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JUNE 17, 1893.

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CONTENTS.

ILLUSTRATIONS.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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CONTENTS.

A SAD accident took place in Washington last week, by which some two dozen persons lost their lives, and many more were injured. It seems from the newspaper accounts that Ford's Theatre, the scene of the assassination of President Lincoln, which, after that tragedy was bought by the Government, has been for several years past utilized to accommodate a portion of the clerical force of the War Department. We need hardly say that the style of building which prevailed in the semi-southern city of Washington fifty years ago was not remarkable for its solidity, and Ford's Theatre was not only of inferior construction originally, but enfeebled by age, so that it had long been regarded by many people in Washington as an unsafe place in which to keep the five hundred clerks who were obliged to spend their days in it. However, it would probably have held together a little longer, but for the fact that an excavation was undertaken near the foundations for the purpose of laying wires. This excavation, presumably, afforded an opportunity for some movement of the foundations, which precipitated the fall of the main part of the building, plunging the clerks into the cellar. It seems that the collapse was not absolutely instantaneous, and the loss of life was probably much less on this account. The inquest held over the dead brought out some strange evidence. The feeling that the building was likely to fall seems to have been quite general among the clerks employed in it, and several of them had taken out policies of accident insurance, while others, alarmed at the commencement of the excavation, had applied for leave of absence and left the city; but no one seems to have dared to call the attention of the War Department authorities to the matter. Even to the chief of the special Bureau occupying the building, Colonel Ainsworth, no complaint was made. The clerks who testified at the inquest explained this by saying that it was understood that any one who complained would be discharged, and a curious sentiment of fear and hatred toward the Chief of the Bureau seems to have prevailed among the clerks. Probably there was very little ground for this feeling, but civilians and military men are not famous for appreciating each other's virtues, and Colonel Ainsworth has, for a time, to submit to being the object of a great deal of popular indignation. Meanwhile, however, the sad occurrence has had the effect of calling the attention of the authorities to other buildings used by the Government, in which similar conditions prevail. In the Patent Office, for example, an immense amount of printed matter, weighing, it is said, six hundred tons, has been for many years stored in a place over a room occupied by a large number of clerks. Two years ago, the floor having settled, and some of the arches cracked, under the load, an examination of the room was made by experts, who reported it in a dangerous condition, but, as it was very convenient to have the stores of documents in that particular place, and it seemed to be nobody's business to have them moved anywhere else, nothing was done. Immediately after the fall of Ford's Theatre, the matter was called again to the attention of the present Commissioner of Patents, who forthwith ordered a portion of the documents to be shifted to another room, so as to bring the load on the floors within a safe limit.

THE Massachusetts Legislature, just before its adjournment, passed a law, restricting the area of mercantile buildings, not of the first class, that is, practically fireproof, to eight thousand square feet on each floor. The previous limit was ten thousand square feet, but the great fires of the winter have shown that this was too much, and the Mayor of Boston petitioned to have it reduced to six thousand. As fire-engineers are almost unanimous in the opinion that the maximum limit should be five thousand, the Mayor's application seems to have been reasonable enough, but it was so vigorously opposed by the business interests that the Legislature, as Legislatures generally do in such cases, compromised, by fixing it at eight thousand. The inevitable result of this will be another season of destructive and uncontrollable conflagrations, after which, perhaps, the limit will again be reduced.

IN the construction of mercantile buildings, particularly those for retail trade, it is the interest of the public, not of the merchants, which should be considered. The merchant's interest often is to put up the cheapest possible building that will hold his goods, insure everything heavily, get in as many customers as can be squeezed into the space, and wash his hands of all responsibility for their safety. The interest of the public, on the other hand — an interest, moreover, which, as the records of the Department of Buildings testify, has to be defended by imperious orders and constant vigilance — is to be enabled, so far as the law provides, to transact its business in the more popular and attractive stores with reasonable safety. It must be confessed that the law provides very little protection, and, at present, the breaking out of a fire in many of the most frequented stores in any of our principal cities would mean inevitable death or mutilation to a very large number of people, so that it seems to us that the protests of merchants on such topics have little claim to be regarded. There is no reason why people who derive incomes of many hundred thousand dollars a year from retail trade should not be compelled to make sure that their customers can, in case of accident, get out of their stores alive. If a large, unbroken floor-area is necessary to their sort of business, they may have it without limit, under the present law, by building with incombustible materials; and if they prefer to build with combustible materials, and put the money so saved into their own pockets, there should be no hesitation in compelling them to do so in accordance with the well-known rules of reasonable protection against fire.

THE friends of the Massachusetts Institute of Technology, among whom may be counted nearly all the architects in the United States, will be glad to learn that the Department of Architecture of that Institute has engaged as Associate Professor of Architectural Design, to succeed the lamented M. Létang, another distinguished graduate of the École des Beaux-Arts, M. Despradelle, who will undoubtedly continue in the department the traditions and discipline which have done so much to raise it to the highest rank in its teaching of architectural design. M. Despradelle, although comparatively a very young man, is already a person of note in the professional world in France. His name, during his course at the School of Fine Arts, was to be found almost constantly in the lists of those selected for honors, and, to take up his work in Boston, he resigns a Government position, such as is, in France, reserved for those whose School career marks them as worthy of public recognition and advancement. M. Despradelle will find the institution in which he is to hold so important a station better

equipped for its work than ever before, and he may be sure of the sympathy and friendship of the profession in this country, where with architects the names of the Institute of Technology and the École des Beaux-Arts are household words.

THE Architectural Publication Society held a meeting the other day, at which it was announced that the final volume of the "*Dictionary of Architecture*," for the preparation and publication of which the Society was established, was completed and ready for delivery, with the gratifying additional information that the money in hand from subscriptions and other sources was more than sufficient to meet the cost of finishing the undertaking, so that there would be a balance to be disposed of as the Society might direct. As the preparation of the "*Dictionary*" was begun in 1852, it cannot be said that the operations of the Society have been characterized by undue haste, but its work has, at least, been prudently and successfully carried out, and the completion of the "*Dictionary*" is an event of importance to the professional world. As, with the publication of the last volume, the work of the Society comes to an end, one of the subjects to be considered by the meeting was whether the Society should be dissolved, and, if so, what should be done with the surplus funds, and with the unsold copies of the "*Dictionary*," or of separate Parts. After considering all these matters, it was decided by the members present that the Society should be dissolved. The stock of books remaining unsold was ordered to be handed over to the Honorary Secretary, Mr. Arthur Cates, with instructions to keep them on sale for twelve months, and, if any complete copies of the "*Dictionary*" remained unsold at the end of that time, to present them to the Royal Institute of British Architects, the Library of the Imperial Institute, the British Museum and the Royal Institution, preference following this order if there should not be four copies left for distribution. In case there should be more than four copies, the Secretary and Treasurer, with Mr. Papworth, the editor, were directed to distribute them at their discretion. As to incomplete Parts of the work, it was directed that, after the lapse of twelve months, the Secretary should exercise his discretion as to destroying or otherwise disposing of them, and it was further directed that the wood-cuts used in illustrating the work should be offered to the Royal Institute of British Architects, and, if not accepted by the Institute, should be destroyed. The latter provision was undoubtedly made to prevent the blocks from falling into the hands of publishers. In order to secure subscribers against the possibility that the work might be sold, when completed, at less than the subscription-price, the Society promised that no complete copy should ever be sold by them at less than this price, and, although several offers have been made to the Secretary by dealers to take the entire remaining stock at a reduction from the regular price, they have been rejected. As to the disposition of any cash balance remaining on hand, the Society voted unanimously that one hundred pounds should be presented to Mr. Wyatt Papworth, in recognition of the faithfulness and zeal with which, although at a very inadequate compensation, he had carried out his duties as editor. It was next ordered that so much of the remaining cash balance, amounting to about sixty-three pounds, as could safely be employed for the purpose, after allowance for possible expenses, should be made over to a committee, with power to appropriate it in such manner as they might find most agreeable to Mr. Cates, the Honorary Secretary, in recognition of his great services in securing the completion of the "*Dictionary*"; and a final resolution directed that, when the accounts were closed, if the balance should be larger than was anticipated, the difference should be added to the hundred pounds presented to Mr. Papworth. There are, we believe, a considerable number of subscribers to the "*Dictionary*" on this side of the ocean, and, if its merits were known, there would be many more, so that we would suggest to persons wishing to possess the best and most thorough work of the kind in the English language that they have only a year left in which to secure it. The subscription price is twenty-one pounds, and applications should, we suppose, be addressed to Mr. Arthur Cates, 9 Conduit Street, London.

SOME of our politicians, who truckle so shamelessly to the labor unions, might learn a lesson from the conduct of M. Yves Guyot, perhaps the most eminent and useful man in public life in France, a man, moreover, who has been found indispensable in nearly all the Ministries for many years. M. Guyot is not likely to be ignorant of the fact that the saloon-keepers and the leaders of the labor unions are the dictators, if not of France, at least of the Department of the Seine, yet he was not afraid, in a speech delivered the other day, to say that the Labor Exchange of Paris, which differs from the Central Labor Unions of our cities mainly in being recognized by the Government, collected "all the detritus of the Parisian population." In this country, the arrogance of walking-delegates has been considerably curbed of late years, by the unfavorable view which the courts have taken of their performances; but in Paris, with a Municipal Council for their abject slaves, and official recognition from the Government of the Republic, the tribe seems to have developed an unbounded conceit, and, at a meeting of the leaders of the Labor Exchange, it was ordered that M. Guyot, notwithstanding his rank as a Cabinet Minister, should be summoned before them to explain his words. It is perhaps needless to say that M. Guyot paid no attention to the summons, and a committee of four delegates was then deputed to wait upon him. The committee had a declaration all prepared for him to sign, expressing much regret at the calumnies which had been circulated in regard to the labor unions, and affirming that these organizations were worthy of the highest admiration. M. Guyot declined to sign this, or any other document offered by them. The delegates, as if reluctant to credit the current report of his speech, and, no doubt, wishing to get from him some modification of his expressions, asked him to explain more definitely what he had intended to say. M. Guyot replied to this by presenting each delegate with a printed copy of his speech, saying that he was ready to stand by every word of it, and that his information in regard to the unions came from the workmen themselves. The delegates then angrily inquired whether he considered them "detritus," and, receiving no satisfactory reply, departed. It is hardly necessary to add that the fame of the Republican Minister who had dared to defy the walking-delegates flew quickly over France, and his example soon began to bear fruit. The city of Amiens had been considering the question of establishing a Labor Exchange, similar to that of Paris, but had not come to a decision when the news of M. Guyot's rebellion arrived. The Mayor of Amiens then took courage to make a speech, in which he said that such exchanges, "instead of attending to their own proper business, namely, the interests of labor, seemed to consider their chief function to be the fomenting of strikes." "They have," he said, "become hot-beds of revolutionary agitation, where class is pitted against class"; and the Municipal Council voted that the exchange should not be established. Meanwhile, although the walking-delegates are strongly entrenched behind their defenses of Government protection and present power, and will undoubtedly use every trick out of their repertoire to divert the attack and destroy or deceive their antagonist, we venture to predict that M. Guyot, if he continues his efforts, will soon gain an immense following. Unless the French unions are very different from those in this country, they are mainly instruments for enabling the idle and violent workmen to ride upon the shoulders of the industrious and intelligent ones, whom they coerce by cruel terrorism; and, far from serving anybody's interests except those of the crafty schemers who control them, their constant effort is to discourage energy, faithfulness and good citizenship, and organize workingmen into a caste apart, without hope, ambition, patriotism, or any other of the virtues that should distinguish a member of a free community.

THE hopelessly ignorant condition of the average country health-board is shown in a recent report of the Connecticut State Board of Health, quoted in the *Engineering Record*. The State Board had occasion to try to find out something about the way in which sewage was disposed of in the various towns, and, accordingly, addressed inquiries to the local health boards, with the results that might have been expected. One official reported that the sewage in his town was mostly "fed to pigs"; while, in another, it was "either spread broadcast on gardens," or allowed to run into "a low spot," "for the hens to drink." A third health officer gave the valuable information that "there is no sewage in town"; and a fourth found that in his district there was "no sewage to dispose of." Another reported that "nature took care of" the sewage in his town, and several described their systems of sewage disposal as "natural," or as "the ordinary method"; while one went into particulars about the "ordinary method," by explaining that the sewage is "washed away by the rains."

COMMEMORATIVE MONUMENTS.[1] — IV.

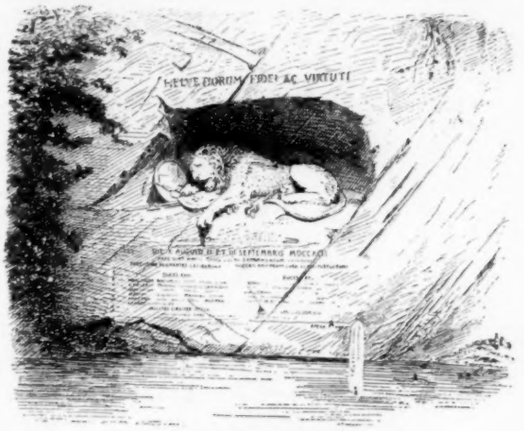


Fig. 25. The Lion of Lucerne.

WE should like to raise a question here suggested by the fact just noted. Is it better that a commemorative monument should be designed in the style of the period at which the hero lived? In support of an answer in the affirmative, the argument of harmony between the costume of the person and the architecture of the pedestal may be urged; but this seems to us a very feeble argument. From every other point-of-view the weight seems to be with the negative. When a man is remembered sufficiently to have an honorary monument reared to him long after his death, it is an indisputable proof that he is worthy of it. The farther the date of its erection is from the time when he lived, the more certain is it that his life was noble enough to serve as an example for all time.

The shade separating modern art from the art of the time of Henri II, is so slight that there is no occasion to criticise the style adopted by M. Scellier for the monument to Admiral Coligny. It suffices for us that the style is properly treated; we can, if we will, recognize in it a desire to realize somewhat novel forms, and we admit with pleasure that these have a stamp of elegance and a certain wealth that belong to a distinguished and pleasing manner. But it would be difficult for us to maintain the same indifference toward all the architectural manifestations connected with commemorative monuments. Although the forms may be well designed, we cannot, for example, comprehend why the pedestal of M. Frémiet's Joan of Arc should be composed in the Gothic of the fifteenth century. The fact that, at the present day, an artist attempts an equestrian statue of the poor maid of Domrémy that shall be at the same time more poetical and more truthful than any other thus far executed, is not only to the honor of the artist himself, but is no less to the glory of the heroine. After thousands of writers have, for nearly five centuries, been sifting history for the facts in the life of Joan of Arc, after she has become the

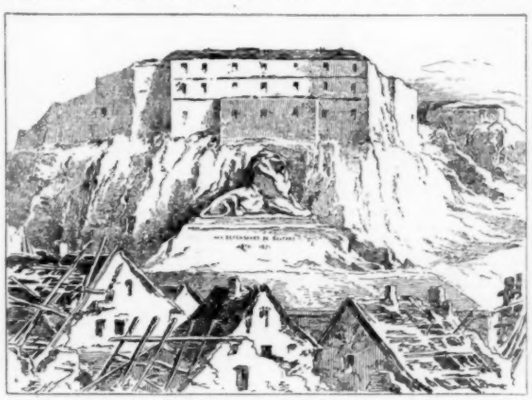


Fig. 26. The Lion of Belfort.

purest and loftiest type of patriotic fidelity and devotion, why resort to an archæological lie which aims to deceive the spectator as to the date of the monument? The Place des Pyramides demanded something quite different from a style more than five hundred years old. The image of the heroine, as we conceive it to-day, should have dated from to-day. That would have been, in view of the time that has elapsed since the historic event, the true consecration of the kind of worship which we have vowed to the Maid of Orleans because she is the personification of the fatherland, maimed and rising again victorious in the consciousness of its own right.

The Lion of Lucerne (Fig. 25) was executed in 1821, to commemorate the death of the Swiss officers and soldiers who fell fighting at Paris, August 10, 1792, in defence of the palace of the Tuileries. A lion pierced with a broken lance is expiring while endeavoring to protect with his paw a shield covered with fleurs-de-lis. It is cut in relief in a grotto 14 metres long, 8m. 50 in height on the face of the living rock, which is of a greenish gray hue. The lion itself is 8m. 70 in length. It was carved from a model by Thorwaldsen. The perpendicular rock is embowered in trees and climbing plants.

As to the Lion of Belfort (Fig. 26): after the evacuation of Belfort by the German army, a subscription was opened throughout France to erect a monument to perpetuate the memory of the heroic defense of the town. The Alsacian sculptor Bartholdi proposed that a colossal lion be placed against the rock on which the castle rises. The idea was original and well conceived. The monument was to be closely linked, morally and

Fig. 27. Monument to Ingres, at Montauban.

materially, to the stronghold whose defenders the country wished to honor; the project was adopted with enthusiasm.

The part of the rock selected for the colossus is a fortification salient about 35 metres above the town. It was out of the question to think of imbedding the lion in the rock itself, which supports important constructions; it was, therefore, decided to set it in front, on a basement, which would leave intact the postern and the staircase of the polygon. This basement is formed of large blocks, in imitation of the rock; the Lion is of mottled freestone; it measures twenty-one metres from the extremity of the paws to the rounded part of the tail; the height is twelve metres and the relief from the wall behind, to which it is firmly fastened, five metres on the average. The visible portions of the animal are of freestone, which forms a sort of sculptured coating, while the unseen bulk is in ordinary masonry of rough stones. This outer coating, or enveloping form, of the colossus is laid in accordance with a plaster model and the joints have been successfully arranged, so as to avoid the sharp turns and the parts out of the perpendicular; sometimes the courses are horizontal and sometimes they are disposed as inverted key-stones.

The place where the stones were hewn was 1,500 metres distant from their destination, and owing to the conformation of the ground, it became necessary, in order to transport and place them, to erect a wooden bridge and an elevated tower eighteen metres high; it was stipulated at the same time that the largest blocks should be reduced to a maximum cube of 1m. 300. To

[1] From the French of L. C. Boileau fils, in Planat's *Encyclopédie de l'Architecture et de la Construction.* Continued from No. 911, page 163.

complete the work it required 228 cubic metres of freestone, 479 cubic metres of ordinary masonry and 105 cubic metres of blocks for the mass below the socle. It took 4,640 kilos. of iron to strengthen the parts out of the perpendicular, and anchor the blocks, or in a word to make the construction of the socle independent of the fortifications, and 1,441 kilos of lead for sealing purposes.

The total expense amounted to 74,344 francs 63 centimes. M. Jundt, chief engineer and director of the works, who has been so good as to furnish us all the technical details, and his foreman, M. Mercellat, however, declined to accept any recompense, as did also M. Bartholdi.

MONUMENTS IN EXEDRAS OR WITH DECORATIVE ENCLOSURES.

In the Monument to Ingres at Montauban (Fig. 27), the glorification of the great painter is clearly set forth. "The statuary, M. Étex, did not think that the figure of Ingres, seated or standing on a pedestal, in the centre of a public square, could portray to ordinary observers the renowned artist, or instruct them as to his work, his influence and his school. He conceived, therefore, the idea of putting the physical nature of his hero in the background, so that, without being wholly disregarded, it should, nevertheless, be absorbed in the representation of his chief work, so disposed that the artist and his genius would be inseparable in the mind of the spectator. For this purpose, Ingres is represented in his working costume, pallet in hand, seated in the attitude of thought and meditation. Behind him, on a slightly concave surface, is reproduced the "Apotheosis of Homer," the loftiest and most characteristic of his productions." ("*Encyclopédie d'Architecture*," 1872.)

Fig. 28. La Fontaine Monument at Paris, France.

The Monument to La Fontaine (Fig. 28) is to be placed in the Parc Monceaux, near the Rue Ruysdael, or in the Ranelagh of Passy. The designer is M. Dumilâtre, statuary. The bust of the fabulist rests on a marble diminishing pedestal. A winged allegorical figure representing the Genius of Fable is bringing a wreath of flowers. Around the pedestal are grouped some of the animals that figure oftenest in La Fontaine's fables: the lion, the fox and the raven, field-larks, etc.

The composition seems to us in all respects excellent. It is impossible that one should not understand at the first glance to what celebrated author the monument is dedicated. The execution is exceedingly careful, and the *tournure* of the figures essentially decorative. The statuary is all in bronze; the socle, the platform and the steps are of marble; a seat in the form of an exedra is to encircle the platform and frame-in the subject, as indicated in our illustration. The architect was M. F. Jourdain.

The composition of that masterpiece, Luther's Monument at Worms (Fig. 26), is due to the statuary Rietschel, who did not live to finish his work. Two of his pupils, Donndorf and Kietz completed it after his death; the inauguration took place June 25, 1868. It occupies a square which measures a hundred square metres. In the centre stands Luther on a pedestal surrounded by statues representing his precursors: John Huss, Savonarola, Wickliff and Peter de Vaux; at the four angles of

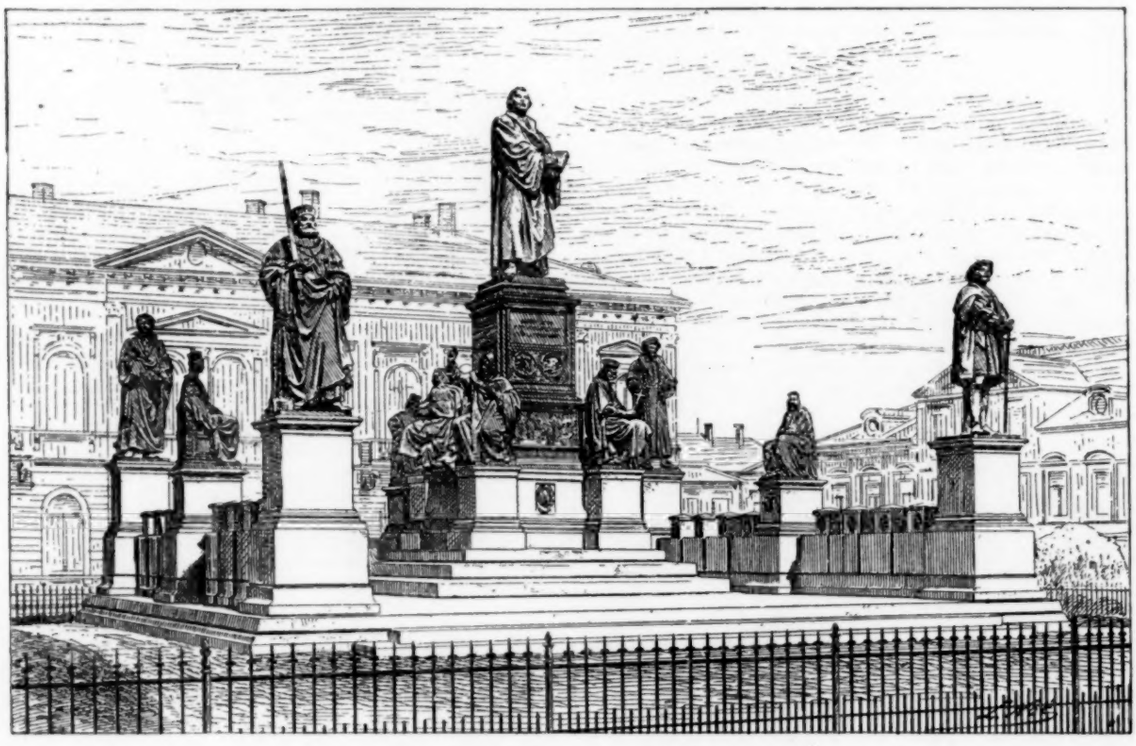


Fig. 29. Luther's Monument at Worms.

the enclosure are Philip the Magnanimous, Frederick the Wise, Melanchthon and Reuchlin, and between them the statues of the cities of Magdeburg, Augsburg and Spires. The *ensemble* is grand and imposing; the statues are very correct in design and the attitudes and movements are fine. The conception and execution are indeed worthy of the great reformer.

The tombs of the Scaligers, at Verona offer a type of construction (which has been taken as a model for all that have since been reared in the Gothic style) that belongs to the middle of the fourteenth century. Designer, Bonino di Campione. The distinctive feature of the composition is a sarcophagus, beneath a baldachin in the form of a great open-work turret. The spire is truncate and crowned by an equestrian statue of the individual; statues of Christian heroes and of the Virtues adorn the pedestal.

The monument to the Duke of Brunswick, at Geneva was erected by the city, legatee of the fortune of Duke Charles II of Brunswick, in 1873. A flight of steps decorated with two large lions in red marble of Verona, by the sculptor Cain, leads to the platform. The monument itself is in imitation of that of Can Signorio della Scala, at Verona, spoken of above. It is a sort of hexagonal pyramid, in three stories, of white marble, red marble and Aberdeen granite. Architect, M. Franel. The bas-reliefs are framed-in with black marble. At the top of the spire is a bronze equestrian statue of the Duke; the model for it was also furnished by the sculptor Cain. The second story of the monument, which can be entered, contains the sarcophagus, with a recumbent statue and bas-reliefs by Iguel. At the angles, covered by canopies, are six statues of ancestors of the Duke; they are by Schœnewerk, Thomas, A. Millet and Kissling. Above, figure the Christian virtues, apostles, etc. The platform is adorned with basins and jardinières filled with flowers; it is paved in mosaics with red-granite from Upper Lombardy, brown-slate from Saint-Gall and black-and-white pebbles from the Arve.

The Albert Memorial at London (Fig. 30), which stands in Hyde Park, was erected to the memory of the Prince Consort, who died in 1861. A statue of Prince Albert in gilt bronze (height 4m. 50), rests on a pedestal beneath a sort

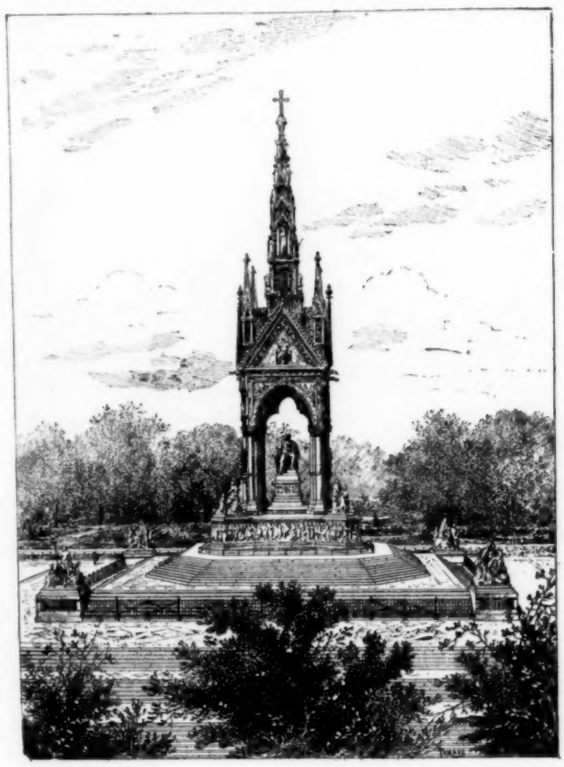


Fig. 30. Albert Memorial, London.

of Gothic shrine resembling a ciborium and terminating in a spire. The basement is embellished with 169 marble figures in round relief, portraying the greatest artists of all times, namely: on the south, musicians; on the east, painters; on the north, architects; on the west, sculptors; at the four corners, on angle projections, are marble groups of Agriculture, Industry, Commerce and Architecture. At the angles of the rectangular platform, are four pedestals bearing allegorical representations of Europe, Asia, Africa and America. The whole structure (height 53 metres), is lavishly enriched with marble and bronze figures, gilding, precious marbles and mosaics. The clustered colonnettes supporting the canopy are of granite. The total cost was 600,000 dollars. Architect, Gilbert Scott; Statuaries: Armstead, Philip, Foley, Macdowell, Theed and Bell.

[To be continued.]

OFFICE-HELP FOR ARCHITECTS.[1]—XIII.

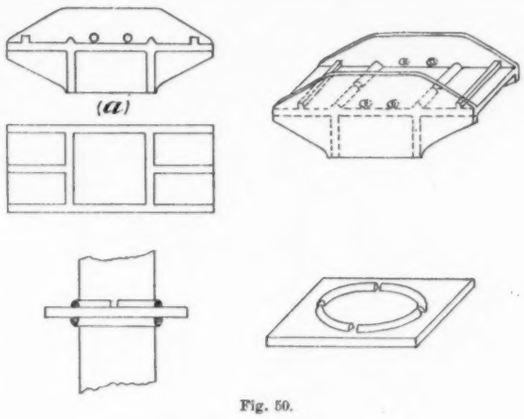


Fig. 50.

CHAPTER IV. — COLUMNS.

§ 212. Materials: — May be any of those used in building. When of any class of masonry, the strength of the mortar used must be taken judiciously and usually allowance must be made for the carelessness of the workmen by exercising care in the supervision to see that the bonding and bedding are carefully done.

§ 213. Proportions: — See Formulas 1 to 8.

Masonry: — Will usually be determined by architectural requirements. Unless for good cause, a masonry column should never exceed twelve diameters in length if monolithic, and eight diameters if built up, and then the building must be carefully watched.

Terra-cotta columns intended to carry weight should be made of solid bricks of terra-cotta of about $2\frac{1}{2}'' \times 4\frac{1}{4}'' \times 8\frac{1}{4}''$.

Wood: — Should be made 1″ larger in diameter than the requirements of strength to provide against the weakening effect of charring in case of fire. Bearing ends of columns should have the fibre strain limited to 500 pounds per square

[1] By George Hill, Consulting Engineer. Continued from No. 910, page 145.

ABBREVIATIONS AND SYMBOLS.

= equal to.	∴ therefore.
∥ parallel to.	□′ square feet.
÷ divided by.	□″ square inches.
× multiplied by.	8# read 8 pounds per lineal foot.
+ added to.	⊏ channel bar.
a^2 a multiplied by itself.	⌶ I-beam.
$a > b$: — a greater than b.	⊤ T-iron.
$a < b$: — a less than b.	∟ angle iron.
$\frac{a}{b}$: — a divided by b.	⊥ deck beam.
	● round section.

I ton = 2,000 pounds as this is the conventional ton, the legal ton is 2,240 pounds, but is rarely used.
l = the length between supports of any beam or girder or height of any column, always in feet.
b = breadth of any beam or girder, always in inches.
d = depth of any beam or girder, or the least transverse dimension of any column, always in inches.
L = total load uniformly distributed coming on any piece in pounds.
L^{lb} = " " " " per square foot in pounds.
W = concentrated load on any piece in pounds.
S = span of any arch or truss between centres of end pins in feet.
A = area of any section in square inches.
M = maximum bending-moment in inch pounds.
n = distance of centre of gravity of section from either top or bottom edge in inches.
I = moment of inertia, neutral axis through centre of gravity.
R = moment of resistance of section.
r = radius of gyration, in inches.
Sc = safe compressive strain in pounds per square inch.
St = " tensile " " " " " "
Ss = " shearing " " " " " "
S = strain per square inch in extreme fibre.
P_e = upward reaction of support at left-hand end of beam.
P_f = " " " " " right " " " "
e = distance of centre of gravity of load from left hand of beam.
f = " " " " " " " " " right " " "

inch. Staved sections should always be made round. Solid sections may be round or square. Built sections should be made rectangular.

All columns should have a central open space to provide for ventilation. This open space should be connected with the air

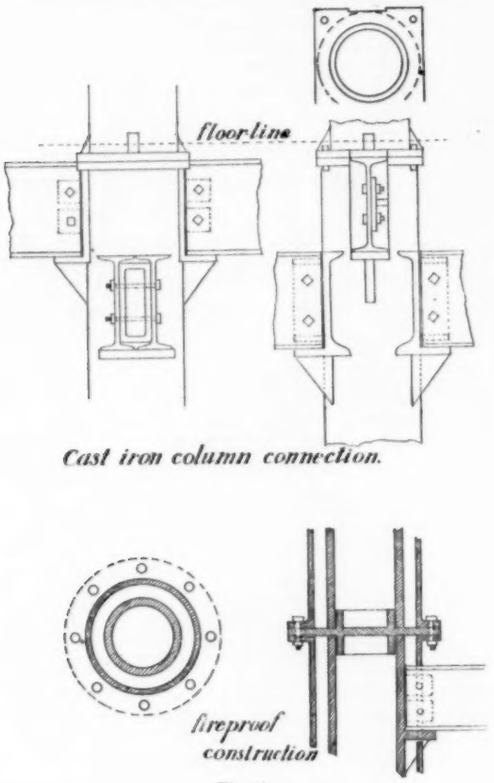


Fig. 51.

by a pair of holes bored at right angles to the axis of the column. Where cast-iron caps are used there should be a ring or lip cast on the top of the base with small openings so made as to free the base of water should any accidentally fall there, and at the same time act to confine the fibres at the end (Fig. 50*b*).

Cast-Iron: — May be used for columns one story high when they are few in number, on account of the ease with which they can be obtained. The outside diameter should never exceed $\frac{1}{16}$ of the length and the shell should be proportioned by formula, but the shell should in no case be made less than $\frac{3}{4}''$ in thickness. For fireproof work the columns are made double, with the inner column the bearing column (Fig. 51).

Wrought-Iron and Steel: — Should be made of Z-bars or of two channels and plates or other shapes (Fig. 52).

These are the best on account of the ease with which reinforcements can be made for bending-moments and eccentric loads, connections of beams and girders made and the shapes procured. When for a story it is necessary to save all the space possible I-beam columns may be used, but they are not economical of metal. All connections should be made as nearly symmetrical or as near the centre of the column as possible. If eccentric loading is unavoidable the position of the

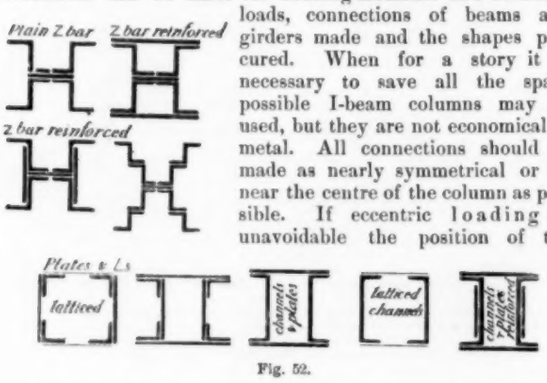


Fig. 52.

centre of the load should be determined for each story and allowed for by shifting the column centre so as to counteract the lever effect of the eccentricity, or by reinforcing the column on the weak side. When the load applied to a column eccentrically is 50% or more of the total load, the section of the column must be increased to allow for it at the rate of 1% increase for each 1% that the load exceeds the 50%. For columns in buildings where the stories do not exceed 16′ 0″ in height and the least diameter of the column is not less than 10″, it is safe to figure sections by using the S, given in the tables.

In building work it is safe to consider all columns as square ended.

Should it be desired to build a Z-bar column of greater strength than is given in the table, additional filler and cover plates can be put on, or the column can be built out farther with still more Zs as shown in Figure 52. When it is desired

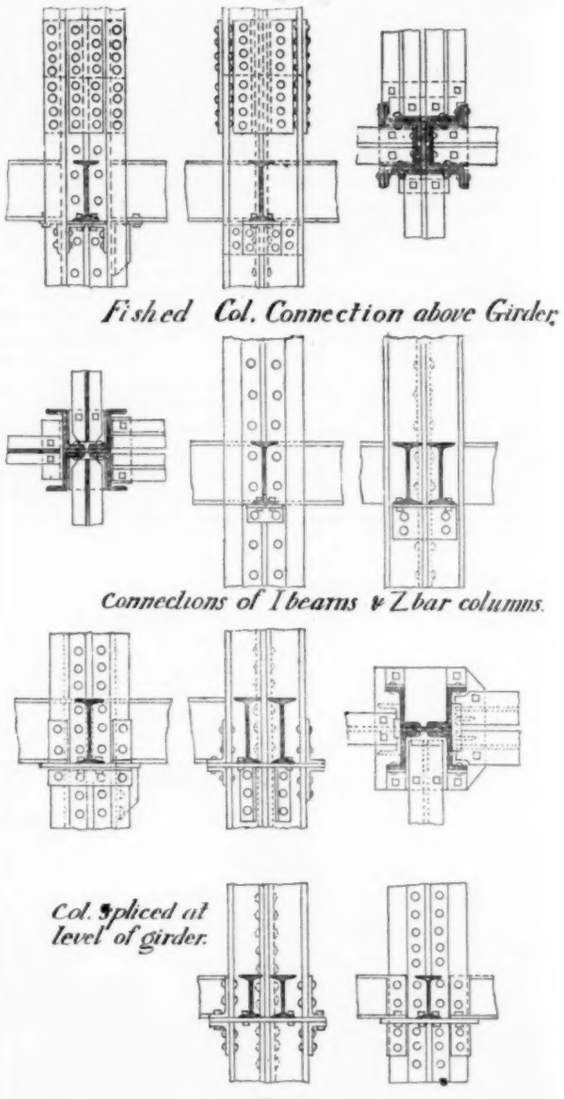


Fig. 53.

to use two Ls back-to-back for the top or compression member of a truss the values of r should be used as given in Table XVI. Where, in a thin partition, it is desired to use an I-beam, its strength should be taken from Table XVII.

§ 214. Eccentric Loading: — Mentioned in § 213. Moments should be taken around one of the extreme fibres and the centre of the whole found, then a section should be found that with the required profile will give the required moment of resistance. When the column length is relatively short the rule given in § 213 will give satisfactory results, or the moments of the flanges or exterior parts of the columns may be taken. All rules on the subject are empirical and the above err on the safe side.

§ 215. Bending-moments: — Often are set up by reason of the sway bracing of the column, or in rafters or ties of trusses

due to the floor or roof loads. In these cases the effect is to decrease the fibre strains on one side of the neutral axis and increase them on the other. We must therefore increase the section of the side that is increased in load and decrease the section of the other, and this is done either by building a section with the flanges of unequal size, or by using a rolled section and reinforcing one side.

§ 216. Column Connections: *Wood Columns:* — Should be erected either in bents of a story in height with Goetz Mitchell or Duvinage caps and girder connections; (Fig. 50*a*) in as long lengths as possible with the joints fished and with girder brackets bolted to the columns; or with 2″ oak brackets put between the story bents, the brackets being well seasoned, clear stuff and filled with a wood-filler to prevent the absorption of moisture.

Cast-Iron: — Must have the connections made with wide flanges at least 1″ thick, with a flange fillet of at least ¾″ radius (Fig. 51). The flanges at both top and bottom of column must be turned up perfectly true in a lathe so as to be exactly perpendicular to the axis of the column. The bolt-holes should be cored-out ¼″ less in diameter than the finished hole and then bored to size. There should be at least 2 square inches of bearing for each square inch of column. Four bolts are usually enough for a column connection when the metal is used within the limitations above given.

Wrought-Iron and Steel: — May be joined either by planing the ends and using fish-plates riveted to the two parts (Fig. 53, Fished connection) or by making a cap of a combination of ⌊s and plates (Fig. 53, Spliced connection). The plates should be faced so as to make a joint over the entire surface. In laying out the work, when the building is relatively low and broad, it is desirable that the column caps should be so placed as to receive the bottom flanges of as many beams as possible, as this makes the erection and connections easier. Where the building is high or the beams come at varying heights, the column connection should be made above the beams with fish-plates, and the beams connected with brackets and angles.

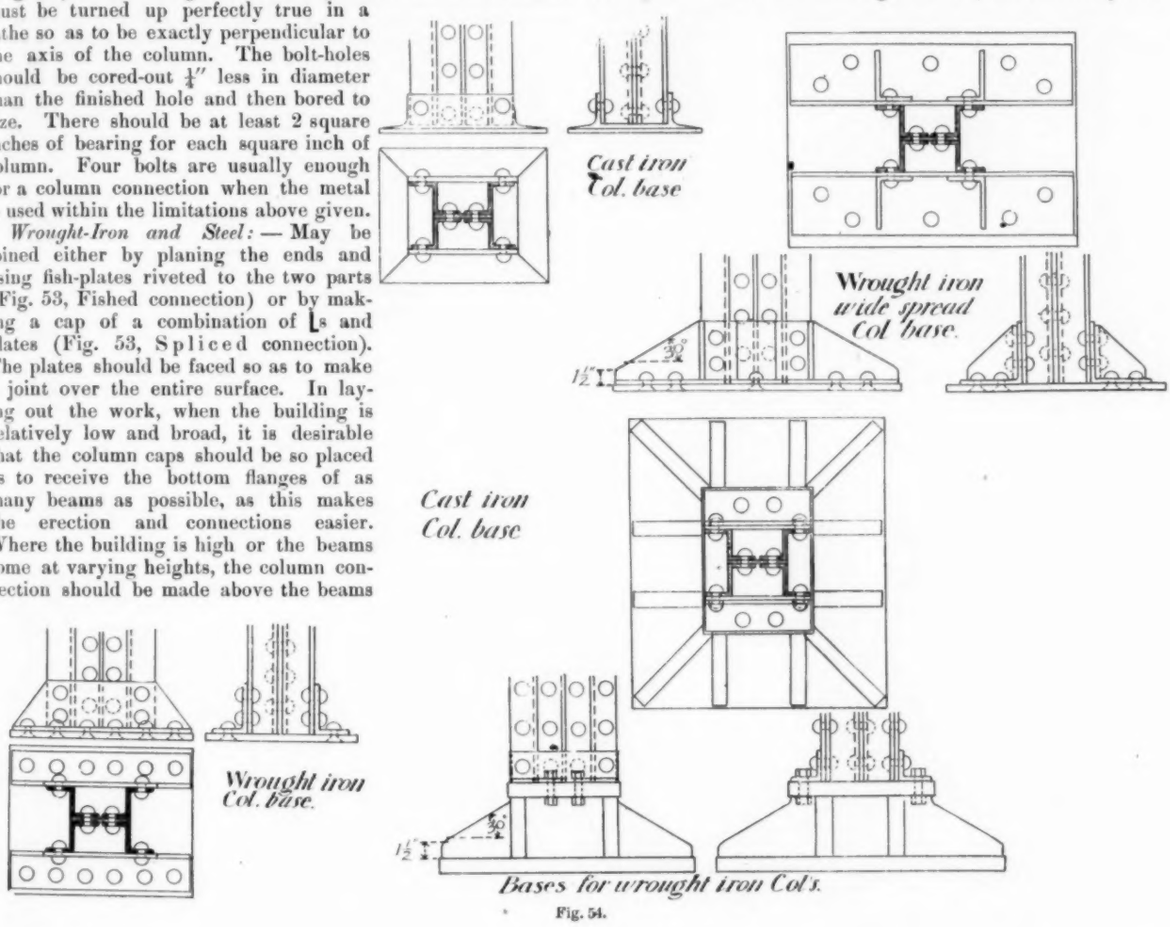


Fig. 54.

All rivets for connections should be made ⅞″ except for ¼″ plates, where ⅝″ rivets should be used.

§ 217. Bases: — Made either of cast-iron, wrought-iron or steel (Fig. 54). In general outline they should be square, with bracing ribs carried to all sides and to the corners. The projection should be determined by the amount of spread required to reduce the load on the footing material to within the limits of S_c for the material used. Where heavy cap-stones are used and the loads are not great, cast-iron may be used to advantage, as the castings may be made very heavy and will not develop defects on cooling. The webs, base-plate and the box supporting the column should all be made at least 1¼″ thick and from that on up to 3″, beyond which it is not safe to go. For steel the spread of the base will be the same as for iron, but the base would be built up of ⌊s and plates riveted together with ⅞″ rivets and so grouped as to give support to the plate. The plates should not exceed 1″ in thickness, and if a greater thickness is required it should be obtained by increasing the number of plates. In any case the ribs should start at the outside of the plate with 1½″ vertical and then slope up and back to the box carrying the column, at an angle with the horizontal of 30°, terminating in a curve upward of 1″ radius. ⌊s should be riveted to the foot of the column so as to give a surface to bolt to. The ribs of cast bases should join the base-plate with a fillet of ¾″ radius. Ribs should be made 1¼″ thick and so spaced as to be twelve times the thickness of the plate apart, for cases where all of the plate lies within the line drawn from the end of one rib to the end of the other. Where a corner intervenes so that a part of the plate lies outside of the line then the distance should be made three times the thickness of the plate. After the base is completed it should be swung in a lathe and the part intended for the column seat accurately faced.

Erections: — Should be made with the cap-stone at top of footings made perfectly clean, level, approximately smooth and about ⅛″ below the determined grade. On the surface spread a bed of the strongest Portland-cement mortar mixed very stiff; strike this smooth with a straight-edge and then lay on it a rectangle of heavy building felt of the size of the base with the centre two-thirds cut out, then set the base on it and bed it well making the top perfectly level. The levelling of the base is best effected by bolting the first length of column to it and then plumbing the column. The base must be set within fifteen minutes of the mixing of the mortar, as otherwise it will set. The building-felt is put under the column to secure an initial deflection of the base-plate and an even distribution of the load which would not otherwise take place.

§ 218. Computations: — The calculation of the loads on columns must be done very carefully. Take the beam-layout for each floor and mark on it the area of floor-load from each beam coming on the column, or else mark on the plan the load supported by each end of each beam or girder, gradually bringing the load or beam reaction back to the column. This method is the easier and makes the tracing of the loads back for purposes of checking much easier. In the other case the loads must be all tabulated. The loads coming on various

sides of the columns should be made to balance or be brought to the centre of the column whenever practicable. After the loads for each floor are obtained and each column is given a number or letter to distinguish it, start at the roof and put down the load from the roof, the section of the column necessary and the weight per foot. Then for the next story below put down the load from the upper story, the load from the story considered, finding the total, then the section and weight, finding the section from the requirements of load using the proper S, and obtaining the weights per foot from Table XVIII. This should be repeated for each column down to the basement and then columns similarly loaded should be compared to see that they agree fairly. This tabulation should be made in the "Computation-book" and then transferred to a table on the iron plans, unless there are so few columns and stories that they can be placed on the plans directly. See §§ 209, 210. Note that the various formulas, assumptions of load and strains and the method of connection should be plainly marked on each sheet for each piece of work.

§ 219. Layout: — Should be made on the same drawings as the beams are laid out on and the columns numbered or lettered for identification. On the same drawing the placing of the shapes should be properly shown so as to determine the manner of the beam connections.

[To be continued.]

ANOTHER ARCHITECTURAL KNOCKABOUT.[1] — IV.

AT last we got off on the little steamer to Tangier, a voyage of some four or five hours. There was a heavy cargo of merchandise and men, owing to the steamer's delay, and we steamed along very slowly. George and I were much interested in an old Arab merchant, who told us many legends of his home. He lived on a big farm in the interior, and raised sheep, poultry and eggs for Gibraltar, where he has traded for years. Dressed in the costume of the country, great baggy trousers, huge turban, his brown legs bare, and feet thrust into Arab slippers, a heavy belt and Morocco bag strung round his waist, he presented a most majestic appearance; he smoked cigarettes and rolled them like a born Spaniard. We became so intimate, that he tried repeatedly to make us go immediately to his home, and visit him for "one, two, three months — a year," he said, as that was the way he did in his country. As for amusement, why we could "hunt, fish and ride miles, and be as his sons"! But in spite of all this hospitality we decided to go to the Hôtel Villa France.

Shoes off.

I shall never forget, as long as I live, the entrance to the Bay of Tangier, and the strange, unique and beautiful aspect of the minarets and white houses, sloping up the side of a hill from a shallow shore, on which the waves began to break far out, with a soft murmur. As soon as the steamer came to anchor, she was surrounded by a swarm of row-boats propelled by a dozen black, semi-naked oarsmen, standing erect, and each, including their captain, yelling with African lungs for patronage. As there is no other way of reaching terra-firma, we relinquished our personalties, our dignity and our lives to one of these nautical baboons, who having secured us, made certain of us by piling over us our trunks, valises and bags, with a dozen or so cases of poultry, and the mail-pouch on top; and with gunwales at the water's edge, our dusky oarsmen sculled us ashore, jabbering, and still intent upon their pay. Landed in unexpected safety, we marched up to the "tribunal of Custom" where superb, sedate Moors, squatted upon wooden divans and scarcely saying a word, conduct this business. Everything being removed from our gaping trunks and valises, and with the help of our pedal extremities replaced, the stuffed Moors looking on the while in silence, two porters placed our baggage on their backs and led us up the wretched pavements and muddy streets, but withal unique and picturesque, to our hotel. We passed through the gates — into a new world, which was the old — past low plastered houses, like white boxes, past the tiny little shops, which are open to the street, the floors raised to the height of one's waist and where the Moor sits on his many-colored mats and bargains with the passer-by; past this to the mart, where dozens of camels lay, chewing their cuds, around them crowds of Arabs, and others squatting before their miserable home-made tent-huts, all hawking their wares of eggs, beans and a villainous-looking black paste. Proceeding to the Villa France, we passed beggars innumerable, most awful to gaze upon, some with their eyes purposely put out to beg more effectually, others having courted disease and exhibiting their numerous sores and filthy persons to the passer-by — it was a sickening sight and George had emptied his pockets long before reaching the entrance to our beautiful casa, situated upon the esplanade outside and overlooking the city.

We found our hotel long and low and spacious — three-quarters of the first story devoted to the dining-room. Walking through its long hall we came out on a beautiful terrace, where were served café and aguardiente, and one could smoke, overlooking the exquisite Bay of Tangier and down over the unique city, in all its dazzling whiteness. Not having wired for rooms from Gibraltar, the landlord told us, with many regrets, that he had no room, not even a spare bed on the roof! But being loath to leave the fascinating spot we begged him to put us up *somewhere*, and he finally, after shaking his head, suggested a "tent on the lawn"; this struck us as particularly jolly, and we quickly told him to "go ahead." He assured us it would not be cold, and that no Arabs would carry us off in the night. We lived here with some comfort for four days, but, as they had neglected to dig a trench around the tent, we and all our belongings were drenched one night when it rained with tropical emphasis.

We rode frequently and I wandered around on foot, as well, and made many sketches, among them the minaret and mosque. What a place for an artist! And what color-effects there are! One day as I was painting the Sultan's (Governor's) palace and prisons beneath, George, who had been looking through the grated windows at the poor wretches incarcerated, came to me and said, as I was putting a few last finishing-touches to my sketch: "Frank, you must go up and see those men in the prison, they are starving. Don't fee anybody, as I have given the guards enough for all."

So up I went, and looking through the window saw ten or twelve of these wretches, standing in tattered rags, knee deep in mud, while they groaned and whined. One burly savage came wallowing up to the grating, and asking him in French, which he understood, why he had been locked up, and for how long? he replied, that when starving, he had stolen a piece of bread, and had been there for five years, and knew not for how much longer he would remain alive. Not knowing whether to believe him or not, I gave him a liberal tip, and, disgusted with the squalor and filth, turned away to descend the hill upon which the palace stands. A policeman with pike and gun, came running after me, and demanded a fee. I told him not to bother me, as my friend had given enough for two, and I had not asked his assistance. This did not please him, and as I started to go on (George had joined us by this time) the Arab caught me by the shoulder, attempting to detain me, so I knocked him down. The howling that then ensued was terrible, and so we both started to clear out. He succeeded in getting all his co-policemen, and most of the neighborhood after us. We ran like deers, while the populace shouting and screaming, dogs and children running out from everywhere, pursued. Becoming frenzied with we did not know what, we showed the best pairs of heels we ever produced. On we ran, with all this truck behind us, clean to the hotel, where they were

[1] Continued from No. 911, page 165.

stopped by our good landlord, and we locked up in a room until the trouble had subsided, which it soon did.

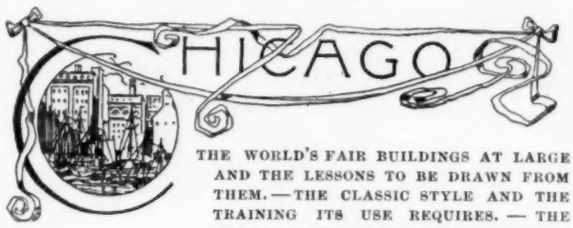
One evening, with a party from the Villa France, we went to an Arab café, where sitting in a row we listened to Arab music, smoked semi-opium pipes and drank Arab coffee, of the consistency of oozing mud. Our guide with whom we had become great friends, and who rejoiced in the name of "Hadgileazier" which he had earned, he said, since performing a journey to Mecca, asked us to an afternoon tea at his "villa." On the day appointed "Hadgi" appeared, and escorted us through the town, to his little plaster hut, no bigger than two large dry-goods boxes. There, making us remove our shoes, as was the custom, and virtually leaving them in the street, we walked in our stocking-feet upon the cold stones and entered his atrium. His wife was sitting there ready to receive her husband and master's guests. We were taken to the one main room, about seven feet square, spread with mats, and each squatted down, tucking his shoeless feet away as best he could to keep them warm, and thinking of our English boots without, now probably upon some Arabs' feet far away on the road, perhaps to Timbuctoo. Hadgi's spouse now brought in an iron brazier on which a charcoal fire was burning, and on this Hadgi placed some little pieces of wood incense, which smouldering away, gave forth thick fumes, most soothing and soporific. Then the Arab tea-pot was brought in and put upon the coals, and a table six inches high, set with nauseatingly sweet cakes was placed before us. Hadgi then proceeded to brew the tea, putting in anything, it seemed, that he came across, sticks, herbs, incense and powders, then he served it up with great rocks of sugar. It was good, very good, but it got in its work soon, I can tell you. We had resolved, however, to see the business through, and had told the hotel proprietor where we were going, so felt that Hadgi had no serious designs upon us. After we had poured down two cups of this tea into our persons, Hadgi made us each smoke hasheesh. George went in for it heavily, and soon overcome by sleep he sank into oblivion. Hadgi did the same, and though I struggled manfully to resist the sense of weariness and sleep, I, too, gave in, and went into a sound slumber. I dreamed of being on a white Arab steed, and of seizing from the sultan's harem, two — I think it was two — beautiful maidens; slinging their willowy forms on either side of me, I rushed away with my bride (or brides) pursued by all the sultan's guard, headed by the furious sultan himself, who catching up with me struck his lance into my foot. This incident awoke me with a start, to find that my stocking was slowly being consumed, and my foot likewise, by a great live coal from the brazier, which I had knocked over. Pulling myself together, I got George into shape, and shaking Hadgi into consciousness, we went out to search for our shoes, and proceeded homeward a little dazed by our late tea-party. I asked George for his dreams if he had any, but he shook his head and said that I "was'nt in it," and he proposed to keep it all to himself — it must have been a very nice dream indeed.

It was high time now that we were getting away from Tangiers, so taking farewell walks and rides around the town and vicinity, we embarked on the French steamer *en route* for Gibraltar and Malaga.

Leaving Tangier in all its picturesqueness and mud, we soon arrived at Malaga, and were deposited upon its mole, with all our belongings.

F. L. V. HOPPIN.

[To be continued.]



THE WORLD'S FAIR BUILDINGS AT LARGE AND THE LESSONS TO BE DRAWN FROM THEM. — THE CLASSIC STYLE AND THE TRAINING ITS USE REQUIRES. — THE GERMAN GOVERNMENT BUILDING.

MUCH, very much, has already been said of the beauty of the buildings at the World's Columbian Fair, but now that they appear before us with finished surroundings and gala garb, words that might almost seem a repetition must be pardoned. We, who have seen the great enterprise grow, step by step, have known how much success must be a factor of the undertaking, but even we are surprised and almost overpowered in these brilliant June days, to see what a creation so nearly allied in beauty to festal and imperial Rome we have here by our very side, and Mr. Gilder's strain, "Say not that Greece is dead," we echo in sentiment, sure that the best part of that classic spirit lives again on the shores of our mediterranean sea. Never before has there been a world's fair to equal this in beauty, and it seems doubtful whether there shall ever again be conditions, in matter of locality, which can work together towards the success which we see here before us. Finer exhibits will as years go by, no doubt, be ready for future fairs, but that any more beautiful setting could be obtained would be very questionable. The greatest inspirations from the past have been combined with the advanced skill and knowledge of the nineteenth century, and we have as a result not merely a gay and pretty plaything, but a wonderful creation so full of grandeur and dignity that it becomes a fitting monument to the discovery, which was the first step towards the foundation of our Republic, a republic never equalled in all history. This element of dignity is one which should not be slightingly passed over. Other world's fairs have had for their chief beauty a sort of ephemeral gayety, that seemed to be the highest ideal conceived for such enterprises. This kind of beauty we see chiefly displayed in the Midway Plaisance, the section reserved for the most instructive,

Sauve qui peut.

expensive and entertaining of side-shows, but from the grounds of the Fair proper it has been practically banished. Naturally the State and foreign buildings have no special uniformity of style. Some few have conformed to the general Classic feeling, while others display the greatest variety of style and no-style. Many of the structures are extraordinarily successful in themselves, but the northern portion of the grounds in which they are situated presents a most motley appearance and more than proves the wisdom of the plan of having one general scheme, emanating from one master brain, for the group of actual Fair buildings. It seems as if, to the smallest detail, grandeur and repose were the features which were most carefully combined with that certain element of gayety always indispensable in such a place of pleasure. In the northern part of the grounds, say from the end of the Liberal Arts Building northward, where the larger trees of the old park are chiefly standing, where the lagoon winds placidly around the wooded islands and willow-fringed banks, no additional architectural features have been added to the buildings. All is kept subordinate to that gorgeous effect which is achieved around the southern basin where is formed the Court of Honor.

The buildings of the Liberal Arts and Agriculture stand north and south of the beautiful little sheet of water. Great stretches of blossoming hydrangeas at present mark the line between the buildings and the green and terraced lawns which brings one to the coping around the water. To the east, with the ever beautiful and changeful lake behind showing through its great arch and columned spaces, stretches the Peristyle across the entire breadth of the court, from the Music Hall to the Casino. The figures surmounting the Peristyle, the triumphal group of Messrs. French and Potter over the arch, are all fine but, when viewed from the best vantage point for the entire court, only serve to carry out the general rich effect and give an impressive outline to that part of the beautiful construction. Southeast of the Casino, and partly hidden by the Agricultural Building, stands forth in ascetic plainness the old convent of La Rabida, its red roof and white walls outlined clear and sharp against the sky and lake. Directly in front of the arch of triumph of the Peristyle stands Mr. French's grand golden "Republic," the very impersonation, it seems, of that spirit of repose, dignity and beauty which so pervades all the great works of the Fair. At the extreme western end of the court, the Administration Building raises its gilded dome on high, while in front, in a mad confusion of rushing, leaping water and sparkling rainbows is the McMonnies fountain, the most beautiful creation of its kind, it would seem, anywhere in the world, if perhaps we except the Fountain of Trevi. A man must have little feeling for the beautiful should he refuse a drink from the basin, if a drink from this, like one from that world-famous Roman one, would be sure to bring him back again to this enchanted scene. Atmospheric conditions have, however, much to do with the beauty of this especial spot, for a day with clear bright sunshine with only a light wind and that not from our monsoon point, the southwest, is the time when everything becomes ideal. Our southwest wind always produces around Chicago a gray, colorless atmosphere, before which all beauty, whether natural or artificial, succumbs.

An actual feeling of sadness comes at the thought that this ideal production can exist for only six short months and that no draught from a charmed fountain can bid it rise again before us.

In the face of all this success there are no lack of the ever present grumblers, complaining of this and that trivial and often imaginary discomfort, and one is reminded of the discontented old woman, whose parson exclaimed: "Oh! mother Brown, mother Brown, when you get to the gates of Heaven, you will be complaining of the kind of door-mat they are using there." With the accomplishment of all these grand results, to certain not infrequent visitors, it seems an equal marvel that all minor details have been so well and successfully arranged.

One very noticeable feature connected with the Fair is the marked architectural triumph it is admitted to be by all classes, professional as well as non-professional, and it is well worthy of note that the exterior of the buildings and their beautiful and studied surroundings attract the crowd quite as much as the interior exhibits. With such conditions the Fair cannot fail to be productive of most beneficial results to the profession here in America. Nothing could be more certain to force recognition of the art from the general public than just this sort of thing, and an educator in the largest sense, the Fair must surely be, in this especial branch of art both to the ignorant and cultivated.

It is very interesting to see how well the Classic style has been accommodated to all the modern nineteenth-century requirements and proves beyond question that this most beautiful of all styles can be appropriately used to-day. The rage for the uncouth, the novel, the bad has done much to hurt our architecture of the last twenty years. The Romanesque revival was certainly a powerful influence toward the obtaining of better mechanical work, but great as has been this improvement there is no reason why a still older past cannot furnish us with inspiration for work of a more artistic and satisfactory kind. Of course, one reason why the Classic treatment has been avoided by many so-called first-class architects is because, for its successful use, there must be in the designer a foundation of hard laborious school-training, that no amount of slap-and-dash "inspiration" can supplant. How much actual artistic knowledge and appreciation does it take to design, as one of our clever young sculptors aptly put it, a house that is "Queen Anne in front, and Mary Ann behind?" In the acknowledged good buildings of the Fair a marked difference is noticeable between those that were designed by men to whom the Classic orders are as the alphabet of their art and those whose work led them into untried ground. With the man of the first class a certain intimacy with this subject produces a fluency of expression, if we may so call it, while those of the latter class give us work in which something is lacking. The actual rules are followed out to the letter, but the spirit of the letter is wanting.

Consequently the architectural student, especially, whose educational foundations have been laid in the class-room and lecture-hall, will not only find great delight but much actual real advantage awaiting him in the study of these beautiful masterpieces, which, moreover, show many unusual school-problems actually carried out. There can be seen besides the large and grand constructions to which the Classic style seems especially to adapt itself, many smaller buildings which are scattered over the Court of Honor and elsewhere. Two of the little chocolate houses are especially charming, as well as the two small structures nearly adjoining the Peristyle on either side, intended as the shelter for bon-bon and soda-water, and the severely Classic structure erected by the Merchant-tailors' Association. The architectural student considers there is nothing like a run abroad, where he may gain inspiration from sketching and studying the old buildings. We do not say that the Fair will afford as much material for thought and study, but let him visit it with half the time he would give to a European trip, but with the same earnestness of purpose, and he will not return with head or sketch-book empty. Aside from these fine adaptations of the Classic style of the chief Fair buildings there is much that is truly admirable among the foreign buildings. We have in a previous letter touched lightly on some of these buildings with the intention of taking them up again when they were completed.

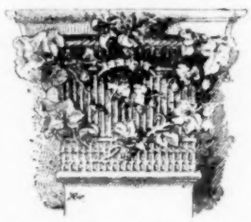
Germany has made an especially fine exhibit at the Fair. Not content with a good showing in the pavilion at the Liberal Arts Building and in a separate building for her great Krupp gun display, she has been especially successful in the building which by itself represents her and much that is typical of the architecture of the nation. Of especial interest to architects will be the exhibit of architectural publications for which Germany has a well earned reputation. This is housed in the German Building proper. This building is a combination of several styles, but has not that lack of harmony which one might expect in such an experiment. The central or, more properly, the chief portion is in the form of a chapel. The outer walls are finished in white plaster, rich in mottoes and decorations in color in South German style, combined with balconies, bay-windows, turrets, dormers, etc., mostly finished in the natural wood, touched-in, here and there, with bright-colored lining and designs, and altogether presenting at first glance such a gay and motley appearance that one's first impulse is to laugh. If those who come to scoff do not exactly remain to pray, they do remain to admire, for, though an extreme treatment of a style pronounced in itself, there is a great deal that is very charming about the building. Over the central entrance rises a tower a hundred and fifty feet high, where hang some beautifully toned bells eventually to go into a church in Berlin built to the memory of the late Empress Augusta. The steep roof of the building is covered with brown glazed tiles, while the copings, water-spouts, lantern, etc., are of bronze. The treatment of the interior of the building is much like the exterior. After passing through the reception rotunda, at the back of which is the chapel, and to the right the rooms of the Imperial German Commissioner, you reach an inner hall which occupies the chief portion of the rest of the building. Balconies rise in tiers on all sides, the heavy and solid treatment of the woodwork, the semicircular arches, etc., all showing influence of the early German Renaissance. The building is said to have cost the government between two and three hundred thousand [marks]. The decoration of the walls is particularly worthy of note. They are, at least in the interior, finished with a coat of calcimine over the rough plaster and this serves for the foundation background on which to lay the decoration. These decorations are done in water-colors, mixed according to the statement of the German government architect with cheese and lime-putty, the lime presumably to give it a certain body and the cheese intended as a sort of *fixatif*.

The result has been very successful, and this process has been used for the exterior as well as interior walls. The designs seem to have been laid-in with the point of the brush, evidently having been drawn rapidly, and give much the effect of colored crayon. Naturally, the decoration has been carried to excess in this building, and though to copy the amount would not be desirable, there are assuredly some features that could be introduced into certain rooms or buildings with great success. The treatment of the interior woodwork is also very acceptable, and brings to one's mind the old German houses which we admire when we see them, but so soon forget when we leave them. We here in America must always have our hardwood finished in an extremely polished state, whether it be fine wood or not. Here a cheaper grade is treated to some kind of umber finish, and bright lines and decorations in oil frames introduced. The newel-posts and balustrades attract our attention as being good where carving cannot be afforded. They consist of the flat scroll-saw work so often seen in Germany, but almost never in this country. Wherever hardware is used, though not of a superior kind either in design or workmanship, it is introduced as a feature. This is noticeable in work around the windows, the long, straight

handles of the doors, and the very ornamental way in which iron is introduced as bolts for the roof-trusses is extremely good. Altogether, though the peculiar style of the building is accentuated to such a degree, the work is very successful, and well worth careful study. To the painstaking student who comes with color and pencil, it offers such opportunities for charming corners for sketching as we only expect to find in old Nuremburg. The crowd and bustle which one would naturally expect to encounter here might easily deter one from the thought of this kind of work, but there is, in fact, many a secluded corner where any one could work unnoticed in a small and quiet way.

An equally characteristic little building in its way is that erected for an East India pavilion. Neither the building nor the exhibit is under the control of that government, but that, nevertheless, does not seem to make it less attractive. The interior is absolutely bad, finished in wood painted to imitate marble, and, were it not for the hangings and furnishings, would be wholly without charm. The exterior is in a Mahomedan style, the building being entirely of staff construction. The building is one story, with a gallery. Its most striking feature is the central doorway, from which arcades extend on either side. The main entrance is surmounted with minarets, which are repeated on the corners of the building. The ground color is a soft, creamy tint, the tympanum over the entrance containing a characteristic design in blue, green and silver, while the interior of the central arch is gilded. Though the materials are of the cheapest in this little building, the coloring and outline is such as to produce a very charming whole.

LORD GRIMTHORPE'S WORKS AT ST. ALBANS CATHEDRAL.



From the Musee de Lille, France.
From *La Construction Moderne.*

AFTER many years the restoration works at the grand old Abbey of St. Albans are approaching completion, and whatever may be the opinions held as to the style of architecture which has found favor in the eyes of the restorer, all will admire, says the *Herts and St. Albans Times*, the munificent generosity of Lord Grimthorpe, who during the past thirteen or fourteen years has expended the enormous sum of over 120,000 *l.* in repairing and restoring a famous edifice which had through the erosions of time fallen into general decay. It is only here and there that one meets with those who are the possessors of such vast wealth as would enable them to spend a princely fortune for the benefit of the community, and still more rare is it to come in contact with those who are willing to thus lavishly spend of their substance. It is perhaps scarcely necessary for us to remind our readers that in the seven years previous to 1880 about 40,000 *l.*, subscribed by private individuals, were expended on restoration works at the Abbey, but it was then found that although a commencement had only as it were been made, the money came in so slowly as to preclude the hope that the necessary sum to carry out the extensive restorations required would be forthcoming. Sir Gilbert Scott, the late eminent architect, was the directing mind up to 1878, and shortly afterwards the subject of what kind of roof should be placed on the nave was discussed, and a "battle royal" took place between the supporters of the flat roof and the advocates of the pitched roof. In public gatherings and through the press the fight raged for a considerable time, but at length the adherents of the pitched roof, headed by Lord Grimthorpe, carried their point, and not long had elapsed ere his lordship, at a time when funds were scarce and the Restoration Committee were partially at a standstill, made application for and was granted a faculty covering the whole fabric of the edifice.

Taking upon himself the weighty responsibility of restoring the building, Lord Grimthorpe, then Sir Edmund Becket, first directed his attention to the west front, and from his own plans and under his close personal superintendence, the massive and imposing west end was built up, the apex stone of the great cross being duly placed in position by his lordship on July 25, 1883. The bitter controversy which was carried on in the press with regard to the style of architecture which Lord Grimthorpe had chosen will be remembered, and eminent as were the writers who entered the lists, the trenchant, incisive and caustic replies of the restorer practically left him in undisputed possession of the field, but the protests raised, though for a time silenced, ever and anon are again heard, and many architects of eminence still talk of the "vandalism and iconoclasm which has been brought to the greatest perfection at the St. Albans Abbey." The evident indifference of his lordship to the ofttimes unreasonable criticisms on his restoration work quelled for a period the storm which had been raised, but meanwhile the restoration of the nave still went on, and in October, 1885, it was reopened for Divine Service, after having been in the hands of the restorer for eight years. The whole of the work in this part of the church has been carried out in the most substantial manner, and there is every reason to suppose that the fabric will stand secure for many centuries to come. In an account of the restoration work his lordship states: "Where there was originally a wall of nine inches thick, the thickness has been increased to nine feet." The five bays at the southwest end of the nave were found to be in a very shaky condition. These were made good and the piers repaired, and attention was then directed to the north and south aisles of the nave, over which high-pitched roofs were erected. Near the great western entrances a flight of five steps has been placed, and the whole of the nave has been refloored with York stone, with marble slabs at intervals. On the western side of the rood-screen, generally known by the name of St. Cuthbert's Screen, a new communion-table has been placed, and the sacrarium space has been enclosed with new dwarf walls. The screen has been extended across the north aisle, the stonework being wrought in the same character of architecture as the central portion. A doorway in this, behind the font, leads to the vestry, and also communicates with the exterior of the edifice. The southern extension of the screen is of carved oak. A new stone pulpit, of cylindrical shape and very massive in construction, has been erected near the fourth pier from the screen on the north side. Substantial choir-stalls and a bishop's throne or chair have been introduced for use at the services. Seating accommodation has been provided in the nave for about 1,600, all the seats being free except the upper row of stalls, which is allotted to church officials, and the front pew on the south side, which is reserved for members of the Corporation. The organ has had added to it a new front of metal pipes on the west side, and the instrument can thus be used for services held in the nave, but many are strongly of opinion that it was a great mistake not to divide the organ, and thus admit of an uninterrupted view of the entire length of the building. Passing into the transepts, those who remember their appearance previous to the restoration are immediately struck with the great alterations which have been made. The great north and south windows were formerly of Perpendicular style, but these have both been destroyed, and windows designed by Lord Grimthorpe have been erected in their stead. These alterations proved to be a fruitful source of controversy, and once again was the battle waged with a fierceness and bitterness which ought not to have been imported into a discussion on the merits or demerits of details of restoration work. A circular window, 29 feet in diameter, of the wheel design and of a very massive character, has been inserted in the north front, and beneath it runs a gallery which gives access to a bell-turret. The south window now consists of five long lancet lights which, when viewed from the interior, appear to rise to an equal height, false heads being used to produce that illusion. Viewed exteriorly, however, it is then seen that the lancets really rise into the gable, the centre one being prolonged to the greatest height. These lancets have been called the "Five Sisters," and remind one of a somewhat similiar window in York Minster, from which the design is said to have been taken. The central light is 60 feet high, and is, therefore, the tallest in England.

The old slype, a damp and gloomy chamber, which formerly stood at the end of the south transept, has been rebuilt at a higher level, and is now used as a porch by which entrance can be gained to the church. Into the south wall of this are built some interesting relics in the shape of carved stonework of different dates found in various parts of the church. The doorway leading from the transept to the porch is enriched on its internal side by some fine Norman tracery; this doorway originally led into the cloister from the west face of the north transept. Much of the work had perished, and has been replaced by modern work, but copied so carefully from the original Norman carving that it is difficult to distinguish which is old and which is new. The arcade of Transition Norman work under the great south window also came from the slype. Externally the church has undergone considerable change. High-pitched roofs have been put on the transepts, presbytery and nave, and the new transept-fronts give quite a different appearance to the building. The unique cylindrical Norman turrets which once adorned the western angles have given place to the present quadrangular erections, and at the eastern end massive buttresses have been built up and other works carried out.

The lady-chapel, which dates from the reign of Edward II, is a rectangular building of fine proportions, and is 50 feet long and 23 feet wide. It is approached from the ante-chapel, and has at the south-east end the chapel of the Transfiguration, which will be used as a vestry. The ante-chapel, which is 41 feet long and 77 feet wide, is divided into three aisles, the centre one being rather wider than the lady-chapel, and it is intended to use this for a chapter-house, diocesan conferences, etc. Speaking generally of the interior restoration works of the lady-chapel, they are of such a character as will commend themselves to those who examine them with an unprejudiced mind, and Lord Grimthorpe is deserving of great praise for the careful manner in which he has used the enormous power he possesses over the building. At the west end, where the old passage passed through the building, there is now a sedilia of eleven seats, the centre one being for the highest official dignitary of the church, and on the back of the arch the word "Præsul" is boldly inscribed. The arcading is cut up into five portions of varied design, with delicately carved capitals, cusps, crockets, finials, etc. The old ceiling has been removed and a new one substituted rather plainer in character. In the south aisle a new oak ceiling has taken the place of the old one, and a marble floor is to be put down. Splendidly-carved pierced oak glazed screens cut off the ante-chapel from the presbytery aisles. The old piscina in the south wall of the ante-chapel has a new panel carved in stone, the subject being the vine and birds, and the work has been most delicately carried out. The

shrine of St. Amphibalus, which formerly stood in the centre of the ante-chapel, has been removed to the north presbytery aisle, where it has been placed on a new stone plinth, and it is probable that the shrine will find a permanent resting-place here. Viewed from the ante-chapel, the lady-chapel now present a grand and striking appearance. At the western end there is an arch with piers flanked by the old carved niches, with cusped circles above and an inscription on either side, that on the north being

Sedicies anni centum pœne isse feruntur,
Post primæ Albani mœnia jacta domus ;

and the insciption on the south is

Quinquaginta annis et sex Victoria rexit,
Cum domus hæc superat quod fuit ante decus.

Round the chapel is an elaborately designed arcade on the line of the old work. Starting from a stone seating are moulded bases with triple engaged shafts and beautifully carved capitals, above which are deeply moulded cinquefoil arches, the label-mouldings terminating in carved bosses. The spandrels are plain, and there is a moulded string-course running along the top. The east end is more ornate than the north and south sides. The cusp points of the arches are carved, and the string-course is magnificently treated, the carved work, based on naturalistic forms, showing nearly thirty examples of flora. The ancient aumbreys have been retained, and other ancient work has been very carefully dealt with, the object in view having evidently been to restore and not destroy. On the south side of the sanctuary, which is raised by two steps of Derbyshire marble, is the old sedilia, which has septfoil arches, carved label bosses and very delicately-carved cusps. The whole of the carving in stone will repay close examination, as it is of a most pleasing and varied character, and it has been based on natural objects. Among the subjects treated are oak, ivy, thorns, filberts, maple, bryony, roses, lilies, pomegranates, figs, sycamore, wheat, vines, passion-flowers, olives, poppies, cherries, strawberries, apples, pears, oranges, lemons, currants, gooseberries, plums, tomatoes, orchids, dogwood, ash, elm, birch, cedar, pine, pansies, azaleas, maize, walnut, holly, hops, chestnuts, arum lilies, lilies of the valley, marsh-mallow, mistletoe, etc. and the remarkably fidelity to nature which the carver has observed is not the least pleasing feature of work which will elicit the admiration of all who examine it. Altogether there are examples of about seventy different specimens of carving in fruit and flowers delineated in the style of the Early Decorated or fourteenth century. Above the sedilia, the old canopied niches have been restored where required. The old windows, the design of which has been so frequently admired, have not been interfered with. It will be remembered that they were restored some ten or twelve years ago, when they were reglazed, and in some cases stained-glass was inserted. On the sides above the arcading are splendidly carved corbels, on the lines of those at Exeter, and from these spring the ribs of the new groined ceiling of clunch stone, which has replaced the old wooden one. The effect of the roofing is grand, especially when compared with the old one patched with lath and plaster. There are longitudinal, transverse, diagonal and intermediate ribs, with boldly carved bosses at the intersections. The old Jacobean altar-table has been repaired, and will again be used; the altar-rail is of oak with iron standards. The floor of the lady-chapel, which is now being put down, will consist of marble 14-inch squares, principally in the form of crosses in black and white, with rouge royal fillings. Over 3,000 slabs will be used, the weight of which is about 40 tons.

The floor of the Saint's chapel has been repaved with Yorkshire stone, with slabs of Derbyshire marble at intervals, the pattern being the same as that in the nave. In the south presbytery aisle the old tomb which formerly stood on the south side has been removed to the north side, and now occupies a position adjacent to Duke Humphrey's shrine. The old doorway has been reconstructed, and is now placed in the centre bay, it having previously occupied a position nearer the west end. The arms of the see fill the spandrel on one side and the coat-of-arms with the crest of Lord Grimthorpe the other. The arcade on the south side of the aisle, which was begun some nineteen years ago under the direction of Sir Gilbert Scott, has been finished out in a most skilful manner, the subjects of the carved capitals being primroses, maple, vine, thorn and filberts; and the bases of the columns in the north presbytery aisle have also been repaired. Many of the fragments of old work which have been collected during the progress of the work have been erected on the east wall of the Saint's chapel, and will be studied with great interest. Exteriorly the windows of the presbytery have been restored and reglazed. New parapets have been erected, the flint work has been repointed, and at the east-end turrets with finials replace the old Norman turrets. The east window of the presbytery has been filled-in with stained-glass given by Mr. Toulmin many years ago, but which previously had not been used. The exterior roofs of the presbytery and lady-chapel are new and have been covered with lead in a most substantial manner, and supporters of the flat roof will be glad to hear that the pitch of the lady-chapel roof is very low. The massive wall of the small churchyard on the south side has been removed and light iron railings have been erected, thus enabling a much better view to be obtained of the fabric. The old yew tree has also been removed and other detail work carried out, everything it is scarcely necessary to say having been done entirely regardless of cost, and so far as the eastern part of the cathedral is concerned there has evidently been an honest attempt to preserve what was really worth preserving, and to restore only where restoration was required.

NEW USE OF ELECTRICITY.

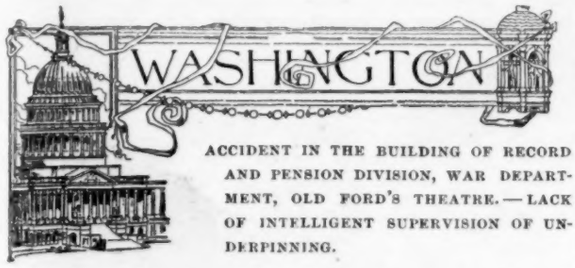
ALMOST important discovery in the use of electricity for heating purposes is described in a report from Consul-General Mason, of Frankfurt, which will be published by the State Department within the next few weeks. The invention is the joint achievement of two Belgian scientists, Messrs. Lagrange and Hoho. When they applied for German patents, some months ago, the means as designated in their claim appeared so simple, and the results therein described so incredible, that the patent examiners demanded that before issuing the patent a practical demonstration of the process should be made in their presence. This was so successful that it was repeated before the Electro-Technical Society of Berlin by permission of the inventors and with brilliant results.

The apparatus consists of a glass or porcelain vase lined with lead, which is connected with a strong conductor of positive electricity. The vase is filled to three-fourths its capacity with acidified water. A pair of iron tongs with insulated handles is attached by a flexible conductor to the negative pole of an electric current generated by an ordinary dynamo. The electrical current having been switched on, a bar of wrought-iron or other metal is taken up with the tongs and plunged into the water, which immediately begins to boil at the point of contact; the immersed portion of the iron quickly rises to a red, then to a white heat, emitting a stream of brilliant white light, and in a few moments the heat becomes so intense that the iron melts and falls off in sparks and bubbles, leaving a clear glowing surface in perfect condition for welding. The heating process is so rapid that neither the water nor the end of the bar held within the tongs is more than slightly warmed.

By the use of a stick of carbon, instead of a bar of metal, it has been demonstrated that a temperature of 4,000 degrees Celsius is developed in the manner described. The rapidity of the heating and the limit of temperature desired are easily governed by the strength of the current employed, so that the whole process is under the absolute control of the operator. During the Berlin experiments a tension of 120 volts and an energy of 220 ampères were registered, and it was estimated that fully 50 per cent of the current was directly utilized as heat, whereas the practical limit has not hitherto exceeded 20 per cent. The inventors say that by employing a still stronger current a temperature of 8,000 degrees Celsius has been developed, or nearly three times greater than that required to extract iron from the ores, the most refractory of which fuse at about 2,700 degrees. Consul-General Mason explains the process in these words, "One of the well-known effects of electricity is to separate compound fluid bodies through which it passes into their primitive elements. The current passing through the tongs and metallic bar into the water decomposes the latter into its two gaseous elements, oxygen and hydrogen. The oxygen is attracted and gathered on the relatively large surface of the lead lining and produces no noticeable effect. The hydrogen, on the other hand, gathers around the immersed portion of the bar, and as this has a comparatively limited surface area, it is immediately surrounded with a close envelope, or jacket, of hydrogen, which, being a bad conductor of electricity, creates a powerful resistance to the passage of the current, and thus develops the heat which causes the bar to glow and melt. It is merely an application of the well-known law that friction or resistance to the passage of an electrical current causes heat, and the apparent paradox of a piece of cold metal plunged into cold water rising rapidly to a melting glow is as simply and clearly explained as the incandescence of a platinum coil in a vacuum bulb."

Respecting possible applications of the new process, Mr. Mason writes: "The quality which entails the largest possibilities and which has been as yet only superficially investigated is the capacity of this process to heat quickly and to any desired temperature the end or submerged surface of a mass of iron while the remainder of the mass is left cool and comparatively unaffected by the heat. It is believed that this may lead to other important results in the hardening and tempering of armor-plates and other objects in iron and soft steel in which great resistance to penetration or abrasion by friction is requisite, while preserving the interior tough and fibrous to resist concussion or strain, as in many parts of machinery. At Essen Messrs. Krupp & Co. are experimenting with it in the hardening of steel cannon, and it is believed that in chemistry this method of producing an intense and easily regulated temperature may lead to the successful manufacture of diamonds, rubies and sapphires through the production of the larger forms of crystallized carbon." — *N. Y. Tribune.*

A Statue of Apollo Found at Delphi. — Excavators at Delphi have unearthed a colossal marble statue of Apollo. The statue, which is of the best antique school, is in excellent condition, except that the nose is broken. — *N. Y. Evening Post, June* 1.



ACCIDENT IN THE BUILDING OF RECORD AND PENSION DIVISION, WAR DEPARTMENT, OLD FORD'S THEATRE. — LACK OF INTELLIGENT SUPERVISION OF UNDERPINNING.

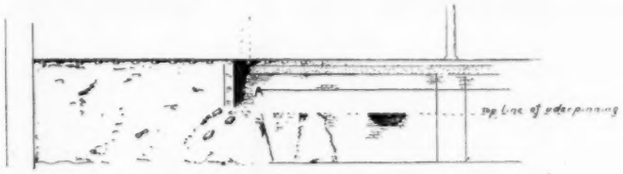
FORD'S old theatre situated on Tenth Street between E and F Streets was erected by John T. Ford in 1857. Mr. James Gifford was the architect. After Lincoln's assassination the Government took possession of the building and arranged the interior for the Army Medical Museum. The back wall was, and is, considerably out of plumb. The interior, with probably the exception of the roof, was replaced, the floor being supported on cast-iron columns carrying iron beams with four-inch brick arches sprung between them. The back wall, which was out of plumb was strengthened by the addition of an interior wall and anchors tying the wall to the system of interior beams.

The first floor rests on a series of arches sprung from dwarf walls two feet eight inches high from footing to spring line. These arches began about twenty feet from the front wall; the floor on the intervening space rests on sleepers laid in an indifferent bed of concrete.

A small cellar was arranged in the back of the building in which the heating-apparatus was located.

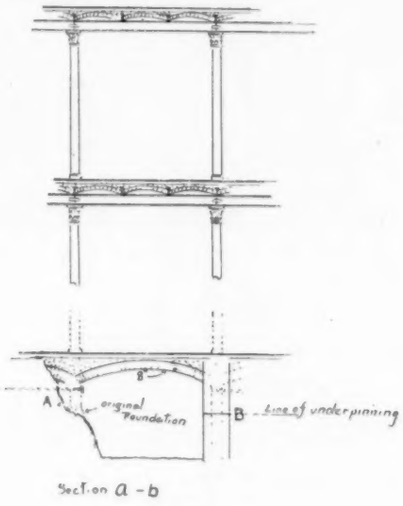
For several weeks workmen have been excavating a passageway from the front to the rear of the building. The central archway had been selected for this purpose. The dirt for this passage was removed, and the dwarf walls were underpinned for a height of about four feet. Curious as it may seem, they had practically completed the underpinning, having finished all the piers on which the columns rested except one, this one as an excavation was made beneath it, gave way, letting down the column marked *A*, pulling over the column marked *B* and precipitating the beams and brick arches which rested upon them on both the second and third floor to the first floor. The portion of the first floor which rested on 3″ x 4″ sleepers was carried into the excavation. The brick arch over the passageway did not fall. The roof, fortunately, was independent of the system of columns, reaching from wall to wall.

The clerks working on the different floors fell with the falling iron, brick, timber and desks, as there was no warning. Nineteen were killed by the fall, one who was safe, was killed by jumping from a window and sixty-eight were injured, three having died from their injuries. Twenty workmen were under the archway. The bricklayer, who was preparing to underpin the pier which gave way, feeling dirt fall on his neck, stepped back (out of harm's way) to brush it from his neck just as the crash came.

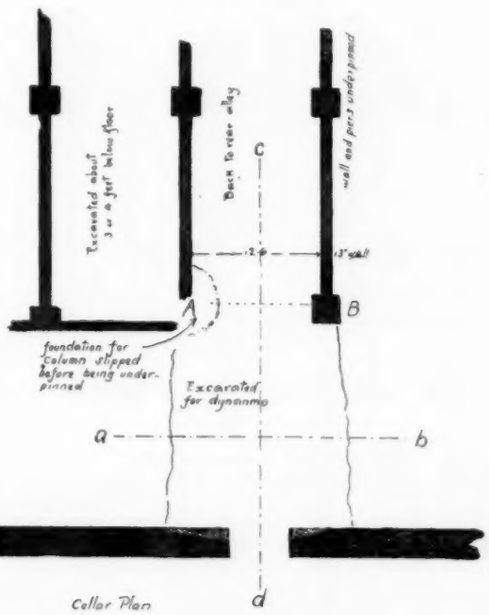


Section c–d

This accident has brought to light customs of the War Department, which if practised by an individual or a corporation would not only be considered criminal but would render them liable to prosecution and conviction for manslaughter. It seems that in work of this character, where the lives of many people are at stake, it does not employ proper expert supervision, and further, that it does not even get expert advice as to the proper methods of conducting such an important undertaking as underpinning a series of piers on which rested columns supporting two stories of brick and iron floors, 13 x 20 square feet, loaded with men, desks and papers. The methods adopted in carrying on this work show an entire lack of comprehension of the matter in hand. Each pier had, at a low estimate, 51,000 pounds resting on it when the earth was taken from beneath, leaving a bond of about three feet of brickwork to support this great weight above. Curiously, this method was successful until they came to the last column. This pier had a wall bonding into it only on one side, hence they were depending on the strength of a brick corbel with only the counterbalancing weight of three feet in height to support 51,000 pounds. They (we might say miraculously) accomplished this feat at *B*, but at *A* the, last pier, what might have been considered inevitable, happened. The brick corbelling and the little support which was obtained from the earth, a mixture of sandy clay, gave way and the columns and superstructure which they supported collapsed. It does not seem to have occurred to the contractor or any of his supervisors to have shored up the story above. The ease and slight cost of such shoring the cross-beams by temporary support one would think would have commended itself to the most obtuse as well as the most penurious person, whether it was a Department Chief or a contractor. It appears, from the assertions of those who made estimates on the job, that no specifications,[1] drawings, or directions were given for the work. The party in charge of the building said that no specifications were needed, all they wanted was that the dirt should be dug from beneath the walls, and the space bricked-up. That was the quality of expert direction as to how the work should be done. The supervision consisted in Colonel Ainsworth (medical Colonel), Chief of Division, the man who attends the boiler (dubbed engineer) and the contractor for the brickwork examining the work daily and asserting that everything was all right. Dr. Ainsworth and Captain Thorpe, who let-out the contract, assert that this is a common way of letting-out contracts for the War Department, and the Supply Division or Quartermaster's Department which has charge, of course, know little if anything about how the work should be done, hence they depend on the contractors.



Section a–b



Cellar Plan

This is a sorry confession from the Department which has the whole Engineer Corps of the United States Army at its command. To what better use could the engineers be put in times of peace than computing the weights and size of shores to resist them, and specifying the necessary precautions that should be taken in such cases as this? It seems as though such trifling affairs are not worthy the attention of even a lieutenant in the Engineer Corps.

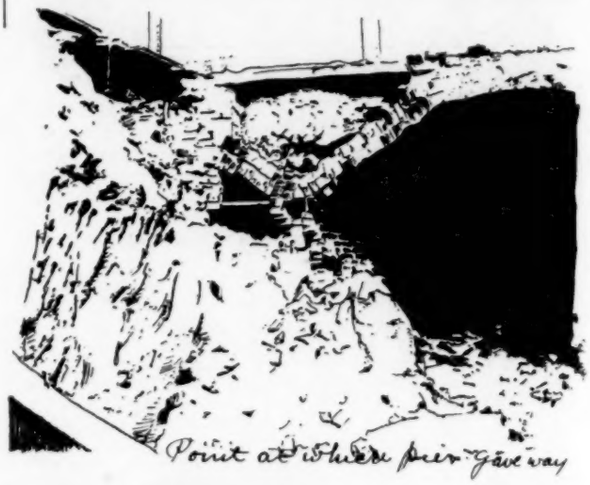
It is a serious question to decide which party is the most to blame, the contractor, Dant, who should at least have known a little about

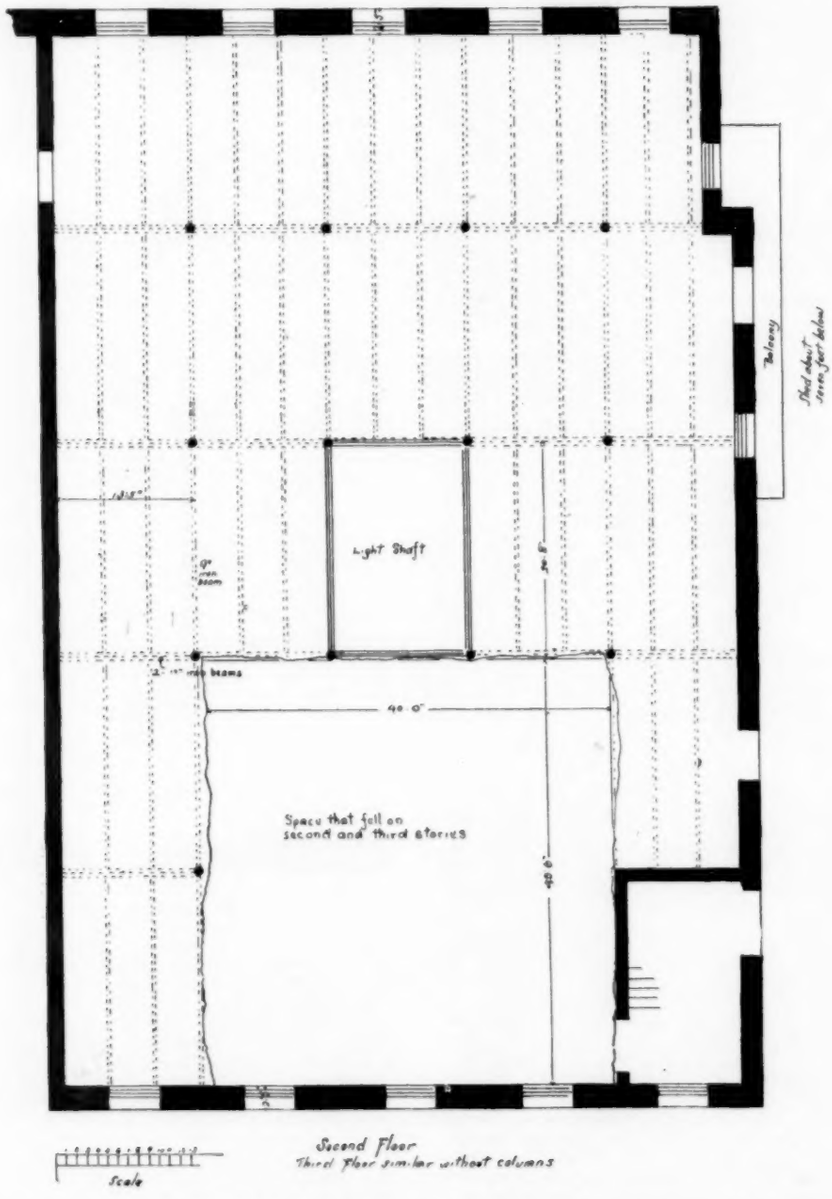
[1] The contractor making the above statement declined to bid, and hence, presumably, the crude specification and drawings (which I have seen since writing the letter) which are stated to have been prepared, "not by a regular architect or *builder*," . . . but by a "steam-engineer"; *i. e.*, the man who attended to the boiler for the heating-apparatus. The estimates and contract were made on such an indifferent basis as this.

relieving the piers from the weight above before underpinning them, or the Army officer, Dr. Ainsworth, who should have obtained expert advice and supervision.

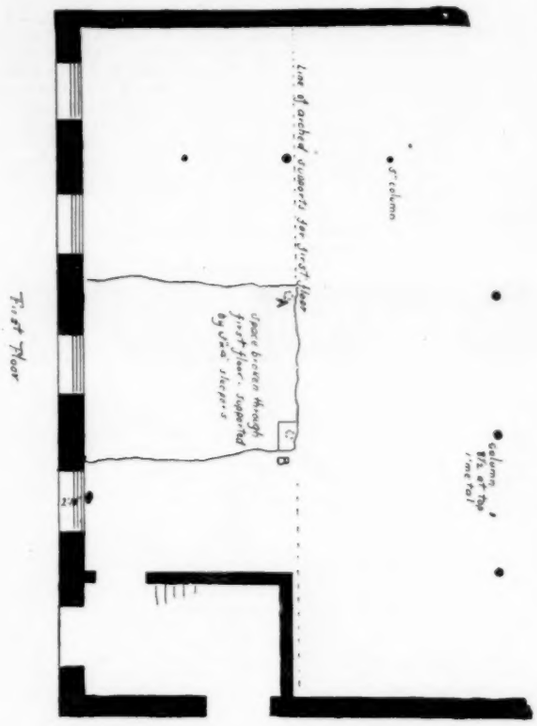
The coroner's inquest and the Board of Inquiry, consisting of Generals Casey, General Batchelder and Major N. Davis, will investigate and probably place the responsibility where it properly belongs.

Several questions have arisen in reference to this accident. The building has been condemned by reports of the Surgeon-General, Barnes, in 1881, and Representative Shellaberger, in 1883. These reports have naturally been talked over and magnified by the clerks.





They seem to bear principally upon the bad light, lack of ventilation and the first floor having no cellar, so it was not considered healthful; and further, that the roof was not fireproof and the valuable collections of the Medical Museum were, therefore, in an unsafe building. The walls seem to be strong. The floor beams are lighter than would be used in ordinary practice, being 9″ for a span of a little over twenty feet. Beams about four feet four inches on centres. This would be safe, but would give more deflection than would be considered agreeable. The collapse evidently did not occur from the condition of the building, as many suppose. The daily papers and the clerks make quite a point of the floor (which was temporarily supported by the sleepers and roped off while the excavation was



going on) shaking when walked upon, but of course this had no bearing upon the accident. It was simply carelessness in preparation for doing and supervising the excavating and underpinning of the new work that was the immediate cause of the failure.

The accident also brings forward prominently the notoriously unhealthful and reported unsafe condition of the Government Printing-office as well as other make-shift buildings which the Government occupies in this city, and again calls attention to the fact that many such buildings are overloaded, and an entire lack of knowledge as to what the floors were intended to carry. All such buildings should have their capacity computed and posted on every floor, as the documents and other matter which the Government stores away, increasing daily, are a menance to the stability of the buildings and the life of their occupants.

SOCIETIES

SKETCH-CLUB OF NEW YORK.

THE last meeting for this season, which was the regular May meeting, was held Saturday evening, June 3, at Delisle's restaurant at the top of the Central Building, corner of Liberty and West Sts. The balcony around the restaurant afforded a fine view of the river and bay which was enjoyed by the members before dinner was served. After dinner Mr. Rudolf L. Daus, architect, lectured on "Early Renaissance in France," with illustrations by the stereopticon. Mr. Holtzer of the Tiffany Glass Co., criticised the drawings for the mosaic mantel, and awarded first mention to Edgar A. Josselyn and second to Edward J. Brown. Mr. Holtzer made an address on the subject of mosaics and showed a number of examples and photographs. During the progress of the dinner Mr. McDonald amused the members by telling a number of stories. The new "*Year Books*" for 1893–94 were distributed at this meeting.

EDGAR A. JOSSELYN, *Recording Secretary.*

ILLUSTRATIONS

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

THE NEW RIDING ACADEMY, BOSTON, MASS. MR. WILLARD T. SEARS, ARCHITECT, BOSTON, MASS.

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

STUCCO ORNAMENT ON THE PALAZZO SPADA, ROME, ITALY. SKETCHED BY MR. W. M. MACCAFFERTY, *American Architect* TRAVELLING-SCHOLAR FOR 1892.

[Issued with the International and Imperial Editions only.]

A CORNER IN VENICE AND THE HOOD OF FIREPLACE IN THE DUCAL PALACE. DRAWN BY MR. W. M. MACCAFFERTY, *American Architect* TRAVELLING-SCHOLAR FOR 1892.

[Issued with the International and Imperial Editions only.]

SAN CARLO THEATRE, NAPLES, ITALY. DRAWN BY MR. T. MACLAREN, FORMER PUGIN TRAVELLING-STUDENT.

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PULPIT IN CHRIST CHURCH CATHEDRAL, OXFORD, ENGLAND. DRAWN BY MR. T. MACLAREN, FORMER PUGIN TRAVELLING-STUDENT.

[Issued with the International and Imperial Editions only.]

COUNTRY HOUSE, MORRISTOWN, N. J. MR. MANLY N. CUTTER, ARCHITECT, NEW YORK, N. Y.

SKETCH FOR A COUNTRY HOUSE. MR. FRANK A. HAYS, ARCHITECT, PHILADELPHIA, PA.

SKETCH FOR HOUSE AT UPSAL, PA. MR. FRANK A. HAYS, ARCHITECT, PHILADELPHIA, PA.

HOUSE OF JOHN DIXON, ESQ., MOYLAN, DEL. MR. GEORGE T. PEARSON, ARCHITECT, PHILADELPHIA, PA.

HOUSE OF WILLIAM R. RONEY, ESQ, COREY HILL, BROOKLINE, MASS. MR. EUGENE L. CLARK, ARCHITECT, BOSTON, MASS.

OLD ROGER MORRIS MANSION, NEW YORK, N. Y.

[Additional Illustrations in the International Edition.]

HOUSE OF GEORGE E. LEIGHTON, ESQ., WARREN ST., ROXBURY, MASS. MR. J. A. SCHWEINFURTH, ARCHITECT, BOSTON, MASS.

[Heliochrome.]

XVI-CENTURY CABINET IN SCULPTURED WOOD.

[Photogravure.]

IMPERIAL INSTITUTE, SOUTH KENSINGTON, ENG.: A REFRESHMENT-ROOM. MR. T. E. COLLCUTT, ARCHITECT.

IMPERIAL INSTITUTE, SOUTH KENSINGTON, ENG.: A CONFERENCE-ROOM. MR. T. E. COLLCUTT, ARCHITECT.

HOUSE AT WITMEAD, NEAR FARNHAM, ENG. MR. RALPH NEVILL, F. S. A., ARCHITECT.

THIS house is about to be erected near Tilford, for Colonel Davis; a lodge already built was illustrated in this journal last year. A basement, containing larders, cellars, heating-chamber, etc., will be built of concrete made of gravel dug on the property and selenitic lime; the latter is also used for all mortar. The building generally will be of red brick in hollow walls, with weather tiles on the south-west side, and Beer-stone mullions and dressings to hall and entrance windows, etc.; local red tiles set in concrete plaster will be used for the roof. Advantage is to be taken of a rapid fall in the ground to form a spacious terrace in front, with flights of steps descending to the tennis-grounds and the ornamental water connected with the river Wey. The side, with main entrance, faces northwest, and the front with terrace southeast.

PART OF OLD PALACE, BAMBERG.

NOTES & CLIPPINGS

Protection of Steam-pipes from Loss of Heat. — Some considerable attention has been devoted at Sibley College, Cornell University, to the loss of heat by radiation from lines of steam-pipe, and with the college steam-plant Prof. R. C. Carpenter has conducted a series of experiments and observations which have served as the basis for valuable contributions upon the subject to the technical press. His most recent article is devoted to the determination of the relative efficiency of two kinds of covering. The College buildings are heated by steam from a boiler-plant on the north side of the campus, and in transmitting the heat to the various college-structures there are employed 150 feet of 10-inch and 2,050 feet of 6-inch pipe, all laid underground. The pipe is protected by placing it within rings, formed by boring out sections of logs, the holes being large enough to leave an air-space of nearly one inch around the pipe. The thickness of the wood is four inches. The outside of the wooden pipe is wound spirally with hoop-iron and coated with hot coal-tar and sawdust. Measurements showed that pipe protected in this manner lost only about 31 per cent as much heat as those uncovered. The second series of tests were made at South Plainfield, N. J., where a number of engines at different points in a coal-handling yard are supplied with steam from a single-boiler plant through 747 feet of 4, 5 and 6 inch pipe. This was placed in a covering consisting of two concentric octagonal pipes, each built of 1-inch plank, and separated from each other by a very thick layer of water-proof paper. The steam-pipe passes through the centre of the wooden pipe, and is surrounded by a half-inch air-space. On account of the wet soil and the difficulty in securing proper drainage, the pipe was left on the surface of the ground and protected by a rough box of 2-inch plank. The experiments showed that this covering reduced the loss of heat to about 8 per cent of what it would have been with naked pipe. These figures are considered to show that it might be found economical in cases where comparatively small quantities of steam are to be used in different places not too far distant from each other to employ a central boiler plant and transmit the steam through protected pipe. It is without doubt possible to generate steam more cheaply in a single large plant than in a number of smaller ones, and if it can be demonstrated that the loss in transmission through covered pipes can be reduced to less than that involved by shafting, belting or electric motors, a strong argument in favor of the system is apparent. — *Providence Journal.*

Obelisks out of Place. — A few years ago the favorite drive of visitors in Alexandria was to see the obelisks known as "Cleopatra's Needles," but now both of them have gone; they stood before the palace or Sebasteum, whose site a stone-mason's yard and Ramleh Station probably occupy, and the connection of them with the notorious Queen is now quite exploded. No one who has stood beside that one still mercifully left at On can but feel anger and regret that they should have been removed to lands where no surrounding is in keeping, and where their rapid destruction is certain; that remaining where those once at Alexandria came from still serves to mark the spot where the great temple stood, and makes one dream dreams of what scenes and persons in the world's story it must have looked down upon, from earlier days than those when Joseph, the Patriarch, came to wed the daughter of the priest here to even later than when its shadow must have fallen upon another Joseph and Mary his wife bearing the child Jesus as they came to its fountain for water. Those at Alexandria had been removed before that great advent, but it would have been far more "scientific" and shown far better taste to have sent them back for future ages to value on their original sites than to have taken them to lands where they must rapidly crumble to dust. There can be no possible excuse made with that gone to New York; the only palliative with regard to ours on the Embankment is the forgotten fact that it was presented by the Egyptian Government to commemorate our triumphs over France. That at New York is now almost smooth, its inscriptions obliterated, as that on the Thames bank will be in another twenty years. Trieste laid some claim to the American one. Its erector, as that of the one on the Embankment, was Thothmes III, about 3,500 years ago, and, like all the rest of them it once had its surface highly polished and the hieroglyphics perhaps inlaid with silver gilt, and its point capped with the same metal. As it rose seventy feet in air its apex caught the first glance of the sun god Ra as he rose over the Arabian desert, and then the smooth sides would glitter, and from obelisk to obelisk would the bright glances flash as he rose in the imperial glory and autocracy of his Eastern rule. Think of this, and then look at those sad, wasted, crumbling monuments in London or New York, and ask if wisdom be justified in such ruthless and greedy children as possess them. There was a scene which took place at their feet as they stood before the palace pylon at Alexandria which all know but few associate with them, and yet the sadly thrilling tale of the death of Hypatia is familiar enough. — *The Nineteenth Century.*

London City. — In an age the tendency of which is to sweep away old landmarks, it is hard to say how long our own London City may enjoy a separate existence, but it may be believed that it will assert its peculiar "rights" to the very end. London Wall exists but in a few scattered fragments preserved by a spirit of love and reverence for the past; the last city-gate disappeared with Temple Bar, but the noblest and greatest of visitors must pause on its site ere they enter the precincts of the City in state, the obstruction, it is true, being nothing more formidable than the address of welcome, but still reflecting in an amiable way the old jealousy of intrusion from without. Only one regiment, the famous Buffs, may march through London City with fixed bayonets, drums beating, and colors flying. The Lord Mayor of old enjoyed innumerable "rights" by virtue of his position, but most of these have been resigned. He, however, still retains the right of precedence in the City before any of the royal family. He also has the right of private audience with the sovereign, it not even being compulsory to request this formally. When levees and drawing-rooms were held at St. James Palace he had the right to drive directly to the Ambassador's Court instead of going round by Constitution Hill. He is summoned as a Privy Councillor on the death of the sovereign, and only after a long lawsuit with the Crown was his absolute sovereignty over the Rivers Thames and Medway, from Oxford to Rochester, compromised. The City Companies are still exceedingly jealous concerning their "rights," especially as regards matters of precedence, and to this day the Skinners and Merchant Taylors obey a mandate of the fifteenth century, by which, in settlement of their quarrel for precedence, the Lord Mayor ordered them to dine together twice a year. — *N. Y. Evening Post.*

A Curious Method of taking Foul Air out of a Well. — I saw, says a writer in the *Globe-Democrat*, a curious method used, the other day in Illinois, to take the foul air out of a well. The well was to be cleaned, but the man that took the job was afraid to go down until he ascertained the quality of the air at the bottom. He let down a lighted candle, and when it descended to about six feet of the bottom it went out as suddenly as though extinguished by a whiff of air. That was all he wanted to know. He was then sure that the well had poisonous gas in it, and took a small umbrella, tied a string to the handle and lowered it open into the well. Having let it go nearly to the bottom, he drew it up, carried it a few feet from the well and upset it. He repeated this operation twenty or thirty times, with all the bystanders laughing at him, then again lowered the light, which burned clear and bright even at the bottom.

TRADE SURVEYS

The most alarming fact in the trade situation is that an enormous amount of promissory-note indebtedness is near due. Added to this is a large volume of book-account indebtedness unpaid. A third source of vexing inconvenience is the restrictive policy of the banks in matters of accommodation. Therefore, it is folly to cry the storm is over, as financial writers continue to do. Payment must be made of some two or three hundred million dollars between large and small traders before safety is secured. Conditions are less threatening than a week ago, because of the generally recognized fact that, fundamentally, the country is safe. Lower prices and infinitesimal margins do not mean danger. Wheat exports are rapidly increasing at low prices, and gold exports appear to be falling off. Gross railroad earnings for May were nine per cent greater than May, 1892, after all the complaining that has been done. Since January 1, reporting roads show an increase in gross earnings of twenty million dollars. Apart from unsettling rumors in the money-markets, there is but little to find fault with. General business conditions are fair. Every inquiry made reveals the fact that there is an enormous amount of work in hand in manufacturing establishments, big and little, everywhere, and this may safely be said also, that facilities for additional capacity are being vigorously added. In fact, something akin to a general expansion of mechanical productive capacity is in progress, and it has come unannounced. One of the avenues for an expanded demand is being found, as has been heretofore pointed out, in supplying material for trolley-lines. Since the writing of last Survey, announcement has been made of schemes, apparently well backed, for the construction of not less than twelve hundred miles of road. That networks of trolley-lines will soon be built connecting the larger centres of population with the smaller all over the country where steam roads cannot go is an assured fact, and electricians and moneyed men are now completing plans for a vast amount of work. With regard to agricultural interests, certain writers are predicting a step backwards because of low prices, but the probabilities are the other way. While wheat is at its lowest point for years, freights for the most part are lower, and cost of goods to farmers is lower than ever, because of a virtually new method of doing business in agricultural communities, which saves the farmers from small, exacting traders, and gives them supplies at greatly reduced figures. Store-keeping has been greatly improved. Middlemen have been brought to terms. More direct dealings with manufacturers have been increased, and, in general, the actual conditions of the great body of the agricultural population has been improved. The fuel-supply interests — coal, oil and gas — have had a good year. Certain portions of the gas-fields are threatening to give out, and care is being taken to protect manufacturing customers. While the supply is far from exhausted, there is a growing feeling among conservative manufacturers that dependence on gas-supplies is becoming more risky. Besides, fuel-gas making appliances are being perfected up towards a point where they can almost compete with clear gas. The bituminous coal-fields are being developed, and producing-capacity is certainly keeping pace with demand. The lignites of the West are also being more successfully utilized. Some forty new companies have been recently organized to develop rich deposits along the Allegheny Mountains. Advices of recent date from boat-builders along the lakes clearly indicate quite an expansion of business in that industry. The whalebacks are meeting all expectations. Other craft is in demand. The railroads will soon find lake competition seriously increased. All the yards are oversold for months to come. The iron trade is in good shape, and mills are everywhere crowded. Were railroad-building to start up, prices would necessarily advance. In textile-goods, manufacturers report no improvement last week. Hosiery-mills are at present not half employed. The distribution of dry goods is all that jobbers and store-keepers can expect. In fact, there is no complaint among the retailers in all lines with the volume of business done. Money is in very urgent demand. Many schemes are held back until borrowing is easier. The labor question is not unfavorable. Many strikes are averted by timely concessions which never reach newspaper columns. Business men begin to feel better, but do not expect an improvement to indicate its coming by higher prices. Serious evils and dangers are being avoided by the far-seeing business management of banking and manufacturing interests, the former being careful of loans and the latter of production. Reports during the past week from building interests show an increase in operations. Country places and small towns show great activity in building. Good reports come from the region west of the Mississippi. The railroad people are voluntarily recognizing that their best interests are in accord with the best interests of the people.

S. J. Parkhill & Co., Printers, Boston, U. S. A.

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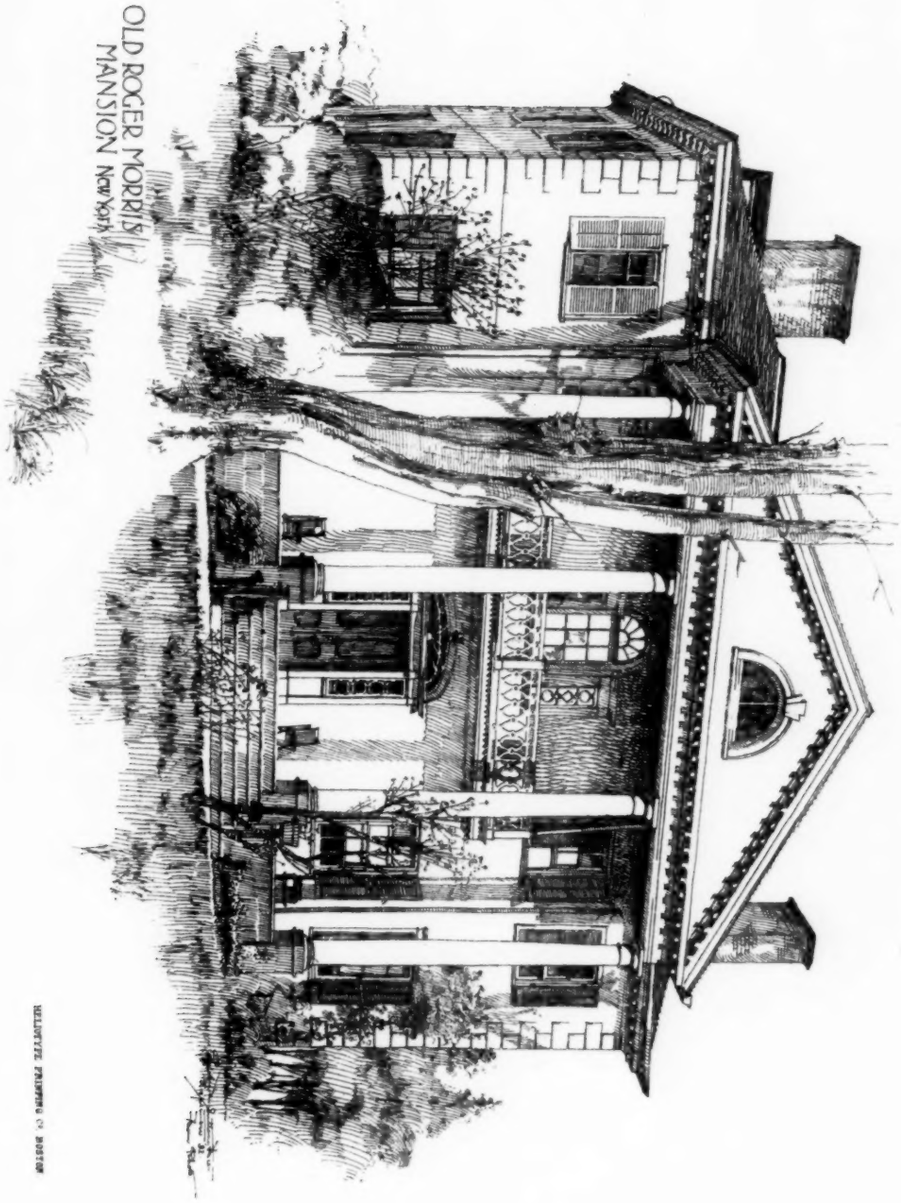
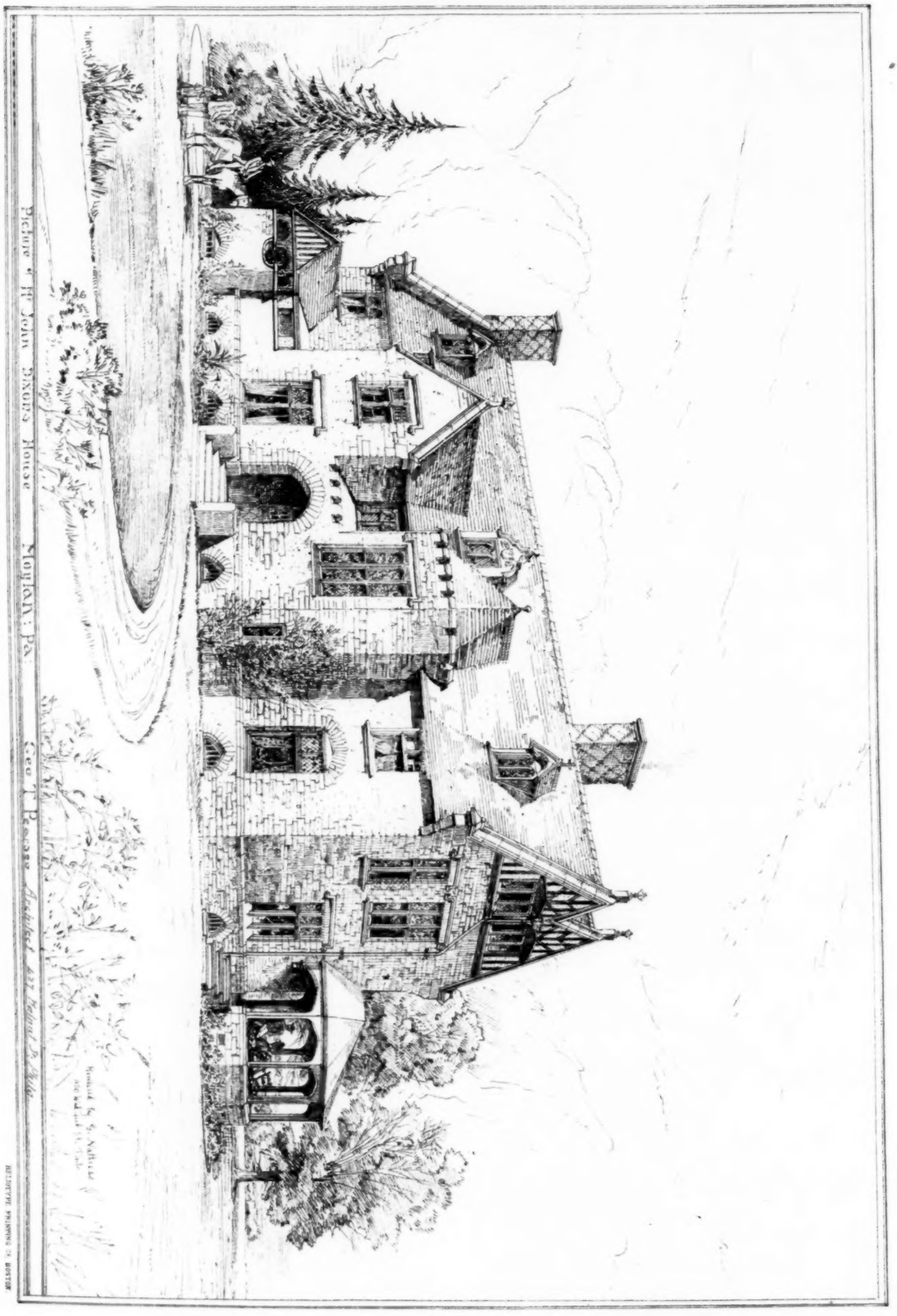
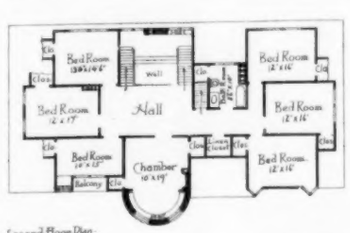


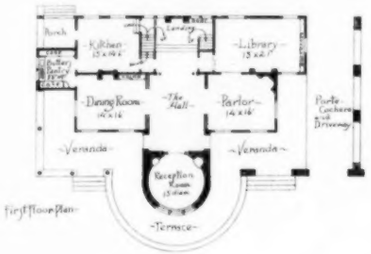


Picture of St. John Knox's House, Norton, Pa. See "Recent Architect and Builder"

American Architect and Building News, June 17, 1893. No. 912.



Second Floor Plan



First Floor Plan

Manly M. Cutter
ARCHITECT
203 Broadway N.Y. City

A Country House for Morristown New Jersey.

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