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THE Sculpture Society, of New York, is to hold an exhibition in December and January next, of works in those branches of art in which form is a factor, such as die-sinking, wood-carving, ivory-carving, glass-blowing, metal working in gold, silver, copper, brass and iron, modelling in terra-cotta and ceramics, cabinet-making, and so on, besides sculpture proper. All works are eligible which have not been shown at a public exhibition in New York since 1883. Selection will be made by a jury of acceptance. Further particulars, including the names of the members of the jury, and the exact date and place of the exhibition, will be made public later. It is, however, desired that intending exhibitors should inform the secretary as soon as possible of the nature of the works they propose to submit, with the exact dimensions, in order to facilitate the work of arrangement. Transportation to and from the place of exhibition must be at the expense of the artist, but the cost of handling in the gallery will be borne by the Sculpture Society. All desired information may be obtained from the Secretary of the Sculpture Society, Mr. F. Wellington Ruckstuhl, 37 West Twenty-second Street, New York.

A VERY curious lawsuit is in progress in Boston in relation to the scheme which was so much discussed last winter, of erecting a building for the Architectural Club. It will be remembered that the affair was a private matter of two officers of the Club, who took all the responsibility of the building, but made a very generous offer to the Club of rooms in it, with a share in the income to be derived from it. It seems that the officers, Messrs. Blackall and Norris, contracted with the Old South Church Society, the owners of a large lot of land near the Post-office, for a seventy-five-year lease of the land, on which they proposed to erect their building, to which they intended to give the name of the Club. The Trustees of the Old South Society agreed to give the lease if Messrs. Blackall and Norris would furnish security for carrying out their part of the agreement. The latter, as they claim, obtained from Messrs. Norcross Brothers, the well-known builders, a promise to furnish the security required, on condition that the contract for the erection of the building should be given to them. The church trustees required from the lessees a deposit of ten thousand dollars in cash, and a subsequent deposit of one hundred and fifty thousand dollars, in good collaterals, as security for the fulfilment of the stipulations of the lease, and these deposits, as Messrs. Blackall and Norris allege in their complaint, the Norcross Brothers agreed to

make. The first deposit, of ten thousand dollars, was, it seems, duly made, but the Norcross Brothers failed to make the subsequent deposit of a hundred and fifty thousand within the time specified in the agreement, which, consequently, lapsed, and the whole project failed. By the rupture of the negotiations, Messrs. Blackall and Norris were deprived of the advantages and profits to be derived from the lease. They therefore bring suit against the Norcross Brothers for damages in the sum of two hundred thousand dollars, this being the loss which they consider that they have suffered from the defendants' breach of contract. The Norcross Brothers, on their side, claim that they have never placed themselves in such relations to the plaintiffs or to the lease as to make them liable for damages from the failure of the negotiations. The suit has been entered in the Suffolk Superior Court, and is likely, if it ever comes to trial, to excite much interest in the Boston building community.

ALMOST every one has heard of the Birkbeck Building Society, a corporation formed about forty years ago to advance money to members for building themselves houses, very much as is done by our coöperative banks. As time went on, the business of the Society, very naturally, took, in part, the character of that of a banking-house, deposits being received subject to call, and interest being paid on them, without necessary reference to their being invested in mortgages on houses belonging to members. Although the theory of the coöperative banks is that such mortgages form the safest and best investment for the depositors' funds, the Birkbeck managers seem to have foreseen what the recent experience of our Western mortgage-investment companies has shown—that mortgage security, which cannot readily be turned into cash to meet an emergency, should not be the sole dependence of an institution liable to sudden demands for money, and their management, as shown in the annual report, ought to be valuable to those who have anything to do with the direction of such institutions. During the past year, the receipts of the Society were £12,169,030, of which £9,857,817 were deposits. The surplus is £5,727,331. This is sufficient to pay all the deposits, with half a million pounds to spare, and is all invested in consols or other readily salable stocks and bonds, the advances on mortgage, under the original plan of the Society, being made out of funds not subject to call. The wisdom of this policy is well shown by the events of last September. At that time, as will be well remembered, the great "Liberator" Banking and Building Company collapsed, followed by several similar and allied companies. This brought a run on the Birkbeck Society. For eleven days the office was besieged by a crowd of members and depositors anxious to withdraw their money. Instead of requiring thirty or sixty days' notice of withdrawal, or paying in checks on some other bank, or trying to impede business by counting out money slowly and in small coins, as is done here by savings-banks in perfectly solvent condition, the Birkbeck officials did everything in their power to accommodate the crowd, keeping the office open extra hours and paying every claim on demand. In the eleven days, £1,578,005, or nearly eight million dollars, were paid out in cash over the counter. To raise this enormous sum, a portion of the consols owned by the Society was sold. As eight million dollars' worth, even of consols, could hardly have found a market all at once, the Bank of England advanced half a million pounds for a few days, until the consols should be disposed of. The directors had something like twice as much more money invested in salable stocks, so that they could easily have paid every depositor in full if the run had been continued, and, as the consciousness of this gradually penetrated the minds of the crowd, the panic abated, and money began to flow in faster than it had been withdrawn. In a short time the Bank of England advance was repaid, the consols sold were repurchased, and deposits had accumulated so rapidly that the directors, to check the flow, as well as to strengthen the Society's position, reduced the rate of interest paid on deposits to two and one-half per cent. Bankers here will wonder how an English company could pay more than two and one-half per cent on deposits and keep its investments within the limits of perfect safety, but, with deposits of twenty-five million dollars, a very small margin of profit in interest would amount in a year to a considerable sum.

THE *Bautechnische Zeitschrift* says that in Norway a sort of train-oil, made from haddock, is much used for mixing paint, in place of linseed oil, and is considered to be much more durable, as well as cheaper. What is called "brown train-oil," which is sold at about three cents a quart, is used, and is mixed with a little Japan dryer. It gives a smooth, shining surface, which resists the weather for a long time, and covers well, a quart of paint mixed with it, and used for a second coat, covering nearly one hundred yards of woodwork. Mixed with one part of dryer to forty of oil, the paint dries rather slowly, a second coat requiring a week to become hard enough to paint over. It seems probable that the haddock oil resembles in quality the fish-oil, made from menhaden, which is used in immense quantities in this country to adulterate linseed oil. Many painters say that paint made with pure menhaden oil is better for use on tin roofs, and certain other purposes, than linseed oil paint, for the reason that it is softer, and less likely to crack by the expansion of the work on which it is laid. Whether it would resemble the haddock-oil paint in durability we do not know, but as a great saving in the cost of painting small houses might be made by its use, it would be well worth while to have some experiments made to determine its resistance to the weather under varying circumstances. The experiments might be made with very little trouble and expense, and we would suggest that some student of architecture or engineering might prepare a very useful and interesting thesis on the subject.

WE wonder how many of our readers ever heard of a Roman-Irish bath. That such things exist is indicated by the fact that they are mentioned in the *Deutsche Bauzeitung*, and the description of them there given forms a part of an account of a great workmen's bath-house, which is interesting enough to condense here. It seems that the firm of Meister, Lucius & Brünig manufacture colors and dyes, in the town of Höchst, on the River Main. It is important to the health of workmen employed in handling such products that they should be able to wash themselves thoroughly and often, and, for this purpose, the firm has provided several bath-houses in various parts of the establishment. Quite recently, however, a very large central bath has been erected, which has several novel features. The building is nearly circular in plan, and two stories high, with a large central ventilating-shaft of brick, which passes through the middle of an iron reservoir placed on the roof, and assists in supporting its weight. Around the central shaft, in the lower story, are arranged eight sector-shaped rooms, each having eight small sinks for washing, while in the apex of the sector is a shower-bath; and around the exterior walls are fourteen more rooms, each provided with five bath-tubs and one shower-bath. The bath-rooms around the walls are repeated in the second story, but the middle portion of the second floor is open to give light to the interior bath-rooms below, by means of skylights in the flat roof. There is thus accommodation for bathing more than two hundred workmen at once. It would have been much cheaper, and less troublesome, to make all the baths shower-baths, as is done in the public establishments in the German cities, but the workmen require, for removing the dyestuffs from their skin, facilities for thorough soaking and scrubbing, such as are afforded only by tubs and sinks, the shower-baths serving mainly for a final refreshing rinsing after the more detailed cleaning is over. Besides the workmen's bath, separate rooms, all with tubs and showers, are provided for the overseers and clerks, and, in addition to these is the Roman-Irish bath, which consists of four rooms, one, heated to about 80°, and containing a tub, another, heated to 120°, and a third, opening out of the second, and heated to 150°. The fourth room is provided with three compartments, in which are marble slabs, on which the bather can undergo massage treatment if he wishes. It will be observed that this description agrees perfectly with that of the bath known here as "Russian," or "Turkish." The explanation seems to be that the South Germans, who live a good deal nearer to the Turks and Russians than we do, being unable to connect them in their minds with any sort of bath, have, like us, endowed their little tepidarium with a name derived from that of the nations to whom their imaginations attributed superior cleanliness. Whether they or we have made the more judicious selection of a name, we will not undertake to say. As to the Russian-Roman-Turkish-Irish bath at Höchst, it is sufficient to say that it is open to all employés of

the establishment, but the ordinary workman must show a physician's order before using it, and must wash himself in the regular bath before entering the tepidarium.

THE method of warming the water for the baths shows the skilful economy of the Germans to great advantage. A large amount of clean water is used in the color works, for cooling liquids in jacket kettles. As it simply circulates around the kettles, it flows away as clean as it entered the works, but warm from the heat which it has absorbed. It is, therefore, in excellent condition to be taken to the bath-house, where it is received in the lower story. It must be lifted to the reservoir on the roof, and, for this purpose, it passes through an inspirator, fed with live steam from the factory boilers, which warms it at the same time that it pumps it into the tank. The water so heated would often be too warm for use, so a direct cold supply is provided for each bath. The waste water is allowed to flow into a brook, which empties into the river close by. The heating of the building is effected by low-pressure steam, live steam from the factory boilers being drawn through a pressure-regulator, and allowed to circulate through coils of pipe. This arrangement will strike our heating-engineers as curious. It is generally supposed that steam is proportionally more effective for heating at a high pressure than at a low one and the reduction of the pressure by the regulator absorbs a considerable amount of heat. Moreover, if the pressure of steam in the radiators is materially less than that in the boiler, it is difficult to return the condensed water to the boiler, so that there must, it would seem, be a further loss by discharging water and steam, at the end of the circulation, into the open air. However, German engineers do not lay out a steam plant at random, and there must be some good reason for adopting this system, which it would be interesting to learn.

THE *Builder* has a very well-written and clever editorial description of the Nicaragua Canal, of which it speaks with great favor. As it never had much enthusiasm about the Panama scheme, its approval of the present plan is a compliment to the engineers who have worked it out so carefully, and it speaks with commendation of the work which has been already accomplished, as compared with the wasteful inefficiency of the operations at Panama, saying that "the present proprietors of the enterprise have shown such a dogged determination to carry it out during the last fourteen years, that it is no idle dream to believe that the great work is about to be accomplished." This is about as high praise as the *Builder* ever bestows on anything, and Mr. Menocal, who has lived through a good deal of misrepresentation and neglect, ought to feel considerable satisfaction in reading it. It adds, however, a suggestion which is interesting, although we fear that it will not be very well received on this side of the water. "Is it still," it says, "too much to suppose that Great Britain and the United States will throw aside their jealousies, and, for once, coöperate together for the accomplishment of the greatest work that human skill has yet devised? Is it too much to hope that these two great nations will stop their useless squabbles as to which is to receive the greater share of the advantages the canal will create, and unite together to construct that source of wealth for all the world? They are neither of them likely to lose much by it, if we may be guided by past history." The idea of "British" coöperation in an engineering work on this continent would give almost a fatal shock to the nerves of some of our politicians, but worse things might happen to the world. It is probable that, next winter, an earnest effort will be made to induce the United States Government either to assume the construction of the canal or guarantee the bonds of the company. In either case, the United States would have to assume about a hundred million dollars of obligations, and there is sure to be a determined opposition to this; but it is quite conceivable that the English Government might make an offer to share the responsibility, in a way which would not only insure the construction of the canal, but please the people of the United States. Whether it is likely to do so is another matter. International affairs, particularly those between the United States and Great Britain, appear to be carried on after the manner in which rival dogs negotiate over a bone, and an honest effort to help in a good work would be a novelty in diplomacy.

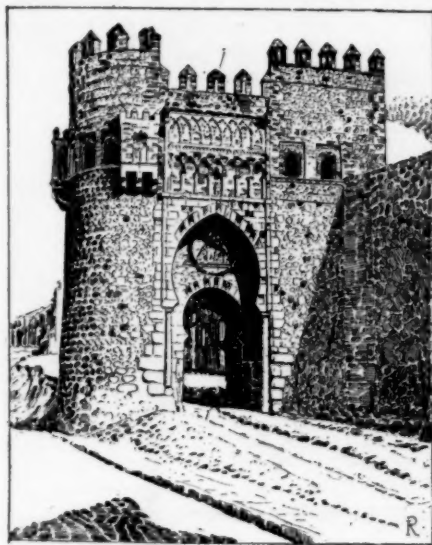
CITY GATES.¹—III.

Fig. 19. Puerta del Sol, Toledo.

THE advent of heavy artillery toward the close of the fifteenth century led to radical changes in the dispositions hitherto adopted. Loop-holes for cannon were introduced in the curtains and in the towers, which were maintained as Transitional; the battlements were modified for the accommodation of the arquebusiers; the bays were still further en-

larged to allow easy passage for the troops with their artillery, which was stationed on outworks [gate of Flavigny].

Before quitting the Middle Ages, let us recall the gate of Saint Vincent, at Avila, in Spain; the Puerta del Sol, at Toledo (Fig. 19), an interesting example of Moorish military architecture; and, lastly, the Bâb el-Futûh, at Cairo (Fig. 20). The City of Cairo has several gates, the most beautiful of which are the Bâb el-Nasr (Gate of the Help of God) and the Bâb el-Futûh (Gate of Victory). The founding of these goes back to the time of the Caliph Mostansir Billah. They were built in the eleventh century. The Gate of Victory (Fig. 20) has a great deal of character, with its round towers and its huge coving with caissons and roses. It is made of freestone laid in regular courses. The arch voussoirs are notched and constructed with the greatest care.

With the Renaissance begins the decline of this branch of architecture. City gates lost at this time all the interest that had attached to them from the standpoint of a programme realized. Their defensive character disappeared, and constructors, finding themselves no longer guided by real needs, could give rein to fancy. This meant decadence. Many of the Renaissance gates are, however, extremely interesting, but purely on decorative grounds. Such is the Puerta Visagra at Toledo (Fig. 21), the decorative disposition of which is very bold and imposing. The gate of Santa Maria (Fig. 22), at Burgos, is important as a specimen of the Transitional style; the defences here are simply a fanciful variation of an old theme, which, nevertheless, had its *raison d'être*. The gate of

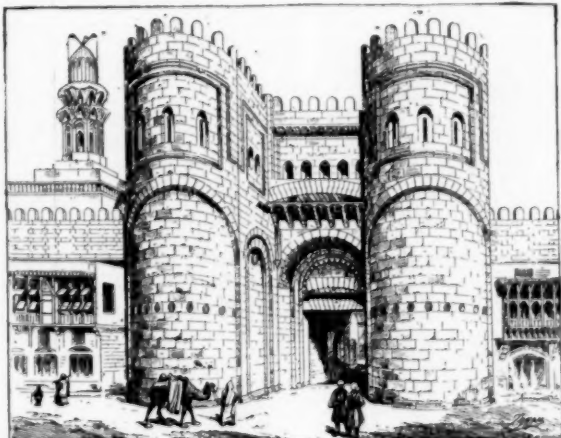


Fig. 20. Bâb el-Futûh, Cairo.

Notre-Dame, at Cambrai (Fig. 23), is likewise a fine bit of ornamentation.

Some of the types of the past can be discovered in these

¹ From the French of G. Redon, in Planat's *Encyclopédie de l'Architecture et de la Construction*. Continued from No. 921, page 113.

Renaissance structures, although under very decadent forms; but, in the seventeenth century, all that was originally characteristic of the city gate had disappeared. The downfall was, in fact, complete. The gate was transformed into a Roman triumphal arch. Such, for instance, is the Porte Saint-Denis,

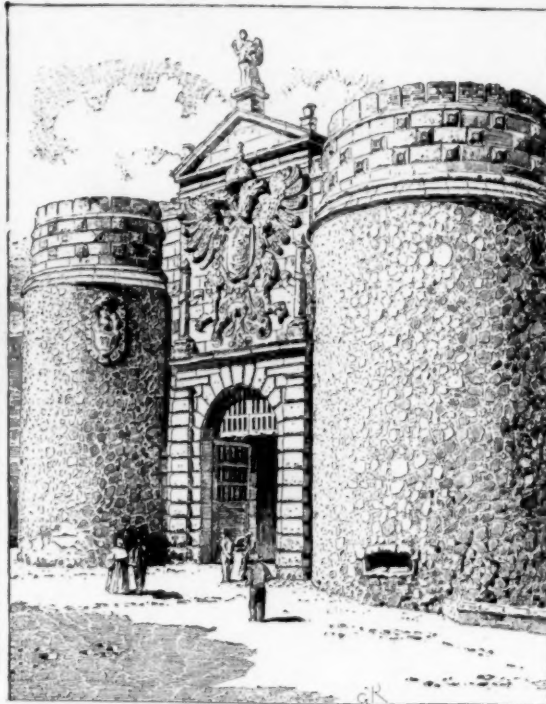


Fig. 21. Puerta Visagra, Toledo.

occupying the site of the old Porte Saint-Denis of Charles V (Fig. 24). It was designed by Blondel, and was dedicated by the city, in 1673, to the glory of Louis XIV. The constructor was Bullet, one of Blondel's pupils, who afterward erected the Porte Saint-Martin. The sculptures are by Girardon. In his work on architecture, Blondel complains of having been forced to pierce the pedestals below the pyramid; he would have preferred these to be solid. The pyramids, or, rather, obelisks in relief, are covered with ancient trophies interspersed with shields and the arms of the Dutch cities which the king had just subjugated.

The Porte Saint-Martin, erected by Bullet in 1674, was also designed to commemorate the victories of Louis XIV.

The gates of the seventeenth and eighteenth centuries nearly all had a single central arch. One with two arches was, however, constructed by Blondel in 1674, in honor of

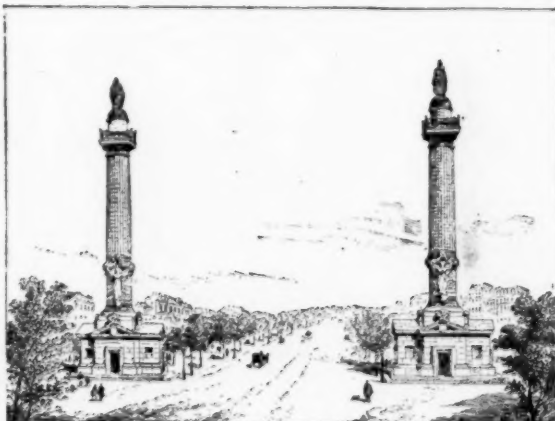


Fig. 25. Barrière du Trône, Paris.

Louis XIV, on the Quai Saint-Bernard, at Paris. It was embellished with bas-reliefs by Tuby.

During the present century city gates have been converted into mere barriers at which local duties are collected. A few of these are monumental in character, one of the most striking of

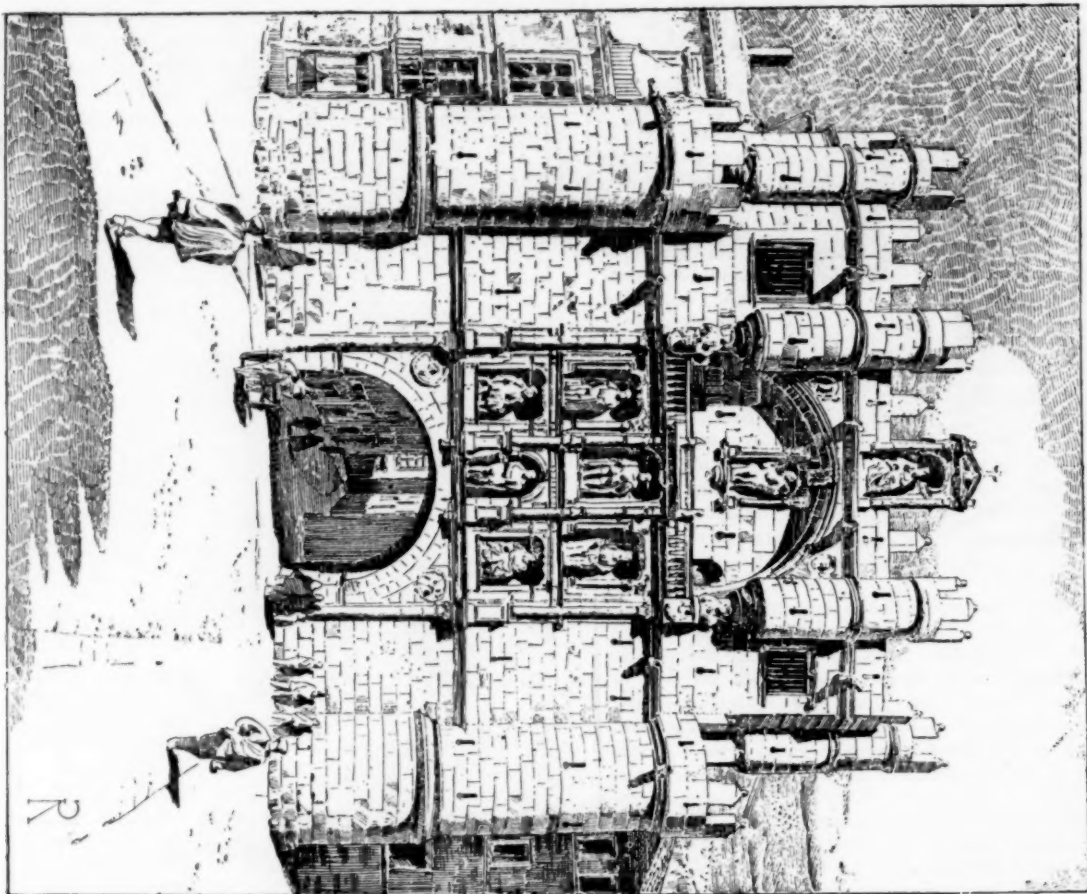


Fig. 22. Gate of Santa Maria, Burgos.

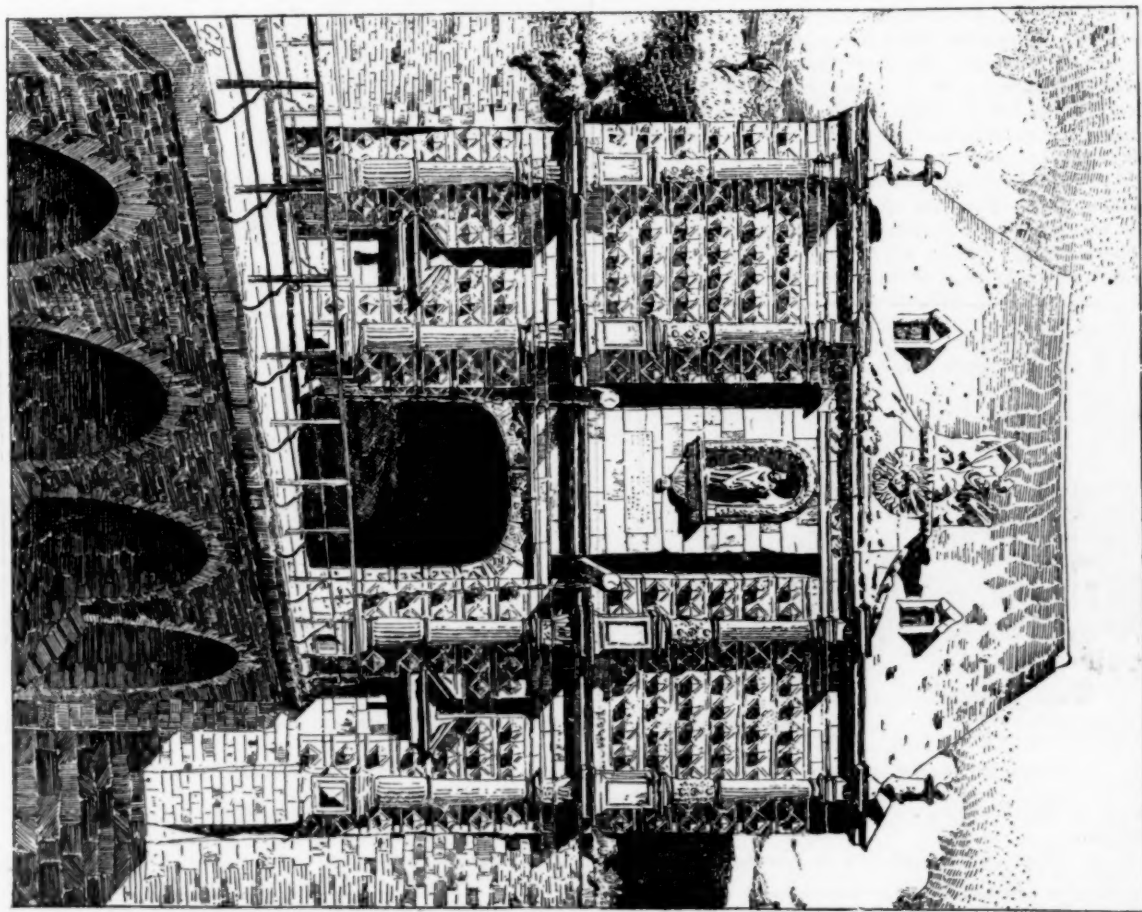


Fig. 23. Gate of Notre-Dame, Cambrai.

which is the Barrière du Trône (Fig. 25). It is by Ledoux, who had been commissioned, in 1783, to build the barriers of Paris; he erected about sixty, but only those of Montrouge, La Villette and the Throne are now in existence. To-day we are constructing neither gates nor barriers. This noble architectural motive is no longer demanded.

G. REDON.

COHESIVE CONSTRUCTION.¹

ITS PAST, ITS PRESENT, ITS FUTURE.



Gateway to a Bohemian Farmhouse. From *Architektonische Rundschau*.

struction, which I beg you to receive, not as coming from my insignificant personality, but as that of a member of the Spanish School of Architecture in this select assemblage.

I believe that you will concur with me in saying that the theme, "Cohesive Construction, its Past, its Present, its Future," is what,

LADIES and Gentlemen, — Mr. President:

Having learned through the courtesy of your worthy Secretary, Mr. Alfred Stone, that the annual convention of the American Institute of Architects was to take place conjointly with the general convention of architects, to meet during the World's Fair, and in acceptance and permission of your most worthy and illustrious President, Mr. Kendall, I wrote for that occasion, and I will have the honor of reading before you this second essay on cohesive construction.

that of a building-engineer in an architectural structure, as if all of the constructive parts of an architectural building were not inside of the faculties and responsibilities of the architects, and as if it were possible to conceive of an architect who cannot understand the construction of his age. Otherwise he could not be thoroughly familiar with the needs of the architecture of his time. Therefore, we may safely admit that the theme, "Cohesive Construction, its Past, its Present and Future" is an architectural theme, and one which every architect can and should regard as within the professional faculties and artistic, scientifically-applied knowledge.

What is cohesive construction?

We have made and already published a definition of construction in general, and divided into two classes:² The first is the construction we shall call "Mechanical Construction," or by gravity. The second we shall call "Cohesive Construction," or by assimilation.

The first is founded on a resistance of any solid to the action of gravity when opposed by another solid. From these conjunctive forces, more or less opposed to one another, results the equilibrium of the total mass, without taking into consideration the cohesive strength of the material set between the solids.

The second has for a base the property of cohesion and assimilation of several materials, which, by transformation more or less rapid, resemble nature's work in making conglomerates.

We can give another definition more precise and comprehensive for both systems in saying that the first, or gravity-system, is one where all the pieces can be separated, one by one, and then rebuilt in the same or similar manner. To this class belong the pyramids of Egypt and the Greek temples, etc. In "cohesive construction," on the contrary, the components cannot be separated without destroying the integral mass. To these belong the Babylonian walls of hydraulic mortar; the vaults and cupolas of the Assyrian, Persian, Roman and Byzantine; the Antique and Middle Ages conglomerate construction.

The structures built by the "gravity-system" can be at any time taken down in the pieces out of which they were formed, while, on the other hand, man cannot again use the parts of "cohesive construction" for modern buildings, and only Nature, with its slow but sure work of disintegration, can take from this style of buildings its material for her immense laboratory.



Fig. 24. Porte Saint-Denis, Paris: after Péréle.

technically speaking, may be called an architectural one, although the word "construction" records and implies at the same time engineering and constructive subject, and is as much in place in a convention of engineers as one of builders; why not. Precisely when we observe the inclination of some architects of the present epoch to make a sort of distinction between the work of the architects and

The materials employed in the construction by gravity only require the physical and mechanical quality of hardness, while for the "cohesive construction," the materials must not only have proper physical conditions, but it is absolutely necessary to take into consideration the chemical properties of the substance employed. Therefore, the use of the cohesive system was rendered impossible to many nations that had neither the material nor the knowledge of its

¹ Paper by Rafael Guastavino, from the Spanish School of Architecture, read before the Congress of Architects in connection with the Columbian Exposition, Chicago, August 5, 1893.

² "Cohesive Construction applied to Timber Arches." First and Second Editions.

use at their disposal; while, on the other hand, all civilizations and all nations could make use of the gravity-system.

The base of the best of these materials are mortars that do not require exposure to the air for their transformation or setting qualities; that is, hydraulic limes and cements, and principally of the quality of Portlands. All that material which your popular Mr. Daniel H. Burnham has employed in embellishing the outside of the structures of the White City with marvels of artistic architecture is cohesive material, although of limited life. Cohesive material holds together and resists equal tests of pressure in whatever position it may be placed.

A brick or stone wall, to be a cohesive wall, must have the resistance required as brick or stone masonry in whatever position the tests may be placed or applied; that is, sideways, applying on both sides at the same time the tests, or in a vertical direction.

Attempts have been made in all civilizations and in all styles of architecture, since the most remote times, to build in the cohesive-construction system. We see Assyrian, Persian, Greek, Roman, Byzantine, Turkish and Arabic monuments; in fact, in all the antique and Middle-Age civilizations.

Investigations have given the conviction that the remotest peoples who were most successful in developments and inventions in their system of construction were the Persians, for which reason they can be considered the fathers of the cohesive mode of construction.¹

There is no doubt that in the days of the dynasty of Achaemenides (800 B. C., which was ended with Darius), was the era of the real development, giving the new forms of abutments for domes and arches.

From that civilization was taken the practice of the system used by the Greeks and Romans, because the Pantheon of Rome, as well as the domes and pendentives of the Caracalla Baths, are specimen buildings taking the idea from the antique Persian monuments, with which the architect of the said buildings must have been familiar or have had some knowledge.²

That the Byzantines were wanting in the knowledge of this system when they began Byzantium (272 A. D.) was proved by the poor buildings of the time of Constantine (See Zosimus, *lib. 2*), for good, skilled men and architects to assist him in his first attempt were lacking, for which reason no building of the epoch of Constantine remains to-day in antique Byzantium.

The primitive cohesive architecture, which began to have character in the Persian monuments, was well developed by the constructive improvements introduced by the Romans during the days of Augustus and subsequent periods, and also by the Byzantines when they reached their days of splendor, which constituted the most brilliant period of that masonry epoch, from the simple walls to the abutments of vast domes, with their spandrels, niches, pendentives and hemicycles, and which development was always pursuing the condition of maximum strength with the minimum weight of material and space occupied by the walls in relation to the full space of the structure until the decadence, which began about the eleventh century, when the stone-cutters' architects, being conscious of their independence and importance of their own time, took in their hands the reign of the fine cut-stone epoch, richly elaborated to the impossible, preparing the Renaissance, passing throughout the Western or Gothic architecture.

But what have the Persians, Romans and Byzantines left?

The Classic construction by gravity was in existence, in fact, only in Egypt and in Greece, although we are perfectly in accord with the eminent and well-known Professor Aitchison that "The Grecian architecture was purely an invention. The constructive principle was that of Egypt." Well enough; Greek architecture was not the complete architectural conception of Greek civilization, but they applied the Classic art lines to the principles of the gravity-system of marble construction to such perfect development that no civilization has been able to improve upon it.

Can the cohesive construction say the same, in any day of its existence, in any civilization?

During all these fifteen hundred years that the cohesive construction has been in practice, all the improvements and inventions have been as we have said, toward the idea of obtaining the maximum strength with the minimum weight and ratio of the mass of materials compared with the space covered.

In the first attempt of the best of their buildings (Sta. Sophia) they did not succeed, because the building collapsed from defects in construction, aggravated by want of uniform conception of construction; masonry was mixed with wooden ties.

These ties, which are the sinews of the cohesive construction during construction, also after the building is completed and set, were exposed and treated in such a way that all these buildings were of short duration (272-337 A. D.). The danger (as in the majority of buildings of our days) was constant, as is evident from the fact that none remain as mentioned, including the first Sta. Sophia, in one of those tremendous and terrific conflagrations and riots, when loss of life in Byzantium was counted by dozens of thousands (532 A. D.), destroying all the buildings of that epoch in Constantinople.

New buildings were started forty days after that terrible calamity by Justinian and Theodora, under the direction of the Asiatic Greek architects Anthemius and Isidore, with better conception and results,

for which cause we can yet admire several of them, principally Sta. Sophia.

But although in this second attempt in the epoch of Justinian, they realized what Constantine could not, other defects appeared after, which compelled them to add new reinforcements to their masterpiece building, as new abutments; from which it appears clear they have not succeeded in giving to the system a spontaneous and æsthetic character, as the Greeks have done in treating the Egyptian construction in gravity-system, for which reason all this Byzantine period has passed into history as an epoch of transition, and we by no means find it necessary to admit this historic remark in comparing the artistic and mechanical perfection obtained in the best periods of cohesive construction, the artistic and mechanical perfection of the Greek era.

It is true that to improve, and to arise to classicism of the Egyptian "stonehenge" construction, or by gravity, is apparently easier than to get the same results in the primitive Persian construction (base of the cohesive one), although several centuries have passed between the primitive Pharaohs, and the people of the century of Pericles, proving that perfection in architectural art takes a fair number of years.

The comparison between the Egyptian and the Greek architectural work, inside the gravity-system (and we refer both to the constructive and artistic conception) passing through Assyrians, can be equally made between the Persian architectural art, inside the cohesive system, passing through the Byzantine and modern periods to the future classic cohesive construction for which this century has been so successful in obtaining great and new elements of success. In fact we are new in regard to the advancement of the building art inside of the cohesive construction, as the gravity-system was, in the period of Egyptian and Assyrian, before the great era of the great art. We have not reached yet in cohesive construction the parallel of the Greeks in the gravity-system.

The Egyptian architecture, with its gravity-system of construction, can be compared to the stone age in the earth's formation; the gravity construction has not individual life. The stone is cut out from the quarries, placed dead in the building one over another. But the Persian architecture, in its cohesive construction, is like the period of animal formation; that is, the cohesive material has natural life, its material components have elements that change its condition and increase its strength by their self-elaborating elements. Egypt is the repose in the sustaining parts as well as the sustained members. In the Persian construction the sustaining elements as well as the sustained constituents have, and should have, constant work of self-abutment and thrust, as the first principle of their existence. To select and put together the right material, to have the said elements of natural life in the materials, is one of the most important parts that the architect has to play in the cohesive system.

In the dome of Sta. Sophia, for instance, they selected brick of such small density that they would float on water; the cement or hydraulic limes, natural or artificial, was also a matter of essential care. All these new conditions and complicated elements of construction, necessary to the cohesive construction, could not be solved in the state of science at that old period, for which reason the most advanced period of architecture on cohesive construction, say the Byzantine period (272-1100), was, as we said, an epoch of transition, because these buildings, although architectural in their lines, were like some specimen of the animal kingdom whose skeleton is not yet well pronounced, does not correspond yet to a well-finished, developed and perfected body, as, for instance, the man, who, although constructed with well distributed and built forms of flesh, giving his beauty, nevertheless it has in the interior skeleton a bond-system which gives the maximum of strength and the minimum of weight and capacity to the body, which can be well compared with this wonderful invention of the steel skeleton construction of our days.

The antique and mediæval cohesive materials were slow. When they could not find natural hydraulic limes they used limes made ydraulic to improve its condition of cohesiveness and quick-setting to a certain degree, by mixing a portion of burned clay, giving in that way to the lime-mortar the condition of an aluminium silicate one. But you will imagine the great number of difficulties and constant danger during the construction of the heavy domes, having only such poor-setting materials. The *pedra pomez* (lava of St. Vesuvius) and pozzuolana lime, which probably was the basis of the Roman cement and mortar, was no better quick-setting, hence, the necessity of enormous thickness, enormous centering and long, long time needed to obtain the strength necessary to enable them to deliver over the building.

The Persians, with their forms of conic dome, could avoid centering by advancing the courses of brick proportionately to the curve in each course, closing each ring, giving time to have some cohesion before they put the next one, and then advancing more. But always at the cost of a great amount of time, which was their only resort; but domes like the one built by the Romans, with centering, although reinforced and helped a great deal by the use of some courses of brick laid flat, were also laid with the same slow setting-material, as can be seen yet in specimens. But a heavy centering could not be avoided, because this material that constitutes at present the domes, and is now strong and massive after centuries of assimilation and transformation, we can imagine was at first, for months and months, of very poor strength; and it had to bear, in

¹ See A. Choisy, "Extrait de la Gazette Archeologique de 1887."

² See Aitchison, "Byzantine Architecture."

addition to what it now is supporting the weight of the water of the material, the weight of the great number of workmen and the pounding, which it would be very serious to risk without heavy centering before giving over the structure to use. And there is no doubt whatever that, in regard to the Pantheon dome, the centering must have been of enormous cost and the material and labor surely, as we will see below, more expensive than the material and labor of the dome itself, that we admire to-day.

We say to-day, because the dome that now exists and covers the Pantheon, attributed to the time of Augustus, is not the same one built for Agrippa, or by Agrippa. The roof of that time collapsed or was taken away, perhaps for defects of construction as we have said in regard to the dome of Sta. Sophia, happening later. We have a doubt that it was a dome, because the plan of the Agrippa building was a square one, and it is now discovered (that is last year) that the dome, and it seems also, the round wall, was built by Adrian about one hundred and fifty or two hundred years after.

This reference I have from a member of the Spanish Academy of Arts, that the Spanish government has in Rome, the illustrious architect, D. J. Pavia, who says, "a crack was discovered last year in the dome of the Pantheon, not from any defect in the dome, but, as always happens, from some trouble in the foundations, and there, in consequence of currents of water of temporary different levels near by. The French Academy in Rome offered to the Italian government to make at their own expense the scaffolding and repairs. To their surprise they discovered that the bricks (as is always the case in the antique Roman bricks) have the mark of the builders, but they have not the mark of the time of Augustus, but the mark of one hundred and fifty or two hundred years after, that is, the epoch of Adrian, whom you know has passed into history as one of the most able architects, and who was known to have a hobby for construction."

This dome is constructed, first—by a series of small circular arches at the base of the spherical dome, and after springing at the centre or key of the said small arches and forming the centres of the caissons or panels, they built in the direction of meridians of the sphere a series of ribs or arches. All these arches were built not with the bricks laid flat, as is attributed to all the arches of the Roman epoch in that class of construction, but laid on edge, like voussoirs, for which it was absolutely necessary to have very heavy centres, from side to side of the dome. These ribs are the bottom face of the caissons or panels, which caissons were made afterwards with casting materials, a concrete made with a porous stone like *pedra pomez* or lava of Vesuvius and lime-mortar mixed with *puzzuolana*, which stone is commonly used in a similar way in the islands of Mallorca and Mahon in Spain. You can imagine that a dome built in that way and with such tremendously heavy thickness of brick, for ribs it was necessary to have a very heavy centering, and yet well anchored; and as the material was of the kind of common hydraulic material which requires exposure to the air for its transformation, although less exposure than the common lime—it takes months before it has the necessary strength to support itself, and in consequence, not only must have been the heavy centering necessary, but besides many months before the centres would be removed.

Another remarkable epoch inside of the development of the cohesive constructive period, will you permit me to put on record in this essay, on account of its influence on modern architecture of this country.

The Byzantine and Moorish-Spanish architecture representing the architecture of the far west, known in the days of the Christian world.

The Imperial edict of Constantine declaring Christianity to be the State religion, transferring at the same time the capital of the Roman Empire to Byzantium, put the Eastern European and Western Asia Jewish race and other sects, for the first time after Christ into emigration, giving occasion perhaps for the late invasions of the Arabs and Mussulmen.

Spain was the principal attraction for emigrants, not only on account of climate, richness and the already relatively large commercial relations with the Greek Empire, which relations in the Byzantine period had made legendary names, as Roger of Lauria and others, but also on account of freedom and religious tolerance, as is always the case in new countries.

Byzantine churches and cathedrals were built in Spain at the same time that synagogues were tolerated. These edifices were of remarkable constructive character, and it is a matter of congratulation that American architects, in their impartial views of artists before historians, having reinvited for Spanish history of art, a page which was erroneously conveyed by Northern European historians. Fortunately history written with architectural monuments could not altogether be misconstrued.

The great Richardson in his travelling studies through Spain with some of his distinguished disciples, now prominent architects, discovered for American activity a magazine of Spanish, Byzantine and Romanesque Architecture, namely, Cathedrals of Salamanca, Zamora, Toro, Avila, Gerona, Segovia, las Puellas, etc., etc., and monuments in Catalonia, Valencia, Castilia and Leon, giving new motives to his great activity and to the learned scholars, to-day, represented by Shepley, Rutan and Coolidge; Andrews, Jaques and Rantoul, of Boston; Potter, Robertson, Eidlitz, Gilbert, of New York and other

enthusiastic disciples of the greatest American architect of his time. But if, as Spaniards, we must appreciate and profoundly recognize the value of the preference of the Western Byzantine to the Eastern Architecture, perhaps as we have said, on account of its constructive character, externally and internally, we as simple, humble apostles of Architectural Art, and in the interests of the good examples for the youth initiated in architecture, we sincerely congratulate the opportune reaction arrived from firms called Richard Hunt, McKim, Mead & White, Post, Peabody, Atwood and others, who assisted in time to avoid the disturbance that in the young generation always made genius, like Michael Angelo in Italy, and Churriguera and Berruguete in Spain, in their pernicious effects for the advancement of true art. For which cause, the nation should be proud for that reaction as much as to the healthy art influence that the masterpieces of architecture of the World's Fair buildings, due principally to the never well-appreciated noble tendencies of the architects, Burnham & Root, when they recommended the distribution of work, that so brilliant a result has been given, not only to the credit of this nation and to the city of Chicago, but also to influence that in the mind of youthful architects and great part of the public, as a teaching medium of good school. And, although, we think that the architect must not be an archaeologist, and that building outside of the classic style, as for instance, the Transportation Building by the well-known firm of Adler & Sullivan, for its originality and typical romantic style is opportune, and necessary to break any monotony, if it exists, nevertheless, in the present case, at the close of the decade of the Richardson reign of the Spanish-American Byzantine and Romanesque, when no more such powerful genius seems to appear, it was necessary that classic display as regulator and to normalize the effects of the illumination given by the great star.

Returning to our theme, the character of the most of ancient Byzantine and Romanesque types in Spain was of monolith construction made of conglomerated material. The walls and floors (like other specimens relatively modern) were, some of them, of stone and concrete, others concrete alone. For the second one it seems that moulds or heavy centering were used, giving to the material an appearance outside like a cast mass, as can be seen by specimens of walls with large portions of floors, of vaulted ceilings, which are yet in existence, showing perfectly their construction.¹

Some domes were built with stone and packed with the same casting material referred to, probably without centres, because there is small ashlar, and it is yet customary there to build domes of that kind, using only a stick pole as a radius, and closing each time the ring of stone, so no centering is used in that case.

Same was the construction in the period of the Arabs and the Moors. It was that of the rest of Spain, in Byzantine style, and although the Moors in their florid epoch arrived at classicism in their way of treating all the constructive material, from wood as applied to ceilings (flat or domed) doors, etc., to the marble work casting and ceramic materials, etc., used in their interior Classic decorative epoch of the romantic styles, the use of wooden materials, for instance, for the stalactites in the interior constructed decorations of their dome ceilings and arches, which is a plain contradiction, and a misrepresentation of the natural stalactites, in that material, proves that they were by no means at the same level in architectural constructive advancement as their neighbors of the north and east contemporaries: Ending here, all we could to-day say in regard to the cohesive construction of the past, whose specimens all of them convey that the classic cohesive architecture has not been in existence. Will it exist in the future?

Unfortunately, the present system of steel-skeleton construction is the opposite extreme of the Byzantine construction in meeting the needs of true art. There was all flesh, and here all bone. Here is the human skeleton only enveloped with the skin, without any more artistic life and soul, than a brain purely mechanical and engineering can give cool calculation and nervo-physical result, which never will be architecture, and if it is architecture, it is in its infancy for want of artistic development or treatment.

This is the character that is growing at the end of the nineteenth century, and it could be called architecture of the nineteenth century. The engineers of this epoch have brought new elements of originality to the observing architect. That is a fact; but it is also true that these new elements are, as we have said, the real architectural character of this epoch, which will pass to history as one of transition on that account, and like the Byzantine epoch, we need besides that which we have, something else perhaps not yet devised.

Have we not got just what the Byzantine wanted? That is, the steel-skeleton construction with the steel ties, or do we need what the Byzantines and Romans had? That is, the flesh, the artistic masonry architecturally treated?

This steel-skeleton combination, together with the massing new elements given by the manufacturers of building material, as Portland cement, for instance, and other materials that for years have been unconsciously accumulating to the end of the century, perhaps to the benefit of the architect of the new era: *Will they be, if well developed, the beginning of the era of the classic cohesive construction, as the Greek era was for the classic construction by gravity?*

The architect could cover now the skeleton, not as we have said,

¹ Near Barcelona, between the town San Andres and the river Besos, we saw about twenty years ago, the ruins of a monolithic building of that kind of great importance.

with this thin skin, without flesh, dry, without life, with this want of soul which gives the inartistic physiognomy so detrimental to all real architectural work, and which is what happens with some of the edifices of steel skeleton covered with the mean coat called fireproof, which, if it is fireproof in itself, is not so to the extent to protect and give beauty to the skeleton; as, for instance, it will not protect, neither give beauty to our animal bond system, if we have the skin and nerves only over the bones! It would be very funny to look, ourselves, like Egyptian mummies.

Can anybody admit that if the man has the bond and nervous system, entrails and the senses which are the essential parts of latent life, that there is no necessity of flesh? Certainly not! We know the man can live, but cannot resist the natural elements. Same is the case in the skeleton building construction that is covered with this mean mechanical coat, so-called fireproof, with which the skeleton construction does not and could not resist the fire, as is just what one of your oldest and most prominent engineers, General Scoy-smith, with his incisive literature, and although he is an iron-building contractor, is for years insisting with much reason, that the skeleton construction is an architectural imperfection and a menace, for which something must be done.

But we do not mean that what is wanted, in the steel skeleton is to cover it, with that material called fireproof in the way that the said worthy engineer does not admit is fireproof: and thus we can call it mechanical fireproofing, because it has not any architectural form at all; neither do we mean that in order to correct the form and give architectural appearance, one must use other kind of fireproofing which consists of wire-lath of different patterns, giving, may be, architectural appearance, covering it with plaster or other casting material but leaving dangerous empty places, which we call false construction, because that will be, as if nature had covered our bones and nervous system with skin alone, as mentioned before, but giving, besides, false inflated forms, such as the false forms of a toy, so as to give artistic lines to giving only the appearance; the bone and nervous system will not be protected better than in the first case, on the contrary they are more exposed, besides that the monstrosity will be false and undignified, which is what happens to all the permanent edifices when the wood, wire laths constitute the false artistic form.

The true architectural construction, the natural and legitimate construction, in architectural art, must be just as Mother Nature teaches us in its most perfect work, the man itself.

The ancient cohesive construction has given us valuable elements of constructive form; that is, masonry materials and new constructive forms of masonry. The engineering advancement of the present epoch has given us the skeleton, that is the bond, and the nervous system. The manufacturers have given us also new materials, improving what Rome and Byzantium have done. Why does not the present-epoch architect now take all these elements of construction together and satisfy what the engineer work requires as illustrated by General Scoy-smith, in recommending so highly to do something, to protect the skeleton construction, and satisfy also what the no less pertinent thought of the eminent Professor Aitchison suggests, who says: "Although iron has been used largely for various structures, it is not likely that it will take the place of more time-honored materials, at least for monumental buildings."

But, unfortunately, the present cohesive architecture also is in embryo, due to the poor treatment of the new materials, and perhaps to the fact that it has not yet passed the period of controversy between the partisans of concrete for cohesive material and the partisans of the brick and tile, clay and cement system. The partisans of concrete have for a model the conglomerate of Nature, and the antique concrete construction. The partisans of the brick and tile clay with cement system have as instances the Babylonian construction, some Roman and Spanish specimens, and the brilliant results in strength, in quicker setting, lightness and cheapness, four elements of success in construction at any time.

For nearly a century after the invention of Mr. Parker in regard to cements, the concrete partisans have been trying to introduce in the building practice the system of cohesive construction of concrete for walls, ceilings, etc., and no successes, it seems, are yet in prospect to compete with the brick walls, which are better adapted than for ceilings, and we think it is due, as we have said, to its weight, to the necessity of use of centres and slow condition of *modus operandi* inherent to the system, as can be illustrated by comparing arches built in concrete with others built in clay tiles and cement.

The domes built in tile, for instance, in the Banigan Chapel in Providence, from plans of the firm of Messrs. Stone, Carpenter & Willson, the senior partner of which firm is your worthy Secretary of the American Institute of Architects, and present with us, have about thirty-six feet diameter, and are only three inches thick, supporting the full weight of the roof. The elliptical dome of the driveway of the new Boston Public Library has forty-two feet for the longest diameter, and is also three inches thick and has received very severe tests. The elliptical domes of the new Court-house at Taunton have for one of them the longest diameter seventy feet, and this is four inches thick only, and supports the full fireproof roof of about 7,000 square feet surface, which is one of the most remarkable specimens in existence. It was built in two weeks, beginning in June, and is to-day covered over with a high roof with fireproof material weighing about one hundred and twenty tons.

The tubular or hollow dome of the Central Congregational Church at Providence, from plans of Carrère & Hastings, fifty-four feet in diameter and carrying a lantern weighing twenty-four tons, is another specimen that together with the artistic condition of the building will form, like the Boston Public Library, by the firm McKim, Mead & White, and the St. Joseph Seminary of Archbishop Corrigan, from plans of the well-known firm of William Schickel & Co., a page in the American history of constructive art. These specimens positively, we think, were impossible to be built in concrete, with such dimensions, strength, thickness and in so short time.

But if in ceilings we have some advancement in cohesive construction in opposition to the mechanical construction that we have considered, viz, the flat, hollow-block ceilings which work as voussoirs, and correspond to thin fireproof referred to, the cohesive walls are not yet well understood in practice, because, although we have on hand and are using cohesive material, they are not well treated in their manipulation, resulting in general cases in a wall that, if it can resist vertically the pressure technically admitted for common masonry walls, it is not equally resistant if the pressure is applied sideways, which shows that the wall is not a cohesive one. It also can be proved that it is not cohesive by the fact that in nearly all the walls built to-day the mortar joints are only working as a cushion, because it is generally known that we can take brick from the said wall, clean of mortar, and pretty ready to be used as a good second-hand material.

That is due to two facts: one due to the poor manipulation, the other to the condition of the climate. Both can be corrected, and are in the hands of the architect to correct in the present state of advancement of material and knowledge.

The first case depends on the fact that the general materials used for cohesive walls here are the cements called Rosendale containing a small quantity of silicate. They are, as you know, good and quicker setting than Portland, but the man in charge of the manipulation manages to use them as if they were common limes, or as if Rosendale was given as much time to be used as Portland, keeping the cement mixed, and running hours and hours if not left until the next day, so we can say that no Rosendale is used in the proper way. They are never used in their own first setting; they are used in the so-called second setting, so we must consider that Rosendale cement, in the way that it is generally used, is not a cement, but an hydraulic lime that requires exposure to the air to have a slow setting, which always takes months.

That can be seen very easily in observing that in good, dry weather the outside joints of any wall built of Rosendale cement used in that way are in a few days very fairly well set. But if you take some of the bricks, and observe the conditions of the mortar in the interior of the wall, it is noticed to be comparatively fresh in summer, but in winter in a very unsatisfactory condition, if not frozen, due to the fact that the outside mortar has had the chance to absorb from the atmosphere the carbon necessary for its transformation like lime-mortar, and the interior is kept for months, or it may be for years, in latent life, if it is not killed already by freezing weather.

These defects cause every year a great number of accidents, that we can call *May accidents* (on account of the rains of that month dissolving the frozen water), in all countries where freezing weather prevails in winter. This is just the same in New York, New England, and all the Northern, Eastern and Western States, concerning several buildings with this unsatisfactory treatment of materials, to the extent that we feel something must be done. The only remedy that we can find to prevent this heavy responsibility of the architects is, in view of the rapidity required to-day in building in cold weather, and especially in tall walls, to specify that from October to the end of April all the walls must be built with cement-mortar of the quality of Portland cement. Experience has confirmed that Portland cement-mortar in the proportion of one of cement to two of sharp, clean sand can be worked safely to within six degrees below freezing; also, that Portland cement-mortar can resist after being laid on the wall, lower temperature if it has a chance of a few hours of setting, and, in case of a severe night's freezing weather after a day of work, if anything gets affected, it is only the material laid the few hours' later work, and not, as it happens, when other material is used, affecting the whole winter months' work, because the soft mortar has a chance of absorbing the rain-water, in consequence of its unset condition, and is, therefore, repeatedly frozen during all the season. The result of this is that walls in this condition are not walls, but a pile of brick regularly laid one over the other, as if it was a wall: the joints outside are some of them apparently good.

We do not think it necessary to remark that what we have said in regard to Rosendale cement, used as commonly in its so-called second setting; the lime-mortars of any kind used during winter are worse, because the presence of lime is keeping fresh the mortar in the wall all winter, and, in consequence, is more exposed yet to be affected by frost. The practice of some builders of mixing cement in lime-mortar for works during winter is also a bad practice, not only because they have the same inconvenience as in any lime-mortars, but also on account that the cement is not giving to the lime-mortar better conditions than if, instead of cement, they mix in powder of burned clay, giving, besides, a proof of empiricism.

All that clearly confirms that we, like the Byzantines, have not

yet succeeded in giving to the system the thoroughly æsthetic conditions to the cohesive construction that the Greek civilization has done in treating the Egyptian system by gravity, and will be in history in the same classification as the Byzantine epoch; that is, an epoch of transition.

But, nevertheless, the progress of the cohesive construction is concentrated at present here in North America. The specimens in Europe are in brick, built in German type for dome and arches, of reduced dimensions compared with the specimens of work with tiles mentioned above. The specimens in Spain and in Italy, with tiles of the same character as those done in this country, are also notable, but not as important and advanced in perfection.

The concrete ceiling between beams with wire, also for relatively small spans, are other attempts of cohesive construction. We suppose you are familiar with some of these specimens, and all are improvements due to the advancement of building-material of this day. They are (the materials) remarkably good, and constant enough to bear coefficients of safety, especially for clay, tile and cement, to the extent that professors of the standing of Dr. G. Lanza, of the Massachusetts School of Technology, assisted us to succeed in getting and breaking specimens of arches built up to 200,000 pounds distributed load, and for which we hope that the architects of this day can give at the close of the nineteenth century compositions of architectural value based, first, on the experience of the steel-skeleton construction, and, second, on the experience given with the masonry specimens of modern cohesive construction with new materials, which we hope the architect could give to his structures the artistic lines, the hygienic and fireproof conditions inside of the new ideas of construction.

Architects, therefore, have to complete the work, constructing architecturally, completing their work in architectural proportions with architectural materials, just as a work of art is any work of nature, although with its mechanical interior work.

This idea of architecture being so rational and evident in its principles, it is impossible to doubt that simple growth will carry *legal architecture* along these lines, and will form the urban practice of the next century, but not without giving necessary organized form to the profession of architecture, as, for instance:

1. The *landscape architect*, whose mission will be enclosed in the lemma of the eminent civil engineer, D. Idafonso Cerda, in his profound treatise on "Theory of Urbanization": "Urbanize the rural district and ruralize the urban ones." Which lemma should be to-day the lemma of the health-departments, aroused by the architects of all great centres of population, in order to protect the health conditions of the larger number against the lesser. The rural districts around the large city must be urbanized in order to protect the lives of the inhabitants of its metropolis, and the condensed urban districts must be returned to life with fireproof and hygienic constructions and streets.

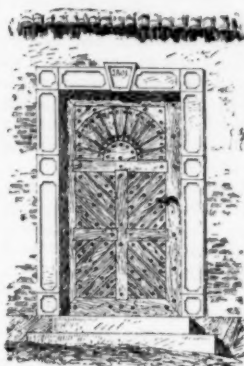
2. *Urban architects*, whose mission on the earth and in the sphere of the tangible is the most exceptional one, because no profession represents in the human limited sphere the universal scientific moral activity of intellectual faculties necessary to a creation, as the architectural profession is the most selected exception.

And that is not only a technical appreciation; no, it is a popular imposition of all classes of society on the architectural profession. The popular feeling is that the architect must know everything, from the most complicated condition of hygiene, all necessities of life, moral and physical, in any building, all natural elements in the earth that could be prevented and taken into consideration in the existence of any structure in any community—all this must be known and be resolved by the architect, for which the profession of architecture since the first Assyrian king, Nimrod, attributed author of the enormous Palaces of Khorsabad, which were no more or less than Bibliothèques, and who was the first architect known in history, all architects after him that have existed, and are existing in the fullest acceptance of the term architect, have been and are in the honored profession that, as no other, represent in the earth God, Creator.

To end this small work, I beg to add a few words. Although the ideas pointed out in as short and concise a way as we could inside of the thirty minutes given are, in part, the result of thirty years of constant pursuing of the development of cohesive construction in the Old and in the New World, they were originated by the noble activity and talent of the performers of the new Spanish school of architecture, properly said Catalonians, that for years were pursuing new applications and new directions to the architectural ideas, in view of the new materials and new elements of construction of their time. The names of Pablo Mila y Fontanais (who was there representing what your illustrious Professor Ware is doing here in benefit of the fine arts in this country) and the names of the architects and professors Marquis d' Cubas, D. Elias Rogent and D. Juan Torras, all from the school of Madrid, I beg this select assembly, if it is not asking too much, to give a record of applause as founders of the new Spanish school of architecture, of which I am the most humble disciple.

THE CORINTH SHIP CANAL.—The Corinth Ship Canal was opened, August 6, by the King in the presence of all the members of the royal family, the cabinet ministers, the foreign diplomatic representatives, the principal military and civil officials, and an immense crowd of citizens. — *Exchange*.

LIVE LOADS IN OFFICE-BUILDINGS.



Gateway to a Bohemian Farmhouse. From Architektonische Rundschau.

A GREAT deal has been written at various times concerning the live loads which exist upon the floors of ordinary buildings, and quite recently there have been several interesting experiments conducted here and abroad looking to a determination of the exact loads which should be assumed in calculating the supporting members, as notably the experiments of Professor Kernot, of Victoria, which were reported in the *American Architect* of April 15th, and which seem to indicate that under some conditions a load of as high as 150 pounds per foot might result from a crowd of people. That any such amount is vastly in excess of the actual average live load is hardly to be questioned. Indeed, the experiments of Professor Kernot and Mr. Story are interesting without being of special practical value, for the reason that they deal with conditions which would never obtain in practice. In each case the attempt was made to pack the greatest number of persons into the least space, but because 58 laborers can be jammed into a space of 57 square feet, it by no means follows that the floors of a hall of audience should be calculated for a live load of 147.4 pounds per foot, for the reason that there never has been a hall of audience into which people could be packed at that rate. It might be possible that small portions of the floor would be loaded to such an extent, but it would manifestly be a physical impossibility to extend such a system of packing over an entire area, while the large factor-of-safety which forms a very important element of all computations of the strength of materials, is sufficient to provide for sudden concentrations of live load on a portion of a floor, even under the most extreme circumstances.

The writer has repeatedly counted the number of persons in the various portions of theatres and music-halls, without once finding, even in crowded aisles and standing-room, an average of more than forty or fifty pounds per square foot extended over more than a few square feet, while the maximum unit load on the spans of beams, which is a fairer way of gauging the strains on the floor, is very much less, falling in the cases of one theatre which was investigated as low as ten pounds per foot. As a matter of fact, the unit load in a hall of audience is usually less than in almost any other kind of structure, as so much space is taken up by light but bulky furniture, by aisles, etc., that the remaining space for live weight is quite small. For example, the portion of floor occupied by the aisles and seats in the Bowdoin Square Theatre, Boston, has an area of 3950 square feet, the aisles taking from this area 696 square feet and the standing-room at the rear of the orchestra circle 561 square feet. There are 605 seats in all, weighing about twenty pounds each. Consequently the average live load per foot, with each seat occupied, would be only twenty-six pounds, while if the floor-beams were spaced for fifteen-foot bearings and the entire audience was crowded into the aisles and standing-room,—which would be physically impossible, the resulting load would be about fifty pounds per foot, and even if it were possible in such a hall to crowd the people together in the standing room at the rate of 58 to each 57 square feet the resulting maximum loads on the beams would be only 93 pounds per square foot.

There are, of course, some kinds of floor loads which can be predetermined quite accurately, and there are some conditions which require a very wide margin of strength, in order properly to provide for such over-loading as might possibly occur. An instance in point is a warehouse recently built on Purchase Street, Boston, the lower stories of which were to be used for the storage of iron. The first floor was made in places sufficiently strong to sustain safely an applied load of 2,500 pounds per foot, while the upper lofts were assumed to be sufficiently strong for miscellaneous storage purposes, when calculated for 250 pounds live load per foot. But the attic was subsequently leased to a publisher who proceeded to load the floor with books piled ten feet high in such a manner as to create strains of 350 pounds per foot, thus reducing the factor-of-safety from four to less than three. But when the loads are as variable as those which exist in office-buildings, with the addition of occasional heavy safes, long rows of law books and constantly changing number of people, the problem is by no means solved by ascertaining how many laborers can be packed into a space of 57 square feet, especially as, since the introduction of the skeleton construction, with the resulting enormous buildings of twelve to thirty stories in height, the architect is obliged to figure very exactly, and is not justified in assuming his unit load either too light or too heavy. A difference in assumption of ten pounds per foot would make a difference of thousands of dollars in the cost of the completed building. It becomes then a very serious question as to what are the actual loads existing in such structures. By actual loads is not meant the theoretical loads nor the amount which might aggregate under impossible conditions but the maximum loads which are found

to exist in actual buildings, as a matter of absolute weight rather than theoretical assumption. As far as the writer is able to ascertain, there are very few recorded investigations of this kind. A recent appeal from the decision of the Inspector of Buildings in the City of Boston, regarding the loads in a building about to be erected, led to a very careful study of some of the most prominent buildings, the investigation being carried on by the writer in conjunction with Mr. Arthur G. Everett, architect, of the Board of Appeals, and the results of these investigations are believed to be of sufficient general interest to warrant a detailed publication thereof.

The process of investigation was as follows:

The Rogers Building, on Washington Street, near Court, the Ames Building, corner of Court and Washington Streets, and the Adams Building, No. 23 Court Street, were selected as types, being located in the centre of the city and being filled with a sufficient variety of tenants to insure a fair average which would be applicable to similar conditions elsewhere. The Rogers Building and the Adams Building are six-story structures, built with the ordinary masonry walls and wooden floor construction. The Ames Building is a twelve-story thoroughly fireproof building. The buildings were gone over very carefully, office by office, and copious notes taken of the dimensions of the rooms, the nature of occupancy and full details as to all of the contents; together with a statement of the number of people in the room at the time of measurement and the greatest number that had ever been known to be in the office at one time. The investigations were, of course, confined to the offices occupied, no account being taken of vacancies. Average weights were then assumed for the various articles entering into the live load. The weights of articles of furniture were averaged from the actual weights of various pieces. The weights of safes were taken according to the actual figures of the manufacturers. The averages are as follows:

ASSUMED AVERAGE WEIGHTS.

Persons.....	150 lbs.	
Books per running foot.....	10 "	including case.
Rolling top desks.....	250 "	
Flat top desks.....	125 "	
Tables.....	75 "	
Chairs.....	15 "	
Radiators per running foot.....	100 "	
Letter press.....	100 "	including case.
Toilet wardrobes.....	150 "	
Folding-screen.....	10 "	
Typewriter.....	25 "	
Glazed partitions per running foot.....	75 "	
Sofas.....	50 "	
Chests per foot in length.....	15 "	
Telephone stand.....	25 "	
Counters per foot.....	50 "	
Open rail per foot.....	5 "	
Steel box safes.....	2,500 "	

So many offices were measured that while portions of the contents might be heavier in some cases than in others, these figures would represent a fair average and would probably be in excess of rather than under the true weight. The same applies to the weight of persons: 150 pounds is probably more than the average of a miscellaneous crowd, including women and boys, but the average was counted at 150 throughout. In regard to the greatest number of persons at any one time in an office, the testimony of tenants had to be followed. It is probable, however, that it would be apt to be over rather than under estimated.

After the data from all the three buildings were entirely in shape they were carefully gone over by Mr. Everett and the writer, the assumed weights of the various contents carried out and summed up, and an average made of the weights per foot in the different offices as well as the weights per foot throughout the entire building. The results are widely different from what is given by some authorities as representing the loads on office floors. The average in some offices was as low as five pounds per foot. The highest load was in one of the offices of the Ames building, amounting to 40.2 pounds per foot. In only 12.4 per cent of the offices was the floor-load in excess of 25 pounds per foot, while in only 26 per cent did it exceed 20 pounds.

The following table presents a tabulated statement of the results. The maximum loads and averages refer to the offices filled with the greatest number of people ever known to be present at one time. The minimum loads refer to the same offices in the condition under which they were measured. The table of "average weights per foot in each office," gives the combined average of the averages of the individual offices.

Building.	Number of offices.	Total areas.	Average area per office.	Total weight.	Maximum.		Average of weights per foot in each office.	Minimum.	
					Average per office.	Average per foot.		Total weight.	Average per foot.
Rogers Building.	41	18,127 sq. ft.	442 sq. ft.	294,984 lbs.	7,194.8 lbs.	16.3 lbs.	16.8 lbs.	249,234 lbs.	13.7 lbs.
Ames Building.	70	32,151 " "	459.3 " "	544,419 "	7,777.4 "	17.0 "	15.6 "	455,618 "	14.2 "
Adams Building.	99	26,183 " "	264.5 " "	425,109 "	4,294.0 "	16.2 "	16.7 "	310,509 "	11.9 "
Total	210	76,461 " "	388.6 " "	1,264,512 "	6,021.4 "	16.5 "	16.4 "	1,015,361 "	13.3 "

In relation to the average load per foot, the number of offices loaded above that average, are in

Rogers Building.....	17 or 41.5 per cent.
Ames ".....	24 " 34.3 " "
Adams ".....	47 " 46.4 " "

Total..... 88 " 41.9 " "

The ten heaviest offices are as follows:

Rogers Building.	Ames Building.	Adams Building.
31.7	40.2	33.0
28.8	34.0	30.3
27.3	33.1	30.3
27.2	30.6	29.4
27.2	30.0	28.3
25.5	30.0	28.0
23.6	28.8	27.8
22.9	26.0	27.8
22.6	23.7	27.7
22.2	22.0	27.1
Average 25.9	Average 29.8	Average 29.0
Combined average, 28.2.		

Or, if a selection from all three buildings were made of the ten heaviest offices, the average load per foot would be 33.3 pounds.

The tenants of the 210 offices measured were as follows:

Lawyers.....	111
Real Estate.....	31
Stenographers.....	7
Architects.....	7
Manufacturing Companies.....	15
Railroads.....	10
Brokers.....	5
Insurance.....	3
Banks.....	3
Miscellaneous.....	18
	210

It was found that lawyers' offices, besides being the most numerous were also the most heavily loaded on account of the number of safes and quantities of books which nearly every lawyer requires.

These investigations were made without any preconceived data or any attempt to prove any particular position, and as far as such a thing is possible they represent the exact loads which exist in office-buildings of this character. Hence it follows, if these figures are to be trusted in any extent whatever, that even under the most extreme circumstances, taking the pick of the heaviest offices in the city and combining them into one tier of ten stories, the average load per foot would be only a trifle over 33 pounds, while for all purposes of strength an assumption of 20 pounds per foot would be amply sufficient in determining the loads on the foundations as well as the loads on the columns of the lower stories. The floor-beams themselves ought, of course, to be sufficiently strong to withstand the maximum, rather than the average load, and the vertical supports would have to be figured for higher averages of load in proportion as they are nearer the top of the building.

It may be of interest to refer slightly to the common practice in computing the strains on the various members of a tall office-building, especially such as have been so common of late years throughout the West and which are becoming more numerous in the East, as better construction and more exact methods of calculation are followed. It is found that the practice among engineers and architects varies a great deal, but there is a commonly accepted feeling that while the floor-beams should be made of sufficient strength to a great deal more than take care of the actual or the theoretical loads which come upon them both in order to prevent undue vibration as well as to guard against deflection of the ceiling, it by no means follows that the columns and vertical supporting members should be estimated upon the basis of the same load per foot that is assumed for the floor-beams. It is manifest that while certain portions of a floor might be loaded to a very high degree either by safes or by a sudden aggregation of people, it is extremely improbable, not to say impossible, that the entire area of an office should be loaded to any very extensive degree, and still less possible that all of the offices, one above the other, should be so loaded; and the investigations in the Adams, Ames and the Rogers buildings abundantly demonstrate the slight amount of load which actually obtains. Consequently, for a number of years the practice among the best architectural engineers has been to assume a much less load per foot for floors in estimating the loads upon the columns and vertical supports than they assume for the floor-beams. One of the most distinguished Chicago architects, who stands at the head of his profession, states that in calculating the floor-beams he assumes a live load of fifty-five pounds per foot, whereas, in figuring the columns only forty-five pounds per foot is assumed. W. L. B. Jenney, in a paper read before the American Institute of Architects two years ago, stated that the column loads in the Fair Building at Chicago were figured for a percentage of live

loads such as would probably obtain, the percentage being estimated on a graduating scale which approximates, for the upper stories, an average of about fifty-three pounds per foot. A tabulation of the scalings is as follows:¹

¹ From the proceedings of the twenty-fifth annual convention of the American Institute of Architects, 1891.

Column.	Live loads which the beams in the story above the respective column are calculated to carry.	Percentage of the sum of the live loads of all the stories above the respective column. This percentage of live loads, together with all the dead load, is the total load the respective column is calculated to carry.
Attic column.....	40 lbs. per sq. foot.....	100 per cent.
16 story column.....	75 " " " " " "	90 " "
15 " " " " " "	75 " " " " " "	87 " "
14 " " " " " "	75 " " " " " "	77 " "
13 " " " " " "	75 " " " " " "	75 " "
12 " " " " " "	75 " " " " " "	72 " "
11 " " " " " "	75 " " " " " "	70 " "
10 " " " " " "	75 " " " " " "	67 " "
9 " " " " " "	75 " " " " " "	65 " "
8 " " " " " "	75 " " " " " "	62 " "
7 " " " " " "	75 " " " " " "	60 " "
6 " " " " " "	75 " " " " " "	57 " "
5 " " " " " "	130 " " " " " "	55 " "
4 " " " " " "	200 " " " " " "	52 " "
3 " " " " " "	130 " " " " " "	50 " "
2 " " " " " "	130 " " " " " "	47 " "
1 " " " " " "	130 " " " " " "	45 " "
Basement column.....	130 " " " " " "	42 " "

In the Venetian Building, Chicago, the dead weight on the office-floors is 100 pounds per foot; the live load on the floors above the fourth is taken at 35 pounds per square foot. On the second, third and fourth floors it is taken at 60 pounds and on the first floor at 80 pounds. The whole of the dead load and about half of the live load is carried on the columns,¹ or in other words the column loads in upper stories are scaled down to 17.5 pounds per foot.

A similar method is followed by several other of the leading Chicago architects, as well as by architects quite generally elsewhere. Indeed, so far as can be ascertained the general practice everywhere, unless impeded by municipal regulations, has come to be that the column loads can safely be scaled down considerably from that which is considered necessary for the floor-beams. In calculating of the framing of a large fireproof building about to be erected in Detroit, the office floor-beams were figured at 50 pounds per foot of floor, with a reduction of 20 per cent for the loads on the girders and of 30 per cent for the loads on the columns. This would bring the column loads to an average of 35 pounds per foot. In Boston the revised building-laws require provision for live loads of 100 pounds per foot, and the Board of Appeals has refused to permit any scaling-down of column loads. The Ames and the Exchange Buildings were completed before the new law went into effect. In computing the former the live floor loads were assumed at 150 pounds per foot, which were carried to the columns without scaling down, although in the determination of the sizes for foundations the live load of the floors was assumed at only ten pounds per foot. In the Exchange Building the floors were figured for 150 pounds live load per foot, which was scaled down to 50 pounds per foot for the columns. In New York the building law requires the floors to be of sufficient strength to sustain 100 pounds live load per foot, and does not permit any scaling down of the column loads, but this law has apparently not been rigidly enforced in practice. The Havemeyer Building is designed for live loads of 100 pounds per square foot.² In the Jackson Building the live load was assumed at 50 pounds per foot.³

The actual average live loads on the floors of the three Boston buildings which were especially investigated are, as has been shown, from 13.3 to 16.5 pounds per square foot. The theoretical loads which are assumed for purposes of calculation in the other buildings referred to range from less than twenty to one hundred and fifty pounds, but a fair average representing the consensus of opinion among those who have had the largest experience in building the very tall structures seems to be to assume 40 to 50 pounds per foot for live loads on floor-beams, scaling down to 35 to 45 pounds for girders and 30 to 40 pounds for columns. C. H. BLACKALL.

M. CHEDANNE AND THE PANTHEON AT ROME.

YOUR readers have heard of the *Prix de Rome*, an institution founded by Colbert, which at the close of competitive examinations every year sends to Rome one young artist in each specialty. The young men remain for five years. Formerly the rules required them not to leave Italy, but now they are permitted to run through Greece, Egypt and other countries. It is our Institute, the Academy of Fine Arts, which conducts the examinations for the Roman prize, and which looks after the delivery of the pensions paid to the artists during their stay in Rome. They are called the "pensioners of the Academy of France." In Rome they stay at the Villa Medici, a piece of property belonging to the Institute. They are obliged to send to Paris annually the works completed by them during the year, which are submitted to the Academy and exhibited. The musicians also send their compositions, which are played before the Institute in solemn session, and Paris high life scrambles for the tickets of admission. The architects, painters, sculptors and engravers exhibit their works at the School of Fine Arts. They are generally, for the last three categories, copies of Italian masterpieces. Inspirations from antiquity, works in which originality is wanting, have something about them belonging to the good

pupil desiring to please his masters and possessing a disagreeable *arrière-goût* of the *penum*. The architects profit but little from the permission to travel, which was accorded to them quite recently, after a lively campaign on the part of the press. They generally confine themselves to restorations indefinitely repeated. It is rare that in the exposition of the exhibits from Rome the Tomb of the Scipios or the Theatre of Marcellus is not to be found. From the time when our young pupils of the School of Rome restored, always in the same fashion, the Temples of Concord, of Hercules at Cori and of Vesta at Tivoli, these monuments might be definitely consolidated even by doing nothing more than pasting over them Whatman paper, which has so often been used in the innocent exercises of our architects.

The Roman exhibits, therefore, especially in architecture, were generally uninteresting reconstitutions, only presentable through the marvellous virtuosity of their execution; and the public had almost completely forgotten the road to their exposition hall. But this year all those who are interested in questions of art have gone to see the exhibits from Rome, because it was said that an original work upon the Pantheon was shown. The specialists knew that the sojourn at Rome of M. Chedanne, the young architect who is the author of the work in question, had been prolonged by two years by a special order of the Minister of Public Instruction and Fine Arts in order to enable him to finish the brilliant discoveries that he had made.

It was not a preconceived plan; it was the investigation made in the course of a study undertaken to verify certain assertions of the archaeologists which brought M. Chedanne to the discoveries that he has made.

In the first place the young architect proposed simply to study the structure of the great dome of the Pantheon, doubly interesting by its antiquity and its prodigious dimensions. Having obtained the permission of the Italian Government to take out a few bricks in order to study the system of arcuation which lightened this dome, he perceived that the bricks employed in the construction were all marked with the seal of the potter and bore dates varying from 118 to 123 A. D., which was a complete disproof of the hypothesis admitted up to the present, that the Pantheon such as we see it to-day, was built by Agrippa. It is known that in support of this proposition the archaeologists rely upon a description by Pliny. Now, inasmuch as Pliny died in 79 A. D., this description, which has been so often cited, could be only that of a building anterior to the one which we see to-day.

Continuing his investigations, M. Chedanne opened the flagging that forms the floor of the Pantheon, and found at two metres below, another floor more ancient still. Investigations made in a sewer which passes near the foundations of the building enabled him to discover a wall very much lower down than the steps of the present peristyle. This wall, on account of its extremely careful dressing, seemed to him to belong to the time of Augustus. Further investigation showed that it was covered in places with a marble casing separated from the stone wall by a *chemise de meulière*.

The young artist was particularly struck by the strange proportions of the columns of the peristyle, eight in number, as you know. After careful study and comparisons, he became convinced that these proportions would not be extraordinary if, instead of eight columns, the peristyle was composed of ten. With this view he made further searches, and discovered the sub-bases of the two missing columns.

Certain joinings, and especially those of the corner capitals also puzzled him by their clumsiness, contrasting strangely with the fineness of the sculpture. Did they use in the construction of the Pantheon which we see to-day the material that belonged to the old Pantheon, whose foundations and floor M. Chedanne has just discovered? A new observation comes to the support of the affirmative. A striking contrast exists between the inclines of the modillions of the fronton in the preserved antique portion and of those that had been introduced in the course of its reconstruction. The former were slightly inclined from the vertical, the others were exactly vertical. M. Chedanne conceived the idea of reconstituting the fronton with ten columns, such as it must have been, he considered, in the ancient Pantheon. Now, by giving the tympanum the same height, the angle which forms the incline between the *fronton* thus reconstructed and the existing *fronton* becomes precisely the angle formed by the modillions with the vertical. M. Chedanne concluded that the present peristyle was constructed with the materials of the old one.

Along with these observations M. Chedanne made some interesting discoveries in the construction of the dome itself. The excavations which he had made to bring to light the flagging of the ancient building, enabled him to discover a sewer in the very centre of the Pantheon, designed, as he thinks, to receive the rain that came in through the circular opening at the top of the dome. It will be remembered that some archaeologists, not knowing how this drainage could be effected, put forth the idea that the Pantheon was covered by a lantern.

This is only a very general sketch of the important study of M. Chedanne, a study which is the result of two years' investigation upon the spot, and which is represented at the School of Fine Arts by about thirty sketches (*châssis*). The exhibit of M. Chedanne is certainly the most remarkable that has appeared in many years among the exhibits from Rome. It places him at the top of the wheel, and

¹ Birkmire, "Skeleton Construction in Buildings," page 65.

² Birkmire, page 172.

³ Birkmire, page 154.

classes him among the most distinguished of our archaeological architects. Let us add that this work is enhanced by qualities of drawing and painting which are truly remarkable. Among others, one great water-color, giving the present state of the whole of the Pantheon, is certainly the work of a first-class water-colorist.

The Italian Government, grateful for his services, has conferred the grade of Knight of the Order of the Crown of Italy upon the pensioner of the Academy of France. Generally speaking, we are slow to recognize the merit of our citizens who possess talent without the spirit of intrigue; but nevertheless, in our "well-informed circles" it is said that M. Chedanne will be made a Knight of the Legion of Honor at the next promotion. — *Raymond Daly in the New York Sun.*



THE MODERN ENGLISH MECHANIC.—BUILDERS' EXHIBITION AT ISLINGTON.—PLUMBERS' WORK ALONE CREDITABLE.—ACTION OF THE CITY COMPANIES AS REGARDS THEIR RESPECTIVE TRADES.—THE NEW TECHNICAL EDUCATION BOARD FOR LONDON.—MOVEMENT FOR A MUNICIPAL BUILDING DEFEATED.

THE inefficiency of the average modern workman has now almost become a byword among architects in England and various proposals have been made for infusing a little more enthusiasm among mechanics but so far with little success. The decline is attributable to many causes, the most important perhaps being the development of machinery and the consequent over-specialization of the men. Take for instance, the average joiner. His progress in his pupil days is almost entirely dependent on the goodwill of the shop-foreman. A man in this capacity who has earned for himself a good position was talking to me the other day and stated that it was quite a privilege for him to let a youngster have a few months in the setting-out shop. The average joiner gets his work not only all set out by others, but the work is planned, rebated, moulded and morticed away from him by machinery, and he develops into a sort of human machine for putting the work together. This state of affairs evidently has a powerful influence in stifling individualism and perhaps another may be found in the trades-unions systems which permeate all the labor industries of this and most other countries. A bricklayer is, for example, fixed by arbitration to be worth a certain sum per hour and it matters not whether he is a good or bad workman nor whether he is fast or slow, he still obtains the same wage. Consequently, is it in human nature to attempt to do more either as to quality or quantity than the minimum allowed by the contractor or architect, as the case may be?

This then being the state of affairs it is pleasant to be able to record some attempts to raise the standard of workmanship, and it is the more welcome when the efforts are made by the men themselves. This is the case as regards the National Workmen's Exhibition now being held at Islington. It is an exhibition promoted by the London Trades-Unions ostensibly for the object of promoting friendly rivalry among the men and stimulating a desire to produce work of good quality and artistic character. I wish I were able to chronicle that the objects of the exhibition have been borne out in the results, but I am sorry to have to record that except in one trade, the plumbers, matters are at about as low an ebb as they can well be. The chief efforts of the bricklayers, for example, have been devoted to the execution of a doorway in carved brickwork, where the brick has been treated as if it were cheese and cut and worked about without any regard to the solid character of the material. No doubt part of this is due to the wretched character of the design, but it is pitiful to see men who really show interest in their work misled in this way. They have evidently wandered on either without instruction at all or with poor instruction, with the result that the labor might almost as well never have been expended. The same remarks almost apply to the joiners. Perhaps it is considered *infra dig* to exhibit a really well-made piece of framing, but at all events there is nothing of this kind to be seen. What we do see are a few examples of eccentric work and marvellous carving of one or two designs, by young joiners, of gates, etc., which are as unscientific as they are inartistic and which have evidently been made without the most elementary competent instruction. This sort of thing runs throughout the entire section of the exhibition which relates to builders' work with the exception of the plumbers who really make a creditable show. The excellence of the leadwork is perhaps as noticeable as the poverty of the productions of the other trades, and augurs well for the future of their trade. The competition is brisk, in itself a healthy sign, and the standard is high, more particularly in the practical plumbing. Perhaps in the ornamental lead rain-water heads the design could be improved, but even here there is much to be admired. I am glad to be able to say this of the plumbers' trade as it

is an excellent testimony of the excellent work being performed by the Plumbers' Company. This is one of the rich City Guilds that were founded in the Middle Ages for watching over the interests of the various trades. Many of these Guilds at the present day have altogether passed out of touch with the trades they nominally represent and excite considerable criticism from the public by the manner in which they discharge their duties.

The Plumbers' Company, however, is one of a small band which really does exert itself, and it has taken the lead by instituting examinations in theoretical and practical plumbing and lead-work. Young plumbers who pass this examination are entitled to style themselves "Registered Plumbers," and the action of this Company is becoming so noised about that plumbers who are not registered are finding increasing difficulty in obtaining good employment. It is evidently this admirable work of organization and education which has borne such good fruit and has enabled this trade to set so good an example to its fellows at Islington. I am glad to see the Carpenters' Company, which has also done good work in the past, has founded an "Institute of Certificated Carpenters," which, however, does not seem to be in a wonderfully flourishing state. They had a dinner the other day and the chairman of the meeting pointed out very rightly that "there was a growing feeling that the method of work of the past fifty years, namely the production of articles on which were expended the least amount of time and trouble was departing, and that the new creed would be that every man would throw into his work earnestness, and endeavor to produce the best work for the love of the work itself, and thus rival the splendid work the carpenters and joiners of the Middle Ages produced, and raise the trade to a higher and nobler standard." This is excellent talk, but it would have been better for the Carpenters' Company had the trade made a better show at the exhibition.

Another influence which may lead to the improvement of the various trades and handicrafts is the organization of the new Technical Education Board for London. Powers to assist technical education and the means wherewithal to afford such assistance were granted to the County Council by the late Government, but it is only lately that the Council have taken any very decisive steps. Mr. Llewellyn Smith, M. A., on behalf of an Inquiry Committee drew up a very able and exhaustive report upon the present state of secondary and technical education in London, and a very remarkable document it is. It has been obvious to us all for some time past that the organization of this most important form of education was much behindhand, but I do not think that the utterly chaotic state of technical education in our metropolis can be realized by any one who has not studied this report of Mr. Smith's. The old apprenticeship system is fast dying out, if not already dead, and there is nothing at present to take its place beyond the few polytechnics which are springing up to meet a want which had to be satisfied. Trade education for the most part is one gigantic system of "picking up" and is it any wonder that our workmanship is falling from its high standard and becoming degenerate. It is to be hoped that this new Board will justify its existence, but it is a matter of keen regret that it has been constituted without any architect or representative from a recognized architectural society among its members.

The proposal to erect a fine Municipal Palace, for London, on the Westminster site that I described last month, has been rejected by the interposition of a Cabinet Minister. Lord Rosebery came down to the Council and spoke strongly against any such proposal, and his influence is so great that he entirely carried the day. The present chairman is, however, not of the same view, and in his annual address referred to the inconvenience felt by the central staff being distributed over various houses in different parts of Charing Cross and stated that many of the Council's offices are located in rooms totally unfit for use, and with not much more air-space than would, by law, be required in a common lodging-house. Indeed he went so far as to say that he hoped that only those who took his view would be returned again to the Council.

PARIS AFTER THE RIOTS.

NOW that the riots of students *versus* policemen are over, says "S. D." in the *New York Evening Post*, it is worth while counting up the cost to Paris and the Republic at large. But first it is necessary to rectify certain telegraphic appreciations. It was natural that Germans, in presence of their Military Bill, should exaggerate the importance of the troubles in the French capital; but it is hard to understand why the English sources of information should have been so untrustworthy.

To go back to the beginning, the Bal des Quat'z-Arts, which was made an occasion for putting in force the Béranger law against public licentiousness, was in reality not a public ball. It was what it purported to be—the annual ball given by students, chiefly of the art schools, with the help of artists' models. It is certain that the ball was not open to loose women; and it was next to impossible for any man who was not a student, a journalist, or a magistrate to get admission. That nearly 3,000 persons were present is not surprising in a student world of over 10,000 souls.

For the rest, the greatest attention was paid to decorative costume, or lack of costume, as known in French art. The principal

figure of the Grand March was Rochegrosse's model for his "Fall of Babylon," clad in the costume in which she had posed to the painter. Considerable pains was also taken with the character of the dances; and an American painter won great success by doing the "Hoola-Hoola" as a Sandwich Islander.

It is evident that sedate people, who have no acquaintance with student life, and who would be horrified at the life-classes of the most correct studio, would find all this Nineviteish to a degree. But this is no reason why an exclusively students' ball, dissolute as it may have been, should be judged in the same way as the great commercial speculations in licentiousness which abound in Paris. One of the policemen who were present to keep order testified in court that the Quat-z-Arts was modestly itself compared with the scenes enacted each year at the masquerade-balls of the Grand Opéra. Yet these are never molested, perhaps because they are under protection from high quarters and are organized for the benefit of retired army officers. Now these Opéra balls are really public, being open to any one who has money to buy an admission-ticket.

Every one who knows Paris cannot help sympathizing with the resentment of students thus unfairly made the scapegoat of public order. It is difficult to imagine where the foreign correspondents who take sides against them have been living.

The League of Order, however, after the ball was all but forgotten, persisted in bringing its organizers before the courts. Shakespeare's "Measure for Measure" might have warned them of the limits of what is practicable in such a case. The judges evidently took the poet's view, and inflicted only light fines on a single art-student, who had been the most prominent in the affair, and on three or four of the women (of whom two were not models, but had obtained entrance without the knowledge of the committee). Then they applied the law of first offences to all the accused parties.

Curiously enough, this law, by which the judge, at his discretion, may remit the punishment of a first offence, is due to the same M. Bérenger who had taken the lead in the prosecution. But this seething the kid in its mother's milk on the part of the judges was not enough to disarm the wrath of students who are always ready to get up "manifestations" for the simple sake of manifesting. Their last riot was in 1882, when they mobbed the police of the quarter because the latter would not keep loose characters away from their Bal Bullier. M. Goblet, the present leader of the Radical-Socialist coalition, was then minister; and his police treated the students badly enough.

All this was now forgotten and a giant "*monôme*" (a students' reminiscence of algebra) was organized. It ought to have been as harmless as any students' procession can be, marching noisily through the streets, but with no special element of disorder. On the first night the police kept the students from getting in front of M. Bérenger's house, which is on the right side of the river; and they had not the satisfaction of making him hear in person their favorite cry of disapproval: "*Conspuez*" (Spit on him)!

The next day the demonstration naturally turned against the interference of the police, and a thousand or more students marched in the afternoon to the Palais Bourbon, the present House of Deputies. The grating across the yard in front had been closed to prevent their entrance. Everything, however, went on with the greatest good nature. Parley was made for the admission of a few delegates from the students; and a number of Deputies, catching the spirit of youth, ran out from their grave parliamentary labors to look from the porch at these future rulers of France. The students took up the game and began throwing pennies to the Deputies, shouting, "Budget! budget!" It was the time when the Parliament was lingering unduly in voting the Government appropriations for the coming year.

With the evening, crowds of idle spectators poured into the Latin Quarter to see what the students were about. No one had the slightest suspicion of trouble brewing. It was then that a vital blunder was made by the police authorities. It was resolved, possibly out of personal pique, to put down these students' demonstrations at any cost; and extra brigades of policemen, unacquainted with students' ways, were imported into the quarter. It is exasperating that some of the principal English papers should announce that the serious trouble which followed came from the students' resistance to policemen attempting to collect fines imposed for the Bal des Quat-z-Arts. The police simply charged a peaceful crowd, wherever the students provoked them by their outcries.

The Brasserie d'Harcourt, which is the most popular resort of students on their Boulevard Saint-Michel, or Boul' Mich', as they call it, was sure to have its terraces cleared. Here, by some great misfortune — no one probably will ever know how — a young man, who was not a student at all, and who was seated inside the café, was killed by a heavy match-holder thrown from without. It is not even quite certain that a policeman threw it. But it was sufficient to transform the harmless *monôme* into the bloody riots of the succeeding days.

The remainder of the story has been accurately enough reported. The police quite lost their heads, their chiefs held out obstinately in the mistaken policy first adopted, and the criminal element came in from the outskirts to break and burn and do as much damage as possible. Meanwhile the students, who, it must be remembered, are the sons of the best families of France and the only hope of the Republic, little by little withdrew.

A new element of contention was now introduced. The Ministry which depends for its existence on keeping its majority in the House of Deputies, had just been openly defied by the Labor Exchange [Bourse du Commerce]. A large number of the trade-unions gathered there openly refused to comply with the law governing such organizations. The delay granted them for the purpose was at an end; and the Government was placed in the alternative of closing the Exchange or yielding once for all to the demands of the Socialist party. In their uncertainty as to what Prime Minister Dupuy might do, the Socialist leaders had installed themselves in permanent committee in the Latin Quarter, perhaps on the principle that one bad cause might help another.

Suddenly, one night, some 20,000 soldiers were ordered into Paris. The next day, to the surprise of every one, the Labor Exchange was closed by armed force. This at once removed the centre of storm and stress from the students of the left bank to the workmen of the right. In point of fact, the trouble was already over. The police may not be liked, but even the workmen love as well as respect the army. The issue now became political.

By his show of firmness in closing the Labor Exchange, M. Dupuy for the first time secured the support of the Conservative Deputies. Now, for a full dozen years, Ministries in France have stood, when they succeeded in standing at all, only by a coalition with the Radicals. The Radicals, who have lately made a fast and firm alliance with the Socialists, were not slow in taking action. M. Peytral, a Radical who is in the present strangely mixed Cabinet, sent in his resignation. M. Dupuy, like every other Prime Minister of late is a rank Opportunist; he accordingly at once set about changing his coat. For that matter, he is right in judging that no conservative element in the French Parliament of the present can ever keep a ministry in power. The old Republican concentration with the Radicals is a necessity, and to the Radicals some sacrifice had to be made.

This was not difficult; he simply procured the removal of the Prefect of Police, who was equally obnoxious to students and Socialists. The Radical Minister retains his place, the Socialists can look forward with renewed hopes to the coming general elections; and the excitement of the students' riots has been made to cover a clever political manoeuvre.

All this shows what has already been written in these letters, that the continuance in power of the present so-called Republican party in France depends on the new and amazingly strong Radical-Socialist coalition. In all the late events, students and policemen have been but incidents by the way. In France it is Socialism that profits by every tumult and revolution.

The cost to the French republic of all these riots is loss of reputation abroad and a feeling of insecurity at home. In Paris itself, outside of the Latin Quarter on the left bank of the Seine and a small portion of the city on the right, there was at no time the slightest disturbance in the city's business or pleasure. Only those who went to search for the signs of revolution could find them. But the knowledge of the facts, with the sudden political trend they have taken, has increased the general impression already felt by the French people that they have not a government able to cope with the elements of disorder in the nation.

Coming after the strikes of Carmaux and the Panama trials, this may not imperil the Republican form of government in France, but it will push Republicanism farther and farther towards State socialism. To avoid this, it will be necessary to form a coalition of all the conservative elements with the moderate Republicans; and this would further require that satisfaction should be given to the religious people for the military and school laws which weigh on them so heavily. But M. Constans himself, who is trying to pose as the leader of such a coalition, is unwilling to make concessions on this ground.

Thus, after more than twenty years' experience, France is still working over the formulas of the two chief founders of her third republic: Thiers, "The Republic will be Conservative or it will not be"; Gambetta, "Clericalism — that is the enemy." Meanwhile, Socialism comes bravely forward in spite of, perhaps because of, a fact loudly proclaimed yesterday by one of its leaders: "Every government is against us, monarchy, empire and republic."

The loss in money to the city of Paris from the late disturbances will hardly be overestimated. The well-known restaurateur, Marguery, who is syndic of the "*limonadiers*" — the quaint name adopted by the union of café and restaurant proprietors — declares that their branch of industry alone has already lost from six to seven millions of francs. He adds that, if the recommendations of the Socialist Municipal Council against celebrating the national fête of to-day (the 14th of July) are followed out, he and his associates are bound to suffer a loss of as many millions more.

But let no stranger imagine that this anniversary of the storming of the Bastille is likely to pass unobserved, or that French thrift will take alarm at Socialism of this Municipal Council kind. One of the most interesting as well as most difficult problems in the political evolution of France is the present steady advance of Socialist ideas, under circumstances apparently so unfavorable, among all classes of society. The ultra-Catholic Comte de Mun has made himself welcome even to the irreligious workmen by advocating a veritable Socialism, in which the State, on Christian principles, should regulate capital to the advantage of labor. It is true he

would not do away with the right of private property but in this he agrees with the more eminent leaders of present Socialism.

It remains to be seen whether the tide of universal suffrage in other countries, as well as in France and Germany, will tend to make Socialism the goal of modern democracy.

THE FORMER GIANTS OF YUCATAN.

PHENOMENALLY big men and women have occasionally appeared in various parts of the earth, and several nations possess traditions of gigantic people having at one time inhabited their lands. Even the Bible tells us something about giants. But skulls of unusual size as well as other bones were really dug up at Pitcairn Island by officers of the expedition under Captain Beechy, in the early part of this century. The French traveller and writer Jean de Despriaux, when residing in the Canary Islands, was much pleased at procuring some mummies of the big Guanches, a man and two women, preserved as the Egyptians used to preserve their dead. "The man was of gigantic stature," he says, "which is in perfect conformity with all tradition relating to the ancient Atlanteans. The women had long black hair, plaited with straps of leather painted red or green. Their dress was plaited in front; their breast covered with a kind of short zarape." The straps of their sandals were painted red and ornamented with small pieces of obsidian beautifully wrought. The dress of the man consisted of a tunic and a mantle, tied up on the chest in a knot. M. Despriaux was delighted later on to find that in the high Andes of Peru the women were attired just as his mummies had been, and that their headgear and mode of dressing the hair were identical.

The American continent seems to have been the place where big men abounded, for here are found many remains of human beings much larger than any of its present inhabitants. At Chancal, thirty miles north of Lima (Peru), very large human skulls were dug up only a few years ago by Dr. Le Plongeon. Others have been unearthed on the Island of Puna, in the Gulf of Guayaquil, at the entrance of the Guayaquil River. A Jesuit father named Anilo Oliva wrote an ancient history of Peru, dictated by an old archiver-keeper, Quippu Camayoc, a Peruvian. Oliva's work exists only in manuscript, and is in the British Museum, London; but the writer has a copy of it. Oliva says that Puna, as well as the opposite coast, was formerly peopled by giants who had come from Central America. In the work of Zarate we read that they were as bad as they were big, so that they became a terror to all the other inhabitants. Those tall fellows had their strongholds particularly at the Island Puna and at Point Santa Elena, Guayaquil. Some of their works can yet be seen in those places in the shape of immense stone and adobe walls and more especially in the great wells which they dug to supply themselves with water. The career of those bad big people was probably brought to a close by some electrical phenomena, for tradition says that the gods destroyed them with fire from heaven.

In the north part of Mexico a few years ago human remains were unearthed from well-made stone tombs. The skeletons were nearly nine feet long. In Southern Mexico, the Yucatan peninsula seems to have been at one time quite a favorite residence of a race of people about nine feet high. On our first visit to that country, before we had been twelve hours on shore, the inhabitants of Progreso mentioned to us that giants had once lived there. Don Fermin Domingo, one of the first settlers in that town, respected and trustworthy, accompanied us to an ancient cemetery whence he had procured stones to fence in his property and build his house. He pointed out vestiges of a mound which on its west side had had stone steps leading to the summit. At the foot of them, on each side were four sepulchres in a line, partly underground. They consisted of two hard limestone urns about three feet square, placed mouth to mouth and joined with cement. The lower one had a hole in the bottom for the escape of gases generated by decomposition. Nothing, not even dust, remained in them, which would show that those stone coffins were very ancient. To the student their discovery is deeply interesting, for the reason that they were exactly like some found at Mughier, in the lower plains of Chaldea, the only difference being that at Mughier the coffins were made of clay instead of stone. By the position of those at Progreso we infer that the bodies were interred in a squatting posture, which was customary in many parts of America. If they were placed thus, and yet needed a height of six feet, they were certainly very big bodies. In various parts of the same cemetery Don Fermin and others dug up a considerable number of terra-cotta jars, containing skulls which the old gentleman assured us were twice as big as his own head. We regretted that he had not felt sufficiently interested to keep at least one sample. We ourselves did a little delving, and found pieces of large bones, but they crumbled in our fingers.

While travelling in the interior of the country we were frequently told of places where giants' bones had been disinterred. The interesting ruins of Ake, twenty-seven miles east of Merida, might reasonably be regarded as the work of very big and uncouth people. Each step in one stairway is twenty inches high, by no means convenient for persons of ordinary stature. The stairway is 156 feet wide. In one part smaller stones have been added, making two steps out of each, a total of thirty-six instead of eighteen, as if people of medium size had lived there at the same time, or perhaps later, and arranged the extra stones for their own convenience. Round about the ancient

structures not only large skulls have been dug from the ground, but also tibia and other bones, all exceedingly large. From the time of the Spanish conquest such remains have now and then been brought to light in the Peninsula. Father Cogolludo and Diego de Landa, second Bishop of Yucatan, wrote works about that country and its people and both testify to the discovery of gigantic human bones. Cogolludo, whose work is the most complete, says that in 1547 on the high road of Campeche a large sepulchre was opened. It was formed of stone slabs placed one above the other, and therein were "human remains of a formidable size." With these they also found three large boxes of terra-cotta supported on three hollow balls that served as feet. There was also an urn of black stone "like jasper." The natives were ordered to break the bones to fragments, but they refused to lay a finger on anything in the grave, declaring that it was forbidden them to meddle with such things; and so the friar, Juan de Carrion, himself destroyed the remains.

One of the superstitions now existing among the natives would seem to be a reminiscence of the big people that formerly dwelt in Yucatan. Uauapach is a phantom giant supposed to haunt the highways at night to intercept belated pedestrians and trip them up by standing astride, stretching out his feet from one side of the road to the other. — *Alice D. Le Plongeon in the N. Y. Tribune.*



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

HOUSE AT DETROIT, MICH. MESSRS. ROGERS & MAC FARLANE, ARCHITECTS, DETROIT, MICH.

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

HOUSE OF J. W. HENNING, ESQ., 50 WEST 52D ST., NEW YORK, N. Y. MR. JAMES BROWN LORD, ARCHITECT, NEW YORK, N. Y.

DETAILS OF THE SAME.

COMPETITIVE DESIGN FOR ST. LUKE'S HOSPITAL, NEW YORK, N. Y., SUBMITTED BY MR. JAMES BROWN LORD, ARCHITECT, NEW YORK, N. Y.

[Additional illustrations in the International Edition.]

DOORWAY TO A HOUSE AT DETROIT, MICH. MESSRS. ROGERS & MAC FARLANE, ARCHITECTS, DETROIT, MICH.

[Gelatine Print.]

HATFIELD HOUSE BANQUETING HALL. DRAWN BY HERBERT RAILTON.

ONE of the attractions of the Chicago Exposition is a reproduction in facsimile of the fine old Banqueting Hall of Hatfield House, which, by the permission of Lord Salisbury, Messrs. Hampton & Sons have been enabled to make. The reproduction is only forty feet in length, whereas the original is fifty-five feet long, but this size has enabled Messrs. Hampton to give a fine reproduction of the spirit and character of this charming old hall. The carved work has all been done with the utmost care, casts having been first taken of the various faces so that the resemblance might not be lost. The oak has been fumed to give it the real shade of dark brown which comes of old age. No attempt has been made to copy the present furnishing of Hatfield House, but the Marble Hall forms a splendid setting for the fine examples of cabinet work which constitute with it Messrs. Hampton's exhibit at Chicago. The fine Minstrel's gallery at one end of the hall and the celebrated screen at the other have been reproduced with remarkable fidelity, and especial care has been taken to give effect to the softly-faded heraldic coloring on the walls. The floor is, as at Hatfield, in squares of black and white marble. Few examples of English architecture could surpass Hatfield in historic interest, dating as the site of a house from the Hatfield of Saxon time (from its situation on a heath), having been a bishop's palace in the time of Henry I, the residence of the youthful Edward VI and of Queen Elizabeth, and at last in the reign of James I, being exchanged by that monarch for Theobalds, the property of Robert Cecil. Messrs. Hampton have, therefore, chosen as an exhibit a subject which should have much attraction both for English and American visitors. This plate is copied from the *British Architect*.

"NELSON ROOM" IN THE STAR HOTEL, GREAT YARMOUTH, ENG.

EAST ANGLIA, chiefly rich architecturally for ornamental flint work, and for the elaborate Gothic woodwork in the furnishing of

its churches, has also some remarkable examples of Jacobean plaster-work and Renaissance wainscot fittings in domestic buildings. Foremost among these for ornateness is the celebrated "Nelson room" in the "Star Hotel," Great Yarmouth, of which we give the accompanying pencil-drawing. This apartment is on the first floor of the house, and is entirely surrounded by an almost black wainscot panelled lining, divided by pilasters into regular bays, and elaborated with alternating female and male figures between the carved panels of the arcaded stage, some five feet from the floor. The lobby porch in the angle of the room forms part of the composition, and the fireplace is also treated as belonging to the design. The ceiling is divided into six compartments, with wide beams more or less depressed and irregular by shape and age, with fillings enriched by foliation, fruits and other devices. The building itself has a square-cut flint front, and was erected by William Crowe, a rich merchant, towards the close of the sixteenth century. The arms of the Company of Merchant Adventurers are carved over the chimney-piece. The portrait of Lord Nelson which hangs at the end of the room was painted by Keymer, when the great admiral visited Yarmouth, and from this circumstance the apartment obtained its name, the club of which the artist was a member having met here for the past hundred years. This plate is copied from *Building News*.

CAPITALS FROM THE ABBEY OF MOZAC, FRANCE.

THESE capitals are copied from *L'Art*.

TOMB AT BUDA PESTH, HUNGARY.

This plate is copied from *Architektonische Rundschau*.

THE PANTHEON, ROME, ITALY, AS RESTORED BY M. CHARLES CHIEPIEZ, ARCHITECT.

This plate, copied from *La Semaine des Constructeurs*, does not indicate a restoration in accordance with the recent discoveries of M. Chedanne, mentioned elsewhere in this issue.

HOUSE IN QUEEN'S GATE, SOUTH KENSINGTON, LONDON, ENG. MR. R. A. BRIGGS, ARCHITECT.

This plate is copied from the *Builder*.

HEWELL GRANGE, BROMSGROVE, ENG.: STATE DINING-ROOM. MESSRS. BODLEY & GARNER, ARCHITECTS.

COTTAGES AT PORT SUNLIGHT, LIVERPOOL, ENG. MR. HUON A. MATEAR, ARCHITECT, LIVERPOOL, ENG.

The works at Port Sunlight, on the Mersey, near Liverpool, having been completed, Messrs. Lever Brothers are now building cottages for the workmen. Several architects are engaged upon the work, consequently there is much variety among the designs. The walls are constructed of stone, and the chimneys of brick; all the external timbers are oak, and the roofs covered with Broseley tiles.

NUREMBERG, AFTER A DRAWING BY SAMUEL PROUT.



[The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.]

A QUESTION OF COMMISSION FURTHER DISCUSSED.

NEW YORK, August 15, 1893.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—I am sorry your reply to my question does not take what would seem to me a fairer view of the architect's rights.

An unremunerative contract is closed and ended. The owner comes to the architect for other added work, he takes time and expense that could be devoted to other work at full commission. Why should the architect suffer positive loss, neglect paying business for this owner for whom one good turn as per your verdict would seem to deserve another? Your point, failure to notify that rate must be advanced, is something I admit, but the law of contracts for added work, viz., "compensation at a reasonable and fair valuation," was all I ever wanted and notification of this seemed to me not at all necessary because universally known. Why should not an architect have as much justice as the builder (in contract service) for extra work?

If the builder loses \$500 in fulfilling a bad contract, and there is an extra, must he lose an added pro-rata on that extra? To say yes, we answer at once, is absurd, yet practically your answer to my question was an exact parallel. If not, why not? Your answer seems to have left out of view the fact that just as with the building cost for

material and labor the architect's work is costly. And I cannot see why in case he has made a bad contract he should not be entitled to the universally conceded law of contracts for extras, and because it is a well known law. Why should he not be entitled to it without the special notification of which your reply speaks which, as I said, seemed to me unnecessary and, therefore, omitted?

Yours truly, X.

N. B. Perhaps I ought to comment on the words, "We do not see how without such notice he could fairly be held to a change in the rate of compensation which had been agreed upon."

No rate had ever been agreed upon. There existed no understanding whatever except the one lump-sum contract for enlargement to working-drawings of accepted preliminaries, and there was a special proviso that the preliminaries fixed the character of the design.

X.

["X" PUTS his point very well, but we can still see no reason for altering our opinion. In the case of a contractor for a building, it is very common to have it specified in the agreement that extra work shall be paid for at the same rate as similar work under the contract, sometimes adding a fixed percentage for the trouble of making the change, and, even where the agreement says nothing about how the proper price of extra work shall be ascertained, it is always assumed that it is to be a reasonable price, and a contractor would have great difficulty in collecting pay for extra work at double the rate that he estimated similar work to be worth under the contract, even though he lost money on the contract work. It must be remembered, moreover, that an architect has much less excuse for raising his price without notice than a builder would have. The latter must depend, in making his contracts, on estimates made on incomplete data, on the honesty of sub-contractors, on fluctuating prices of materials and various other uncertain quantities; but the architect has no such uncertainties to contend with in putting a price on his own work, and if he agrees to execute a certain commission for a client for a given remuneration, it still seems to us that the client is entitled to presume, unless notice to the contrary be given, that the architect will be satisfied with that rate of remuneration for anything that can be called a continuation of the original commission. Let "X" examine the converse of his claim. Suppose he had agreed with his client that he should receive the usual five per cent on the original commission, and after he had done the subsequent extra work, his client should tender him payment for it at the rate of two per cent, saying that although he had paid the first bill of five per cent, it was more than he could afford, and that he had lost money by doing so, because several other architects had offered to do the work for two per cent; and he could, therefore, only pay him for the extra work at the rate that he could get it done for by other parties. Would he have thought this fair? And, if his client had agreed with him, saying that he was out of pocket by keeping his agreement for five per cent on the original commission, and ought not to be expected to pay more than the market-price for the extra work, would not "X" have replied that his terms were fixed and agreed to at the outset, at five per cent on the cost of the work, and that these terms covered any extension of the original work, or even any new work for the same client, whether the client thought this was the market-price or not, until a change in them had been consented to by both parties? Of course he would, and he would have been right. In an important case in New York, where no agreement had been made between the architect and his client as to the fee to be paid for an important piece of work, the architect sent in a bill at the Institute rate. The client disputed it, saying that the service was not worth so much, but the architect proved that he had previously done work for the same client, and had charged the Institute rates, and his bill had been paid; and the Court held that these rates were implied as part of the contract for the subsequent building, and that evidence as to the actual value of the service rendered could not be admitted. If, therefore, the architect has the right to claim that the rate of payment once agreed upon between himself and his client governs, by implication, all subsequent transactions between them until some different bargain is made, has not the client the right to claim the same? This is a question that a court would ask, and we are convinced that it would answer in the affirmative. Of course, we are sorry that "X" should have done work at a loss, but we hope that his case will serve to show architects, particularly the younger ones, the importance that the law attaches to a professional man's valuation of his own services. Many a young architect, who in his anxiety to get a chance to show what he can do, yields to the temptation to accept work for less than it is worth, finds that the fact of having once done work at a low rate diminishes his reputation, and reduces his income, for years afterwards. He has become known as a cheap man, and thenceforth those who want the best service avoid him, while those who come to him with other views indignantly depart if he ventures to suggest that he has raised his charges. It is for this reason, perhaps more than any other, that the regular schedule is valuable. Although the reproach is often quite unjustly brought against it that it reduces the compensation of the most eminent in the profession to that of inexperienced beginners, it at least furnishes the latter with an invaluable support. Unless they themselves proclaim that their services are worth less than those of ordinary reputable members of the profession, the schedule will furnish the rule by which their duty and their reward are to be measured, and that the standing, and even the existence, of the profession depends upon the maintenance of some such code is shown by the experience of all civilized nations.—EDS. AMERICAN ARCHITECT.]

A TRACT ON COMPETITIONS.

ST. LOUIS, MO., August 15, 1893.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—In relation to editorial in your issue of 12th inst., the undersigned begs to remark that at the convention of the American Institute of Architects in Chicago, in 1892, as chairman of the committee on competitions, he presented the accompanying outline for a circular to be printed and placed at the disposal of members who might wish the aid of the Institute in their attempts to persuade owners to conduct a proposed competition in a rational manner. This document was read at the convention, accepted, ordered placed on file and printed in the *Proceedings*.

Should there be a call for it, I presume there would be no difficulty in persuading the Directors to have a thousand copies printed for

circulation. After trial for a while, amendments might suggest themselves, and, in time, a very serviceable tract might be evolved, which would be of great service in the many cases where owners who invite competition err more through ignorance than by evil intent. Very respectfully, C. E. ILLSLEY.

REPORT OF COMMITTEE ON COMPETITIONS. — PUBLICATIONS OF THE AMERICAN INSTITUTE OF ARCHITECTS.

(Series . . . No. . . .)

Suggestions to owners and architects in the management of architectural competitions.

At the annual convention of the American Institute of Architects, in the City of Chicago, October 20, 1892, the following minute on the conduct of architectural competitions was approved and ordered printed for gratuitous distribution in such manner as might be ordered by the Board of Directors.

While the American Institute of Architects emphatically disapproves of architectural competitions as usually conducted, long experience having shown that they result almost invariably in disappointment and harm to all interests concerned, to the public as well as to the profession, and to owners equally with architects; and while the Institute advises that wherever practicable an architect should be selected individually in the same manner with lawyers, physicians and other professional men; still whereas on Government work, for any reason an architectural competition is unavoidable, the following precautions are suggested to both owners and architects as calculated to obviate the principal causes of miscarriage and to enlist the cooperation of architects who will otherwise be likely to refuse participation in the competition:

1. An experienced architect of repute should be engaged by the owners at the start as consulting-architect throughout the competition. All the papers and correspondence should be controlled by him. Of course he will not participate as competitor.
2. The rules and restrictions should be few as possible and so explicitly stated as to prevent misunderstanding.
3. Two kinds of competition are customary, namely, an open and a limited competition. In the latter a certain number of architects are invited to submit designs, and all others are excluded. In the former the competition is open to every one. An open competition is often preliminary to a limited competition confined to those architects (usually three to six in number) whose designs received in the open competition have been placed highest.
4. Every invited architect should be paid for his competitive design the schedule commission of one per cent on the estimated cost of the building. The architect whose design is placed highest should be guaranteed the work at the schedule fee of five per cent for plans and superintendence. Unsuccessful designs should be returned free to their author immediately after the award is made, no portion of them to be used without the consent of their authors.
5. The site of the building should be given and the requirements as to accommodation, cost, etc. It might be well to arrange the requirements in two classes, namely, those which are arbitrary and must be rigidly adhered to, and those which are advisory only. As a rule, owners will find their interests promoted by making the list of arbitrary conditions as small as possible.
6. All transactions relating to the competition should be in writing, and open to the inspection of each competitor.
7. A date should be fixed within which the awards should be announced and all premiums paid.
8. After the award, all drawings should be open to the inspection of all competitors for at least twenty-four hours. In many cases an exhibition open to the public would be desirable.
9. The selection and premiation of the designs should be made by a jury, of which at least two-thirds should be disinterested and experienced architects, whose report should be in writing, and accessible to each competing architect.

NOTES AND CLIPPINGS

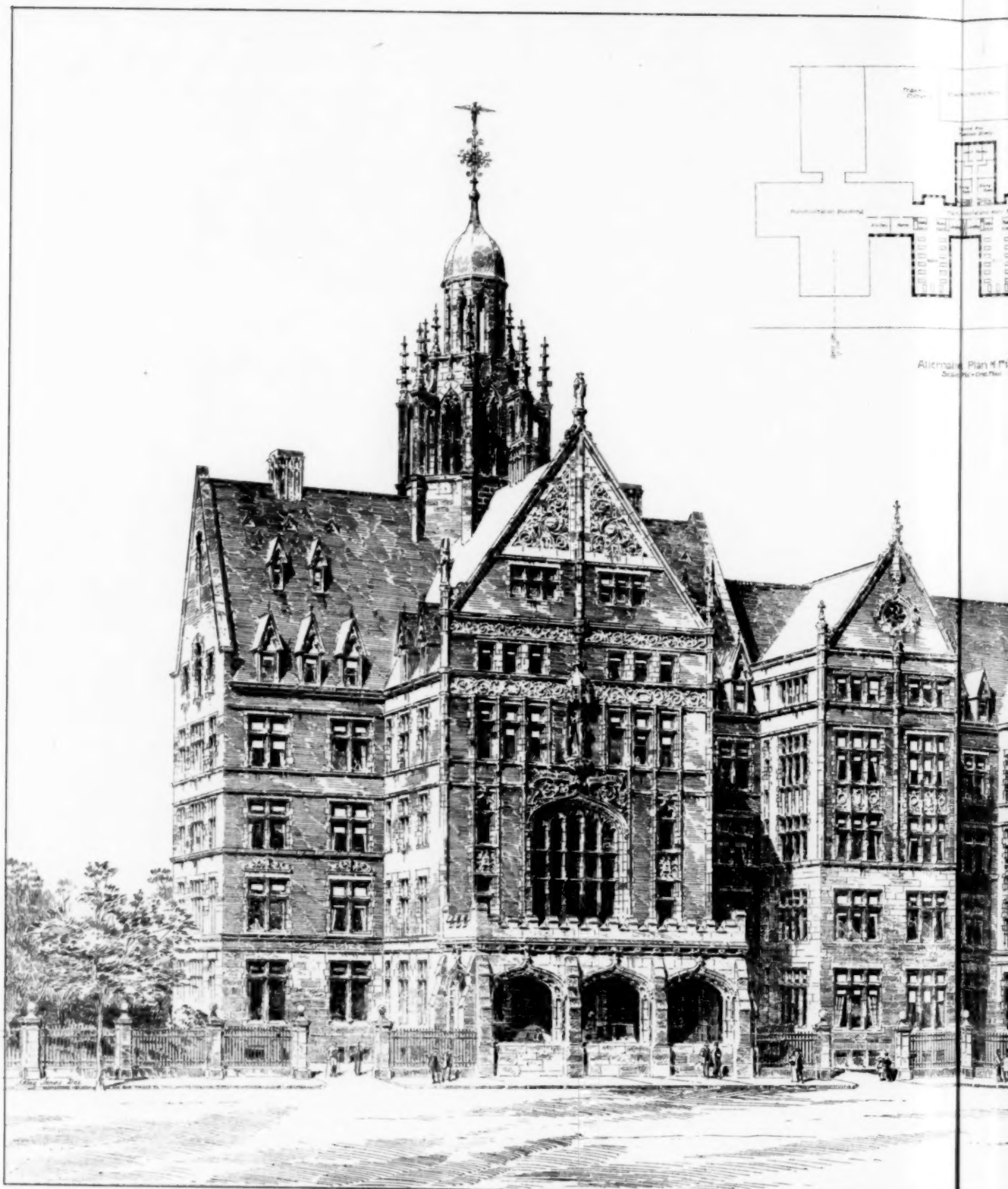
THE LOST COLUMN OF THE PIAZZETTA, VENICE. — Venice is at this moment in a state of great expectation. For it is believed that the long-lost Piazzetta column is on the eve of being recovered, after lying for the best part of eight centuries in the lagoon mud. The story which has long been accepted is that about the year 1080 Alexis Comnenus, that Emperor of Constantinople who restored the imperial greatness of his family, presented, out of gratitude for services rendered him by Venice, three splendid monolithic columns of Egyptian syenite to the city. These were duly received by the Doge, Domenico Selvo, and two of them, safely landed, stand to this day on the Piazzetta, one crowned by the Lion of St. Mark and the other by a statue of St. Theodore. But the third, either through awkwardness or some mishap of which history has failed to preserve the particulars, toppled into the Lagoon, and there has remained ever since. There is, however, another story, and possibly quite as authentic as its rival, which attributes an entirely different origin to the two columns on the Piazzetta and to the one in the mud, whence it is hoped it will soon be disinterred. According to this version, they were brought from Egypt as trophies after the crusading victories of Doge Domenico Michieli in Syria, about the year 1126. Nor were they all three of red Egyptian syenite, one of the two standing on the Piazzetta being actually gray. Finally, it is affirmed that they were actually set up, with their present fine capitals and bases, by a Lombard engineer, one Niccolò de' Barattieri, as late as 1180. As all the world knows, the gray monolith is surmounted by the bronze lion. This is in the Byzantine style, and, like the column on which it stands,

has been attributed to the Emperors of the East. But it is now known to have been cast in Venice for the Doge Zianna, about 1178; while the marble statue of St. Theodore, standing upon a crocodile, was not placed on the sister pillar for more than fifty years subsequent to that date. Be that as it may, the third pillar has never had a place in the chronicles of the State of Venice. Some sceptics have even been ready to affirm that no such column ever existed, except in the imagination of the Venetians. Still, the story of a third pillar having been lost has never quite been abandoned. So firm was the belief in its being recoverable that a serious attempt was made in the sixteenth century to discover the spot where it was lying. Until last week every effort of the kind proved futile, and even now what is believed to be the long-lost pillar was come upon only by accident. At present a dredge, engaged in deepening the chief approach to the Lagoons from the Adriatic, is at work a few hundred yards behind the Church of San Giorgio Maggiore, built on an island opposite the Ducal Palace. On Friday the machine came to a sudden standstill. An examination by divers proved the obstruction to be an enormous column of stone, lying under some thirty feet of water. Instantly the news spread around, and as the poorest Venetian has some knowledge of his city's history, it was not long before all Venice was convinced that at last the third column which ought to have been in the Piazzetta was deep in the mud behind St. George's Church. Further examination shows that the pillar is nearly forty feet long and six feet in diameter, so that it is, at all events, a very remarkable find. — *London Standard*.

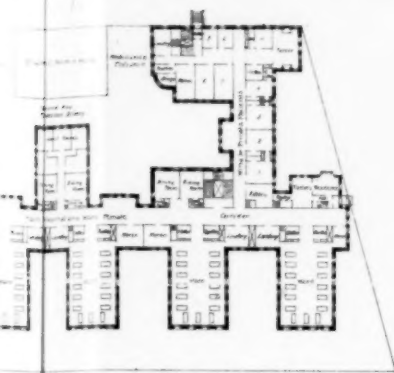
MOKI SAND-PAINTING. — Who ever heard of painting in sand? The Moki Indians understand that species of art. Two paintings of this kind, copied accurately from the originals, have been newly placed on exhibition at the National Museum. Perhaps they might better be called mosaics, being done in sand of six different colors on a flat horizontal surface. The colors are yellow, green, white, black and a mixture. Such pictures are made by Moki priests and priestesses on the floors of their subterranean chambers. The six colors stand for the cardinal points. Yellow is the north, green is the west, red is the south, white is the east, black is the region above and all colors signify the region below. One of the two sand-paintings is a copy of the kind of picture made for the annual ceremonial of the Moki women's festival to the Germ God which takes place in September. The work of art is executed during the progress of the secret rites. It represents two figures in an elaborate frame of different colors. On the left is a likeness of La-kone-ma-na, the patroness of the affair. She is clad in a white blanket. On the right is a portrait of one of the twin gods of war, who carries a zigzag of lightning in his hands. The other picture is a facsimile of the one made by the chief of the Fraternity of Antelopes at the festival of the snake dance. It is highly conventional in its character. Rain clouds are represented by semicircles. Parallel lines show the rain falling. Four odd-looking zigzag figures stand for the lightning snakes, which are respectively red, green, white and yellow. The green and white snakes are female and the yellow and red snakes are male. Around this sand-mosaic are performed the weird rites of the antelope priests, who sing songs embodying the mythological drama of the "Snake Hero." — *Washington Star*.

THE BUILDER ON THE LONDON FIRE. — On Monday night July 17, London was the scene of a serious fire, such as we only expect to hear of from some jerry-built American or antediluvian Russian harbor town. A large number of well-stocked warehouses in St. Mary Axe were entirely destroyed, and many others much damaged. The actual cause of this conflagration is not yet known, but it is fairly certain that its extension was primarily due to the non-division into risks of the first warehouse attacked, then to the bad construction and crowded position of the neighboring buildings, and further to the organization and strength of our fire-brigade not permitting of an adequate attendance of appliances and men at once, on a first alarm, to so dangerous a district. Speaking of the latter it appears inconceivable why so fine a body of men should be continually handicapped by defective organization and irrational means of inter-communication. The seconds alone lost with the separate telephonic communication to each individual station mount up, and the average two minutes' "night alarm" is nearly treble what a perfect institution should aspire to. As usual, the large conflagration did not come alone; another serious one in the Brompton Road, and one at Aldgate, occurring about the same time, thus again giving London a night this summer in which it had three heavy fires, each insufficiently attended, and scarcely an engine left at home to protect the rest of the metropolitan area. In each case the consequences of the three outbreaks were nearly as bad as they could have been. — *The Builder*.

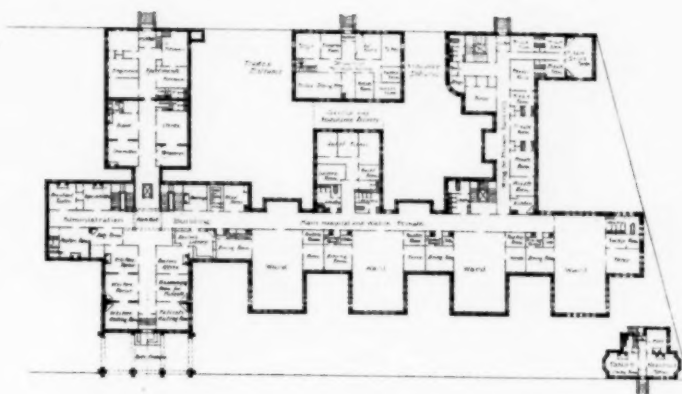
THE BITER BIT. — The City of Paris is just at the present moment in rather a pretty dilemma. A dispute has been waging for a long time between the metropolis and the Department of the Seine-et-Oise relative to the impurities of the Seine water. Arrangements to remedy the evil were adopted, which took the form of the acquisition by the city of some large fields for filtration purposes. One of these fields belonged to a M. Louchet, formerly Mayor of Herblay, and which, it is said, he purchased for about 100 francs, or \$20. He objected to his property being forcibly acquired, even for purposes of public utility. The matter was submitted for final decision to a jury of valuation composed, through carelessness on the part of the authorities, of proprietors in the same district, every one of them as bitterly opposed to the projected improvement as M. Louchet himself. M. Louchet began by demanding 10,000,000 francs, or about \$2,000,000, his aim being to render the price prohibitive; and to his immense surprise, the jury actually awarded the sum demanded. According to the legal experts who have been consulted, the award appears likely to hold good since the corporation cannot now refuse to purchase after having pledged itself to accept. Efforts are being made to find some flaw in the process with a view to upsetting the verdict of the jury. — *New York Tribune*.



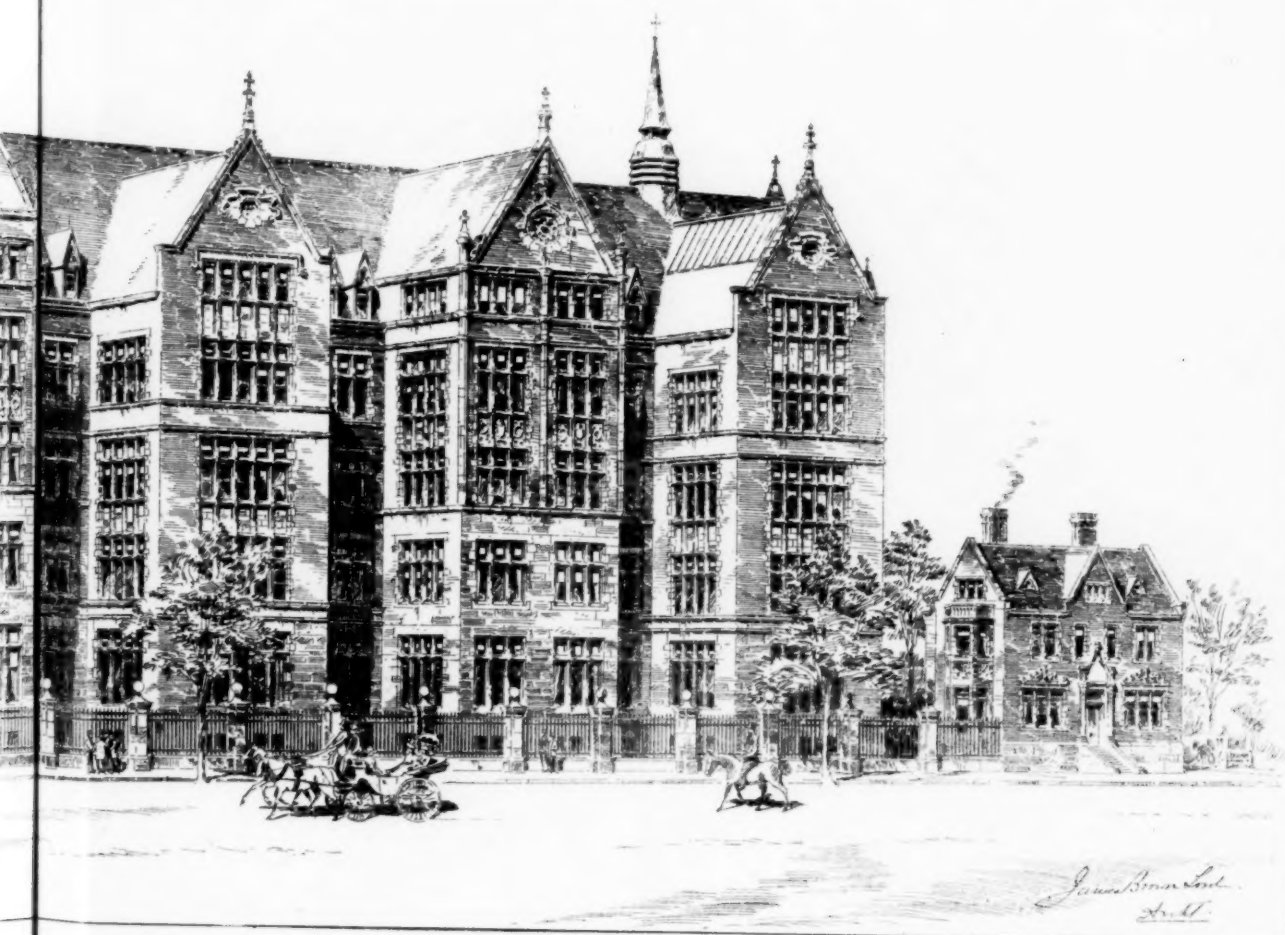
PROPOSED DES.
ST. LUKE'S HOSPITAL
SOUTH FRONT



Enlarged Plan of First Story
Scale 1/8" = 1'-0"



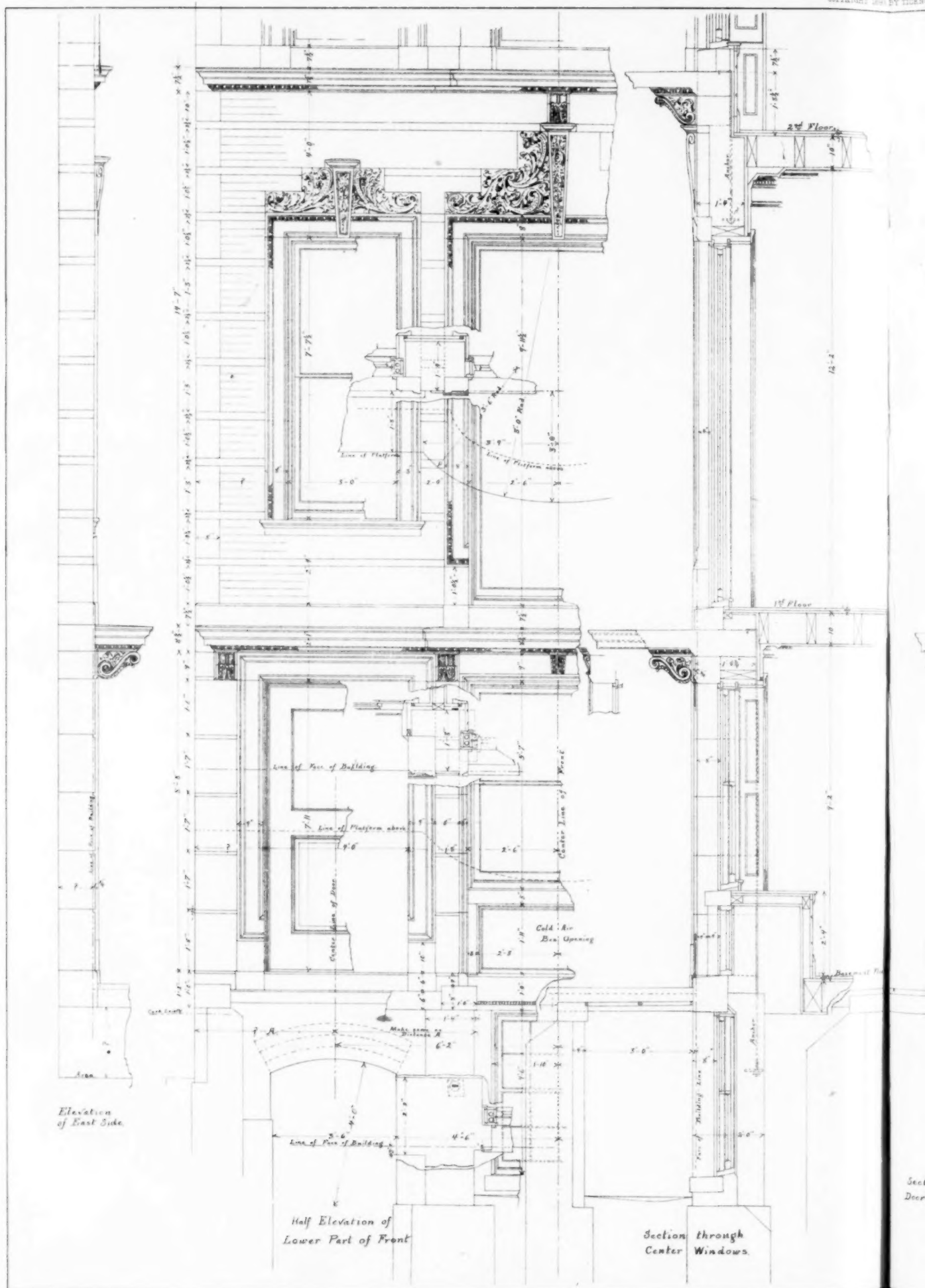
Original Plan of First Story
Scale 1/8" = 1'-0"



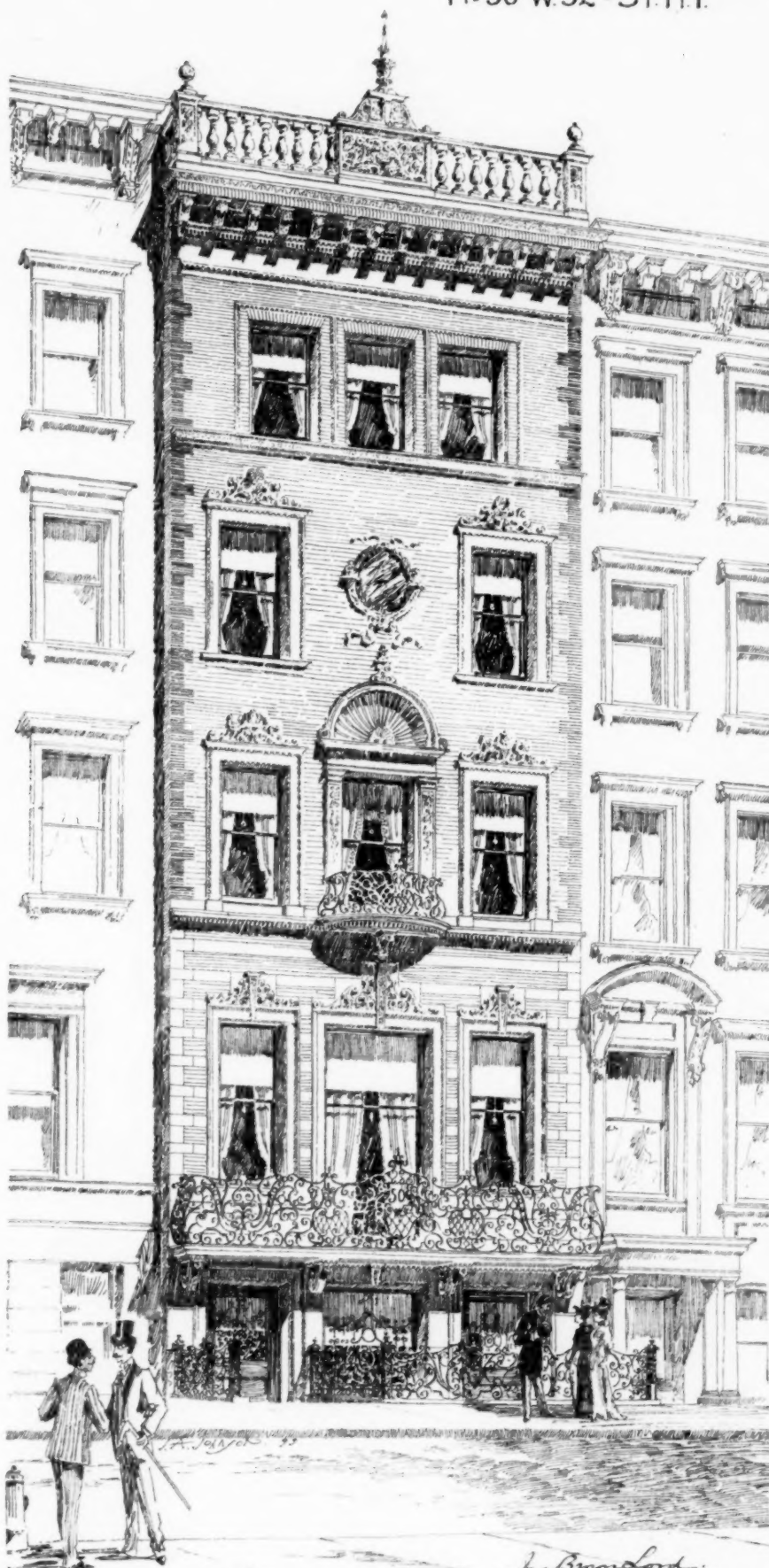
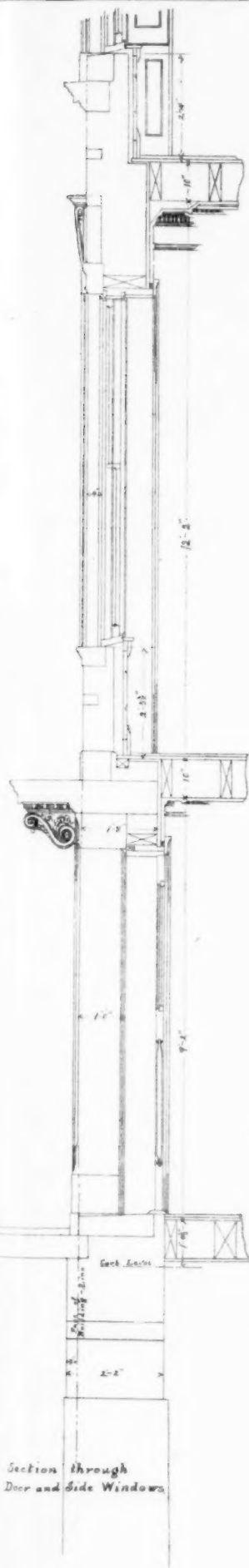
James Brown Lord
Arch.

HELIOTYPE PRINTING CO. BOSTON

DESIGN
HOSPITAL
SOUTH FRONT.



HOUSE OF J.W. HENNING, ESQ.
No 50 W. 52ND ST. N.Y.



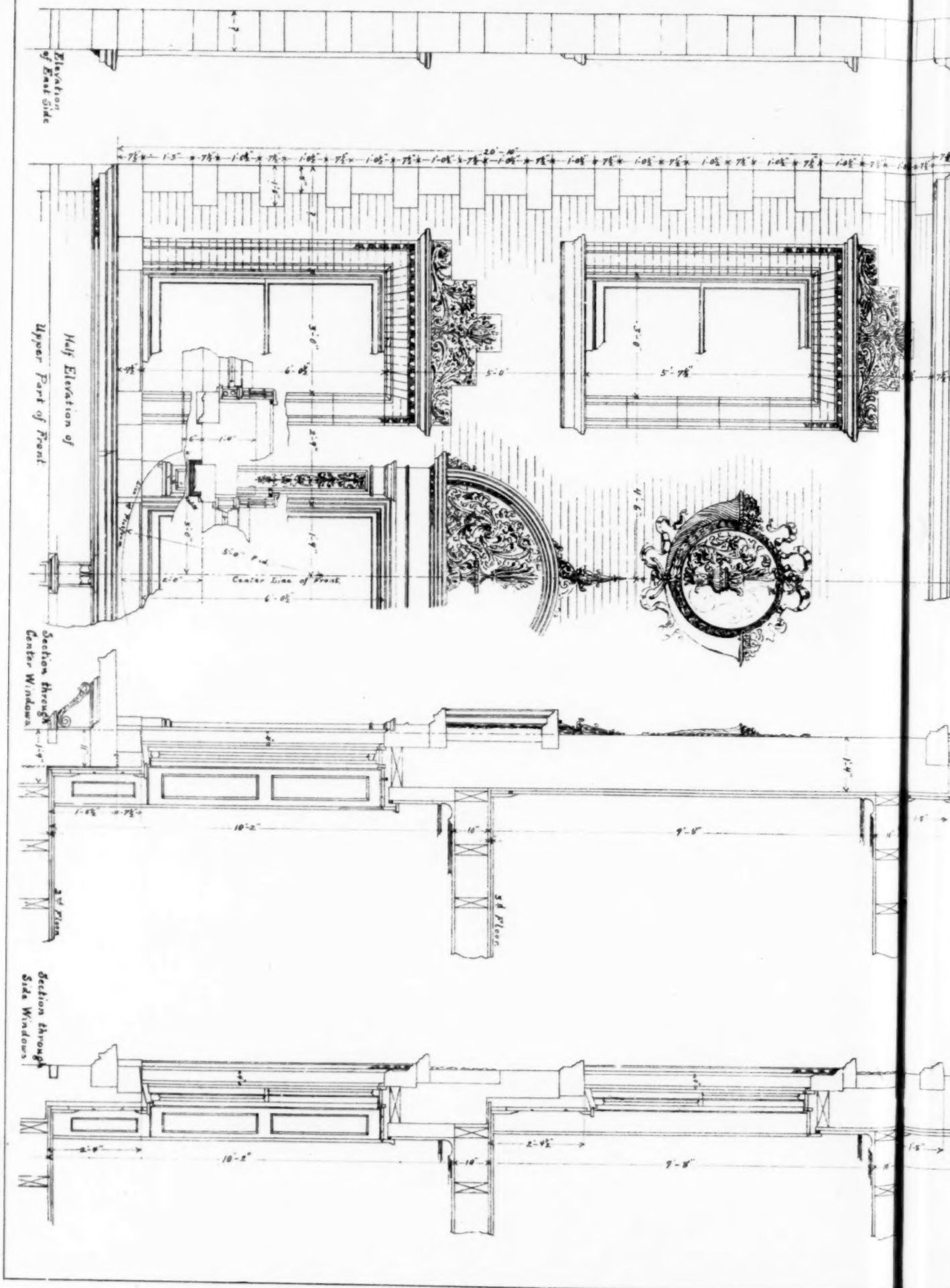
Elevation
of East Side

Half Elevation of
Upper Part of Front

Section through
Center Windows

Section through
Side Windows

— BELLAMY, FRANKS & CO. ARCHT.



No. 922.

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