Trenton, N. J.—The labor leaders here have prepared plans for a \$100,000 building to be used as



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BUILDING INTELLIGENCE

(Advance Rumors Continued.)

headquarters for labor unions, and to contain a large hall. An effort will be made to build the structure by money from the sale of \$5 shares of stock to members of the local unions.

Washington, D. C.—The Baltimore and Ohio Railroad has let the contract for the Washington terminal improvement to McMullen & McDermott and the Hoffman Engineering and Constructing Co., of Philadelphia, at their bid of over \$2,000,000. The station is to be built under the direction of Architect Burnham, of Chicago.

Waterbury, Conn.—The plans for the new Waterbury Hotel are now ready for bids. The hotel is to cost in the vicinity of \$400,000. It will be of brick and of fireproof construction; will be 100' x 100', and six stories in height.

Wenham, Mass.—This town has voted to erect a new school-building at an expense of \$15,000. The building, which will be located at the corner of Cherry and Main Sts., will be a four-room, two-story frame structure.

Wilkesburg, Pa.—The vestrymen of St. Stephen's Protestant Episcopal Church have purchased additional ground adjoining their present lot, and will begin soon the erection of a handsome new church building. It is the intention to erect a building costing about \$75,000.

Worcester, Mass.—The Thule Music Hall Association building which is to be built next spring at the corner of Main and George Sts. is the outcome of this energetic and enterprising work of a handful of Worcester's best Swedish speaking residents. The need for such a building has long been felt among the Swedish speaking people in this city. The building will be seven stories in height and will be built of smooth red brick with granite trimmings and will, because of its site on Main St., be one of the most notable buildings on the street. This hall will have a seating capacity of 1,500 and will be arranged so that entertainments, operas, dramas and balls can be given as desired. On the fourth floor will be nine rooms fitted up for studios, either for music or art. Each of the studios will be about 20' x 29', and will be let for no other purpose than that for which they are designed. No office for the transaction of commercial business will be let. The building will cost in the neighborhood of \$100,000.

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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

York, Pa.—A press report states that the ordinance authorizing the making of a loan of \$400,000 for constructing a general house drainage sewerage system throughout the city and providing for the construction of a disposal plant has finally passed both branches of City Councils.

Zion City, Wis.—Work has started at Zion City on the Shiloh Tabernacle to be the greatest building of religious worship ever erected in this country. It is expected that the work will require more than five years and cost more than \$750,000. The building will be 330' x 330' in dimensions. It will be of skeleton steel construction with solid cement base.

ALTERATIONS AND ADDITIONS.

New York, N. Y.—Seventy-ninth St., cor. Park Ave., five-sty rear extension, 14' x 23', to five-sty bk. residence; \$20,000; o. J. Woodward Haven, 26 E. 39th St.; a. Ogden Codman, 47th St. & 5th Ave.

Park Ave., nr. 136th St., three-sty north side extension, 25' x 10' 8", to three-sty bk. stable; \$25,000; o. American Express Co., 65 Broadway; a. Charles W. Romey, 55 Broad St.

APARTMENT-HOUSES.

New York, N. Y.—One Hundred and Eighteenth St., nr. Park Ave., six-sty bk. & st. flat, 50' x 87' 11"; \$55,000; o. David Lashkowitz, 14 W. 118th St.; a. G. F. Pelham.

Hester St., cor. Forsyth St., six-sty bk. store & flats, 50' 13" x 67' 6"; \$60,000; o. Henry Meyer, 22 Lapeer St.; a. G. F. Pelham, 503 Fifth Ave.

Central Park West, nr. 65th St., nine-sty bk. flat, 30' x 109'; \$200,000; o. Coburn Gahren Con. Co., 664 Columbus Ave.; a. Neville & Bagge, 217 W. 125th St.

Avenue C, cor. 6th St., s'-x-sty bk. store & flats, 41' x 90' 6"; \$65,000; o. Abraham Rosenberg, 38 Rivington St.; a. A. E. Badt, 1 Union Sq. W.

HOTELS.

New York, N. Y.—W. Fifty-first St., Nos. 308-310, nine-sty bk. hotel, 60' x 93' 8", slag roof; \$175,000; o. Gillespie & Carrel, 1123 Broadway; a. Barritt & House, 11 W. 30th St.

HOUSES.

New York, N. Y.—Grand Ave., nr. 184th St., 6 two-sty bk. dwells, 18' x 45'; \$36,000; o. Lochinvar Realty Co. on premises; a. Geo. W. Yandle, Davidson Ave., Fordham.

One Hundred and Eighty-first St., nr. Amsterdam Ave., two-sty bk. & st. stores & dwell., 42' x 50'; \$6,500; o. estate R. Morton, 941 Sixth Ave.; a. Thomas H. Styles, 449 W. 28th St.

Filmore St., nr. Morris Park Ave., 2 three-sty fr. dwells, 21' x 50'; \$8,000; o. John E. Badum, 1273 Madison Ave.; a. Chris F. Lohse, 627 Eagle Ave.

E. Fifty-second St., No. 11, six-sty bk. dwell., 25' x 61' 5", tile roof; \$65,000; o. Harley T. Procter, Williamstown, Mass.; a. Trowbridge & Livingston, 424 Fifth Ave.

STABLES.

Chicago, Ill.—Boston Ave., nr. Halsted St., two-sty bk. & st. stable, 75' x 88'; \$9,000; a. W. T. Brantitzky, Unity Building.

New York, N. Y.—E. Seventy-third St., No. 173, three-sty bk. stable, 20' x 46'; \$10,000; o. J. H. Alexander, 35 E. 67th St.; a. H. A. Walker, 31 Nassau St.

TENEMENT-HOUSES.

New York, N. Y.—Bedford St., cor. Carmine St., six-sty bk. tenement, 45' x 79' 9"; \$55,000; o. Louis J. Max, 302 Broadway; a. G. F. Pelham, 503 Fifth Ave.

W. Eleventh St., Nos. 227-229, five-sty bk. tenement, 40' x 85'; \$30,000; o. Woodbury G. Langdon, 719 Fifth Ave.; a. A. O. Hoddick, 57 W. 24th St.

MISCELLANEOUS.

Chicago, Ill.—W. Lake St., Nos. 148-86 two-sty laundry, 60' x 169'; \$20,000; o. Schreiber Laundry Co., 692 W. Lake St.; a. Huehl & Schmid, Metropolitan Block.

New York, N. Y.—White Plains Road, cor. 229th St., three & one-sty bk. police station, 31' x 46' x 56' x 75' x 72'; \$85,000; o. City of New York; a. Whitfield & King, 160 Fifth Ave.

FILTERS.

[At Watertown, N. Y.] Sealed proposals, addressed to the Board of Water Commissioners, Watertown, N. Y., will be received at the office of the City Clerk, City Hall, Watertown, N. Y., until August 17, 1903, for the construction of a system of filters. Plans, specifications and form of bid may be seen at the office of the City Engineer, and at the office of Allen Hazen, Consulting Engineer, St. Paul Building, New York, after July 27, 1903. The work includes about 11,000 cubic yards of rock excavation, about 3,000 cubic yards concrete masonry, building, cast-iron pipe and specials, gates, valves, rate controllers, strainer systems, coagulating devices and appurtenances. JOHN C. KNOWLTON, President Board of Water Commissioners.

1441

PROPOSALS.

PAVING.

[At Sidney, O.]

Sealed proposals will be received at the office of the Board of Public Service of Sidney, O., until the 17th day of August, 1903, for furnishing all materials and labor necessary for the construction of approximately 45,993 square yards of brick asphalt, bituminous macadam, or asphalt block paving, together with the necessary curbing, drainage, etc., on Main Ave., Ohio Ave., Poplar St. and Court St., between certain points. Forms of proposals, plans, specifications, etc., on file at the office of the Board of Public Service, and at the office of Riggs & Sherman, engineers, Toledo, O. CHAS. ABBOTT, President. 1441

SCHOOL.

[At Lynn, Mass.]

Sealed proposals will be received at the office of Charles H. Spear, Clerk of Committees, until the 12th day of August, 1903, for constructing an eight-room brick school-building on Boston St., near Myrtle St., in accordance with the drawings and specifications, copies of which, together with explanation of same, may be had at the office of J. Chandler Fowler, architect, 68 Devonshire St., Boston, Mass., or at the office of the Inspector of Buildings, City Hall, Lynn, Mass. CHAS. H. SPEAR, Clerk. 1441

PAVING.

[At New York, N. Y.]

Bids will be received August 15 by Mordecai T. Endicott, Ch. of Bureau of Yards and Docks, Navy Dept., Washington, D. C., for furnishing and laying about 1,275 square yards wooden block paving at Navy Yard, New York. 1441

Treasury Department, Office of the Supervising Architect, Washington, D. C., July 31, 1903. Notice is hereby given that the time for opening the bids for the new vaults (except vault doors) cash-room, Office of the U. S. Treasurer, and work incidental thereto, in the U. S. Treasury Department Building, Washington, D. C., has been extended from August 5, 1903, to 3 o'clock P. M. August 17, 1903. JAMES KNOX TAYLOR, Supervising Architect. 1441

SCHOOL-BUILDING.

[At Cleveland, O.]

Sealed proposals will be received at the office of the Clerk of the Board of Education, Rose Building, Cleveland, O., until August 24, 1903, for furnishing all the materials and for doing all the work necessary to complete the school-building on the property owned by the Board of Education between Willson Ave. and Arlington St., and to be known as the annex to Central High School, in accordance with the plans and specifications on file in the office of the Superintendent of Buildings, Rose Building, and as determined by the Board of Education by resolution No. 1645, adopted June 22, 1903. STARK CADWALLADER, School Director. 1442

NORMAL SCHOOL.

[At Cape Girardeau, Mo.]

Bids will be received by the Third District Normal School, Cape Girardeau, Mo., on or before August 19, 1903, for the construction and completion of the Academic Hall, a stone building two hundred sixty by one hundred seventy-six feet, three stories, fire-proof. Bids to be addressed to L. J. Albert, secretary, Cape Girardeau, Mo. Plans and specifications for said work are on file in the Science Hall on the Normal campus at Cape Girardeau; also in the office of Legg & Holloway in St. Louis. The plumbing and sewerage for said building will be let separately. LOUIS HOUCK, President Board of Regents. 1442

SEWERAGE SYSTEM.

[At Fort Bliss, Tex.]

Bids are wanted August 20 for improvement of sewerage system at this post. JOHN L. CLEM, Ch. Q. M., San Antonio, Tex. 1442

BUILDINGS.

[At Chickamauga Park, Ga.]

Chattanooga, Tenn. Sealed proposals will be received here until August 26, 1903, for constructing, plumbing, heating and gas-piping fifteen frame buildings at new military post, Chickamauga Park, Ga. Information furnished here or at Room 392, War Department, Washington, D. C. Bids will be received here only. H. J. SLOCUM, Capt. Cav., Q. M. 1442

REPAIRS TO COURT-HOUSE.

[At Thibodaux, La.]

Bids will be received August 27 by the Police Jury of Lafourche Parish for repairing and remodeling the court-house. Wm. S. Hull, archt., Jackson, Miss. H. N. COULON, Clk. 1442

HIGH SCHOOL.

[At Prineville, Ore.]

Bids will be received August 31 by the Co. High School Bd. for erecting a brick and stone high school. John B. Shipp, archt. WM. BOEGLI, Sec'y. 1443

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PROPOSALS.

ROCK EXCAVATION.

[At Boston, Mass.]
U. S. Engineer Office, 25 Pemberton Sq., Boston, Mass. Sealed proposals for rock excavation in Boston Harbor, Mass., will be received here until August 21, 1903. Information furnished on application. W. S. STANTON, Lt. Col. Engrs. 1442

SEWER CONSTRUCTION.

[At Washington, D. C.]
Office of the Commissioners, D. C., Washington. Sealed proposals will be received at this office until August 29, 1903, for constructing Section B of the B St. and New Jersey Ave. trunk sewer in the District of Columbia. Forms, specifications and necessary information may be obtained at this office. HENRY B. F. MACFARLAND, HENRY L. WEST, JOHN BIDDLE, Commissioners, D. C. 1443

REPAIRS.

[At Hudson, N. Y.]
Bids will be received September 12 by Chas. H. Strong, Pres. Bd. of Mgrs. at House of Refuge for Women for repairs, alterations and fire-escapes in administration building, hospital and reconstructing prison building at said House of Refuge. G. L. HEINS, State Architect, Albany. 1443

BRIDGE.

[At Kansas City, Kan.]
Sealed proposals for furnishing and erecting a steel bridge across the Kansas River, at 12th St. in Kansas City, Kan., will be received August 31, 1903, and forth opened by the Board of County Commissioners of Wyandott County, Kan., at the office of the County Clerk, in the court-house of said county, in Kansas City, Kan. Plans, specifications and forms for submitting bids will be on file in the office of said County Clerk on and after August 1, 1903. F. M. HOLCOMB, County Clerk. 1443

HOUSES.

[At Merrill, Pa.]
U. S. Engineer Office, Pittsburgh, Pa. Sealed proposals for building two lockkeeper's houses, except foundations, at Dam No. 6, Ohio River, near Merrill, Pa., will be received here until August 14, 1903. Information furnished on application at this office or at U. S. Engineer Office, Beaver, Pa. WM. L. SIBERT, Capt., Engrs. 1441

PAVING.

[At New York, N. Y.]
Sealed proposals will be received at the Bureau of Yards and Docks, Navy Department, Washington, D. C., until August 15, 1903, for furnishing and laying 1,275 square yards, more or less, of wooden block paving at the navy yard, New York. Plan and specifications can be seen at the bureau, or will be furnished by the commandant of the navy yard named. MORDECAI T. ENDICOTT, chief of bureau. 1441

WALKS.

[At Fort Leavenworth, Kan.]
Office Constructing Quartermaster, Fort Leavenworth, Kan. Sealed proposals will be received here until August 14, 1903, for the construction of granolithic walks and curbing at Fort Leavenworth, Kan. Full information and blank forms of proposal furnished on application to this office. MAJOR D. E. MCCARTHY, Quartermaster. 1441

FIRE-HYDRANTS.

[At Washington, D. C.]
Office of the Commissioners, D. C., Washington. Sealed proposals will be received at this office until August 20 instead of August 8, 1903, as previously advertised, for furnishing three hundred high-pressure fire-hydrants. Information may be received at this office. H. B. F. MACFARLAND, H. L. WEST, JOHN BIDDLE, Commissioners of the District of Columbia. 1441

PROPOSALS.

Treasury Department, Office of the Supervising Architect, Washington, D. C., July 27, 1903. Sealed proposals will be received at this office until 3 o'clock P. M. on the 18th day of August, 1903, and then opened, for the installation of a conduit and electric wiring system for the U. S. Post-office at Newport, Vermont, 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 the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1441

Treasury Department, Office of the Supervising Architect, Washington, D. C., July 22, 1903. Sealed proposals will be received at this office until 3 o'clock P. M. on the 11th day of August, 1903, and then opened for the installation of an electric passenger elevator in the U. S. Post-office and Court-house at Hartford, Conn., in accordance with the drawing and specification, copies of which may be obtained at this office at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1441

Treasury Department, Office of the Supervising Architect, Washington, D. C., July 20, 1903. Sealed proposals will be received at this office until 3 o'clock P. M. on the 26th day of August, 1903, and then opened, for the construction (except heating apparatus, electric wiring and conduit) of the extension of the U. S. Custom-house and Post-office at Nashville, Tennessee, in accordance with drawings and specification, copies of which may be had at this office or at the office of the Custodian at Nashville, Tennessee, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1441

PROPOSALS.

HOTEL.

[At Monessen, Pa.]
Bids for a \$30,000 brick and stone hotel building for J. H. Threscher will be received until August 25. J. A. Lohmen, architect. 1441

DORMITORY, WATER AND SEWER SYSTEMS.

[At Tulalip School, Wash.]
Department of the Interior, Office of Indian Affairs, Washington, D. C. Sealed proposals addressed to the Commissioner of Indian Affairs, Washington, D. C., will be received at the Indian Office until August 27, 1903, for furnishing the necessary materials and labor required to construct dormitory and water and sewer systems at Tulalip School, Wash., in strict accordance with the plans, specifications and instructions to bidders. For further information apply to C. M. Buchanan, superintendent, Tulalip, Wash. W. A. JONES, Commissioner. 1441

NAVAL SUPPLIES.

[At Portsmouth, N. H.; Boston, Mass.; New York; League Island, Pa.; Washington, D. C., and Norfolk, Va.]
Proposals will be received at the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., until August 25, 1903, to furnish at the navy yards, etc., Portsmouth, N. H.; Boston, Mass.; New York; League Island, Pa.; Washington, D. C., and Norfolk, Va., a quantity of machine tools, steam kettles, chemicals, overcoat cloth, woollen socks, motors, windlass and locomotive crane. H. T. B. HARRIS, Paym. Gen., U. S. N. 1441



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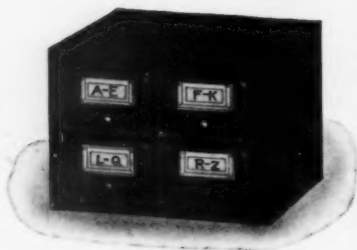
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Professional Ethics.

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 draw-
ings 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 altera-
tions of a building designed by another archi-
tect, 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, with-
out 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 criticise 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 de-
signs 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 draw-
ings 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 Archi-
tects' "schedule of charges" represents mini-
mum 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 archi-
tect 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 profes-
sional education and render all possible help
to juniors, draughtsmen and students.

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