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VOL. XXXII.

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APRIL 11, 1891.



## SUMMARY:—

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THE most important professional news of the week is the resignation, by Mr. Windrim, of his post as Supervising Architect of the Treasury Department. Mr. Windrim having been offered the place of Commissioner of Public Works of the City of Philadelphia, at a salary more than twice that paid by the United States for service requiring far more skill, and involving many times the responsibility, naturally lost no time in accepting it, and, while we congratulate the City of Philadelphia on having secured so able and skilful an officer, we imagine that it will be no easy matter to fill his place at Washington. Of course, we think, with nearly all those who know anything of the operations of the Supervising Architect's Office, that it would be far better and more economical for the country to abolish the office altogether; but it would probably be best to appoint a temporary officer, to see to the winding-up of its affairs, and the proper completion of the work now in hand. So far, the only name that we have heard suggested for appointment is that of Mr. William L. Windom, a son of the much-regretted Secretary of the Treasury, who is an architect by profession, and has had the advantage of two years' experience as a subordinate in the office of the Supervising Architect. From what we know of Mr. Windom, who is a young man, not yet thirty, we think, such an appointment seems to us likely to be a satisfactory one. It is hardly necessary to say that the Supervising Architect does not, and cannot, do much professional work with his own hands and head. For all such service he is provided with designers, draughtsmen, computers, experts and engineers in unlimited numbers, while he is himself expected to divide his time between keeping an eye on his staff, overseeing the letting of contracts, and meeting with proper blandness the exactions of Congressmen, some of whom are said, on very good authority, to have utilized the office for getting plans made gratuitously for their own houses, while many others, who would scorn to extort private services from a public officer, find themselves moved with a laudable spirit of inquiry into the building operations of the Government, which can only be satisfied by long and frequent interviews with the head of the Supervising Architect's office. For fulfilling a portion of these varied duties, Mr. Windom's distinguished social position, and long familiarity with official life in Washington, would well fit him, while his professional knowledge, if not fortified by so much experience as that of the previous incumbents of the office, has been acquired by earnest industry, under favorable auspices.

THE Combined Committee, consisting of delegates appointed by the American Institute of Architects, the National Association of Master-Builders, the National Association of Building-Inspectors, the National Board of Underwriters, and the National Association of Fire-Engineers, which met in New York last week, to consider the subject of preparing a model building-law, which should be recommended for general adoption, decided, after the first day's discussion, that the conditions prevailing in different cities were, for the present, too diverse to make it possible to draw up a detailed code of regulations which would be generally adopted, and that it would be better, and more useful, to offer to State Legislatures a concise scheme, embracing the principles most essential to safe construction, which could be everywhere adopted as a basis upon which local codes could be formed by adding details suitable to the varying conditions and habits of building which prevail in different cities.

AS finally agreed upon, the recommendations of the Combined Committee were as follows:

1. That all buildings over seventy feet in height be constructed throughout of incombustible materials, protected in the most approved manner for resisting fire.
2. That interior structural ironwork in all buildings be covered and protected by fireproof material.
3. That all buildings over fifty feet in height be furnished with permanent stand-pipes and ladders for the assistance of the Fire-Department.
4. That the height of buildings to be erected should not be more than two and one-half times the width of the principal street on which they are situated, and that no building, or portion of a building, except church spires, should be more than one hundred and twenty-five feet high, except under a special permit.
5. That the open floor-space, not divided by walls of brick or other incombustible material, in all buildings hereafter erected for mercantile or for manufacturing purposes, should not exceed six thousand square feet, without special permission, based upon unusual and satisfactory precautions.
6. That every building to be erected, which shall be three stories high or more, except dwelling houses for one family, and which shall cover an area of more than twenty-five hundred square feet, should be provided with incombustible staircases, enclosed in brick walls, at the rate of one such staircase for every twenty-five hundred square feet in area of ground covered.
7. That wooden buildings, erected within eighteen inches of the line between the lot on which they stand and the adjoining property, should have the walls next the adjoining property of brick; or when built within three feet of each other should have the walls next to each other built of brick.
8. That the owner of an estate in which a fire originates should be responsible for damage caused by the spread of the fire beyond his own estate, if it should be proved that in his building the foregoing provisions were not complied with. A certificate from the Inspector of Buildings shall be considered sufficient evidence of such compliance, if the building shall not have been altered since the certificate was issued.

In addition to these general propositions, another series of suggestions was adopted, providing for proper fire-stops between the stringers in wooden stairs, and between all studdings and furrings, in the thickness of the floors, and for six inches above; for carrying brick party-walls, and outside walls adjoining neighboring property, above the roof, and for anchoring wooden floor-beams to brick walls, in such a way as to prevent the overthrowing of the walls in case the beams should be burned off and fall.

ARCHITECTS and builders will readily concede that the enforcement of this short code, which is intended to apply to all towns and villages, without any additional regulations, at once immensely lessens the risk to which persons and property are now exposed in this country from fire, which, being by far the most universal and dangerous enemy to buildings and their contents, naturally received the greater part of the attention of the Committee; but the enforcement of a code, however good, is not always easy; and it was with the object of making the present regulations, where adopted by State Legislatures, self-enforcing, that the eighth section, the suggestion of which, in substance, came from the delegation appointed by the Fire-Engineers, was agreed to, after considerable discussion and modification. Those familiar with the subject will observe that it is a mild application of a portion of the law which prevails in France and Italy, and which has been the principal agent in making an extensive conflagration unknown in either of those countries. It would hardly be possible to persuade the people of this country, who have been permitted to burn

up other people's property at will, to submit at once to the full rigor of the French Code, but the justice of the Committee's provision is so evident that there is reason to hope that it will find general acceptance, to the incalculable benefit of the country. The present French law is a development of the principle laid down in the Code Civil, Section 1383, which says that "Every one is responsible for the damage he has caused, not only by his acts, but also by his negligence or imprudence." Section 1733 of the same Code specifies the mode in which the principle of § 1383 shall be applied in cases of fire in rented buildings, as between the landlord and his tenants, by saying that the tenant "is responsible for fire, unless he can prove that the fire occurred by chance, or by *force majeure*, or was communicated from a neighboring building." The following section, No. 1734, provides that "If there are several tenants, each is responsible for the whole loss from fire; unless it is proved that the fire began in the apartment of one of them, in which case he alone is held, or unless some of them can prove that the fire could not have begun in their apartments, in which case these are not held liable." In January, 1883, this last Section was modified by an act of the Legislative Assembly, which substituted for the first clause of it another, providing that "If there are several tenants, all are responsible for fire in proportion to the rental value of the part of the building which they occupy." Around these Sections of the Code has grown up a considerable mass of explanatory decisions, by which it is now established that a person who suffers damage through the spread of fire from a neighboring building can recover compensation from the owner of the building in which the fire originated only by proving that it broke out, or spread, by his, or his tenants', negligence or fault; while, as between a landlord and his tenants, the legal presumption is that the latter are at fault for the occurrence of a fire, and those of them who cannot prove positively that they are not at fault must make up the landlord's loss. In practice, all these various responsibilities are assumed by the insurance companies. The landlord insures his building, including his responsibility to adjoining owners, and, by his policy, delegates to the insurance company his right to recover the loss, if any occurs, from the tenants; while the latter, in their turn, insure not only their own furniture, but their *risque locatif*, or responsibility to their landlord for the consequences of fire which they cannot prove not to have originated in their apartments; but there is always present in the minds of the parties concerned the possibility of a mishap in which their insurance might not protect them, and, in practice, tenants will not hire, or landlords build, houses in which both the occurrence and spread of fire are not pretty thoroughly guarded against.

THE consequence is that while there is a good deal of bad and cheap construction, both in France and in Italy, where the Code, Section 1590, makes very similar provisions, the economies of the speculating builder rarely take the form of neglecting precautions against fire. In Paris, particularly, where rubble masonry of small stones is much used instead of brick, it is not uncommon to have a house fall down, but it is an extremely rare occurrence to have it burn, for the simple reason that tenants and purchasers, having the fear of responsibility for fire to sharpen their perceptions, assure themselves on that point before they will have anything to do with a new building; while the execution of the mason-work, which involves them in no accountability to others, receives much less attention than it deserves. From the insurers' point of view, the French system, although it throws nominally a much greater risk on the companies, exercises an influence upon construction which makes the risk, although much more comprehensive than with us, actually far smaller. In Paris, the ordinary premium paid by owners for insuring their own property is ten cents per thousand dollars, — about one-tenth the best rate for dwelling-houses in our cities. The owner's responsibility to his neighbors is covered by an additional ten cents per thousand dollars; while the liability of tenants to their landlords is covered for twenty cents per thousand dollars; and even at these rates, as we are told by the Massachusetts Commissioners for the revision of the Boston Building-Law, one insurance company pays regular dividends of one hundred and forty per cent. It must, of course, be many years before so mild a measure as that proposed by the New York Committee would have its full effect, but its influence would very soon be

felt, and, in connection with the provisions with which the Committee proposes to combine it, and the acknowledged skill of American architects in fireproof construction, which, when they have the opportunity, they practise with a perfection unequalled anywhere else in the world, the result would certainly be a rapid improvement in building methods, to the great advantage of the whole community. We need not apologize for restating the figures of the fire-losses in this country, which every citizen should not only know, but understand in their full significance. The best estimate of the annual cost of fires in this country, including losses actually suffered by uninsured owners, and premiums paid for insurance, puts it at more than two hundred million dollars, while the cost of maintaining our fire-departments is about a hundred million more, making three hundred millions of annual outlay which might be saved if buildings, and the goods in them, would not burn. If this annual loss were reduced to the French standard, which, as indicated by the relative premium rates, is not more than one-tenth of ours, we should make a saving of two hundred and seventy million dollars a year. What this means may be best shown by a few comparisons. With that sum, which, it must be remembered, would unquestionably be actually saved every year after the rules proposed by the New York Committee had come into general use, all the pensions, the interest on the public debt, and the whole cost of maintaining the army and navy of the United States could be paid, without drawing on the public treasury; or, if we preferred, we could distribute it to our Congressmen, to whom it would give an income of nearly seven hundred thousand dollars a year apiece; or to our army, the private soldiers in which might thus have their wages, without expense to the Government, raised to the handsome sum of eleven or twelve thousand dollars a year each. If, which would be more reasonable, we should save up the money, and apply it to the improvement of building, it would, if put at interest, pay the cost of rebuilding every house, store, warehouse, factory, theatre, schoolhouse, church, hotel and office-building in the United States every twenty years, not only without expense to the owner, but with enough left over to give him a handsome *douceur* in addition; or, if he were content to keep his building without change, it would put the value of it into his pocket in cash; and we say without fear of contradiction, that the money would be better applied to any of these uses than to its present object, of feeding huge bonfires, and paying people to go about and collect contributions for putting them out; and if the New York Committee has accomplished anything towards making the change, it will deserve the gratitude of the community.

**FIRE AND WATER**, in speaking of the work laid out for the Combined Committee which met in New York last week, expresses its surprise that in the preliminary suggestions which were prepared for it no mention was made of the subject of the "safe construction of elevator and light shafts, such dangerous conductors of fire." At the meeting of the committee, this subject was discussed at great length, but it was evident that a diversity of opinion existed, not only among architects and builders, but among fire-engineers, as to the way in which such shafts should be constructed, and it was finally decided to omit all reference to them in the scheme of general suggestions adopted by the committee, in the hope that closer observation would make it more certain how to build them with the best effect. The question is, naturally, between shafts open on all sides, and those enclosed in brick walls. Of late years, the latter have been commonly regarded as the safest, and are required by law in several cities; but the experience of fire-engineers does not show that they are always the best. Unless carried above the roof, and covered with a skylight which is easily broken by the heat, so as to let smoke and flame pass out, they act as chimneys, which draw the fire strongly from the basement to the upper stories and roof, so that, in such buildings, the appearance of flame in the cellar and roof is almost simultaneous. If the shaft has tin-covered doors, kept closed, and the skylight glass breaks at the right time, the fire will be kept in the shaft, and escape without communicating to the upper stories; but it is found that, in practice, it is often advantageous to have the doors to the shaft left open, as when the glass in the skylight breaks, the draught into the shaft assists greatly in clearing the upper stories of smoke, which penetrates into them in various ways, and may do great damage, even if not accompanied by fire.



FRENCH ARCHITECTURE.<sup>1</sup>—II.

HOWEVER, in the general disintegration the old organization did not entirely disappear. When the ties were severed which bound the people to their protectress and when the entire land was delivered over to barbarian invasions, they were indeed forced to defend themselves wherever they were, in an isolated fashion, for there was no cohesion anywhere and consequently no concert of action. The population took refuge in the cities, which they turned into so many fortresses, and within which the old institutions were safeguarded. This fact is evident, especially in the south, where Roman occupation had left the deepest traces and where the Franks of the north could never gain a secure foothold.

This concentration in local unities was, moreover, a natural outgrowth of the distribution of population common to the Gauls and the Romans. We must not fancy the rural regions inhabited at that period as they are to-day. At Rome and around Rome, "there was no country; at least the fields in no way resembled those of to-day; they were cultivated, of course, but they were not peopled. The proprietors of the land were the inhabitants

went out from their homes to look after of the cities; they their country estates, where they often kept a large number of slaves; but what we now term the country, with its scattered population occupying isolated dwellings or small villages, but covering the soil everywhere, was almost unknown in ancient Italy.

"In the same way, it is cities that one constantly encounters in the Gauls and in Spain: away from the towns the land is covered with woods and forests. Consider the character of the Roman remains and Roman roads. The latter are highways running from one town to another; the network of little routes which checker the country to-day was then unknown. There was nothing at that time which resembled the countless small monuments, the villages, châteaux and churches which have sprung up all over the land since the Middle Ages. Rome has bequeathed us nothing but the mighty imprints of the municipal system, vast monuments destined for the service of a numerous population concentrated at one spot. From whatever point of view one contemplates the Roman world, he finds almost without exception this great preponderance of cities and the non-existence socially of the country."

It was in the cities, which were genuine fortresses, and which may be considered as islets emerging here and there above the barbarian flood, that the old traditions, manners and institutions, all, in fact, that remained of national existence took refuge. Sheltered within the walls of these strongholds, the primitive population could guard a part of their privileges, and conduct the internal government in conformity with ancient institutions. When everything around them had been transformed, cities like Marseilles, Arles, Nîmes, Narbonne, Périgueux, Toulouse, Bourges, Paris, Rheims and Metz maintained for centuries, still, a relative independence, and presented an aspect wholly foreign to that which feudal society everywhere assumed.

It was in country regions that this society effected the most radical changes. As the invasions succeeded one another, each warfaring band pushed a little farther than its predecessor had done in quest of new lands to expropriate, the chiefs taking possession of vast domains, which they wrested from the former owners; but it should not be supposed that from the outset the invaders proceeded to a peaceful allotment of territory, wherein each member of the band had his part, of which he was to become the undisturbed proprietor. To effect this, it would have been necessary to disperse, which was hardly feasible in a subjugated but rebellious and hostile country. The newcomers were then in most cases obliged to remain encamped on the unfriendly soil, surrounded by redoubtable defenses. Fortified castles now began to spring up, and these multiplied in measure as the invasion progressed.

The primary consequence of such occupation, important in view of the ulterior mixture of the races, was not long in declaring itself; namely, a very unequal distribution of property in the hands of the conquerors. The barbarians, being neither able nor willing to form unions with the subjugated inhabitants, were driven into that state of savage and armed isolation, which was moreover suited to their instincts. "But isolation is only supportable in a laborious condition. . . . Now, the barbarians were essentially idle, they therefore required to live together, and many companions remained about their chief, leading on his domains pretty nearly the same life that they had led before in his train. But from these circumstances it arose that their relative situation was completely altered. Very soon a prodigious inequality sprang up between them. . . . The chief, become a great proprietor, disposed of many of the means of power; the others were always simple warriors, and the more the ideas of property established and extended themselves in men's minds, the more was inequality, with its effects, developed. At this period we find a great number of freemen falling by degrees into a very inferior position; the laws speak constantly of freemen, of Franks, living on the lands of another and reduced almost to the situation of the laborers," that is to say of the original inhabitants.

Another consequence, not less important than the first from our present standpoint, was destined to show itself soon. The cities, as we have said, long served as a rampart to the conquered people, who sought refuge within their walls. The Franks penetrated into these with difficulty and could not have attempted with sufficient guarantees to make them their dwelling place. The Franks needed, moreover, a free field for the excursions by which they carried afar their pillaging exploits. It was therefore in the abandoned country regions that they settled.

The establishment of the feudal régime brought about a revolution in the distribution of the population. For the agglomerations in cities a different order of things was substituted; the new owners of the soil lived apart, each in a fortified dwelling, which he called his castle, and at a great distance from neighbors. Within the walls of his fortress, placed on some lofty, isolated site, he shut his family and surrounded it with a few defenders, who were attached to his person, and shared his roof and his table. Around the base of the castle rock, were grouped the *coloni* and serfs who cultivated the estate; a priest settled among these and founded a church; the priest became the village curate, while the castle had its chaplain. Such were the component elements of feudal society, which constituted a complete, distinct and isolated unity; it was sufficient unto itself and was bound to the society enveloping it on all sides only by the tie which the military obligation of a fief-holder to a suzerain establishes.

Was it possible for the customs thus imported by the races of the north to develop a vast social and political state, powerful as to its extent even? Assuredly not: each elementary group each of the units necessary to form such a social *ensemble*, was certainly endowed with uncommon energy and vitality; but it remained obstinately isolated and hostile to its neighbors. No bond was possible between these groups unless perchance a moment should come when their unsatiated and always present taste for distant adventures should temporarily establish one, as was the case in the Crusades. But of a permanent organization, wherein each member was to accept and bear obligations, of general laws, there could be no more question than of the creation of a vast state in which all the resources should be put in common and directed toward one end.

Herein lay the evil, and the cause of destruction to the feudal system. It possessed, nevertheless, virtues and merits. We are indebted to it, conjointly with Christian sentiment, for the institution of the family, as it is conceived by modern nations, as well as for the importance of woman's place in human society.

If it was impossible to weld any one of the elementary groups to its neighbor, never, on the other hand, were these individual groups themselves so compactly constituted. "Never, in any other form of society, has the family been reduced to its simplest expression, never have husband, wife and children found themselves in such close union and so entirely separated from all other powerful and rival relationship. . . . While in his castle, the holder of a fief was associated with his wife and his children, who were almost his only equals, and who constituted his only intimate and permanent companionship. He doubtless often quitted his stronghold and led a brutal and

<sup>1</sup> From the French of P. Planat, in Planat's "Encyclopédie de l'Architecture et de la Construction." Continued from page 5, No. 797.

adventurous life outside; but he was obliged to return. It was there that he shut himself up in times of peril.

"When the holder of a fief left his castle in quest of war and adventures, his wife stayed behind. . . . She remained in the castle as mistress, as *châtelaine*, representing her husband, entrusted, during his absence, with the defence of the honor of the fief. This lofty and almost sovereign position, in the very bosom of domestic life, often endowed the women of the feudal period with a dignity, a courage, a worth, a splendor, that have never been their portion elsewhere; and, without the least doubt, it powerfully contributed to their moral development and to the general improvement of their condition." In fact, according to the Germanic idea, woman was not destined solely to keep the house and spin the wool, as the Roman precept inculcated, but she was the faithful companion of man, through all the chances of life, in his military expeditions as well as under the family roof.

While the conquering race was thus creating for itself, and for itself alone, a social state suited to its instincts, its virtues and its defects, what was the condition of the conquered people?

We have already remarked that the municipalities survived the general breaking-up which followed the various invasions of the Franks, and for several centuries preserved at least a semblance of the old institutions, together with a certain measure of independence, which was, however, dearly disputed, and was in constant jeopardy. When finally, toward the eleventh century, evidences of stability appeared, history records the beginning of a sort of resurrection, an uplifting of the conquered race, which was destined to encounter many obstacles and to suffer more than one defeat, but which was never again wholly arrested.

When the holders of fiefs were definitely settled, when they had begun to organize their affairs on the basis of a more sedentary existence, abandoning the idea of living exclusively by plundering depredations, an autochthonous population might be seen grouping itself about the castles, and, under their protection, devoting itself to the cultivation of the soil. Agricultural labor being resumed with some regularity and partial security, a certain degree of comfort resulted therefrom which created more extended and varied wants; commerce and manufacturing began once more to thrive, and gave an added importance to these rural communities. From these sprang the burghs; hence in part also arose the communes, which must not be confounded with the ancient cities, for the communes appeared with and through feudalism.

The prosperity of these small communes became a source of wealth to the proprietors of the domain which sheltered them, and so they obtained certain privileges, which, without taking them out of the feudal domination, without conferring upon them genuine independence, nevertheless had as an aim and result to attract the population thither and increase the wealth. And, in its turn, this growth of population and wealth secured more valuable favors and more extended concessions.

By the side of the old municipalities which had survived the invasion of the barbarians, genuine cities grew up; these were of inferior importance to begin with, but, owing to the development caused by commercial and industrial prosperity, they at length constituted considerable centres of population, and embraced a numerous and rich bourgeoisie. New towns and ancient cities alike, more independent than the burghs of which we have just spoken, at an early period showed themselves boldly belligerent, and they engaged in relentless warfare against the neighboring suzerains, whether cleric or lay, who sought to impose a too heavy yoke upon them.

The history of the struggles, mingled with many reverses, which the communes, towns or cities of Laon, Rheims, Vézelay, Soissons, Sens, Amiens and so many others engaged in, is well known, and we need not recount their history here. After the twelfth century, nearly all these struggles ended disastrously; some at first successfully resisted their immediate suzerains and extorted treaties and privileges from them; others were crushed out in bloodshed and conflagration. But they were at last doomed to pass under the royal authority, which had been constantly strengthening and had long aimed at the suppression of every rival power and the subordination of all feudal dominion, and which, in this bitter contest, was able to rally to its aid all the forces existing in the old population,—the sworn enemy of feudalism.

We have reviewed the changes which the civil society of the conquering and the conquered peoples underwent, from the

tenth to the eleventh century; it remains for us to indicate the transformations which took place in the religious society during the same period.

[To be continued.]

## ETRUSCAN ART.<sup>1</sup>—II.



It is a characteristic of people who possess the sentiment of grandeur, to endeavor to affirm their power and perpetuate the remembrance of it in works which, without being imperishable, since nothing can be imperishable in this world, can yet stand the biting tooth of centuries and the triumphs of ages. The best sustained effort of a nation in the domain of art always consists in assuring to itself this kind of survival, to mark with an indelible trace the moment when its genius was in full flower, and it is for this that architecture will always be, *par excellence*, the national art, because it is the very one which best lends itself to satisfy this ambition, and can bring to bear upon a masterly and durable work the collective effort of an entire people. There are the Parthenon and the Temple of Augustus which, under different forms, still present to-day a wholly palpable image of the grandeur of Rome and of Greece. Nothing of Etruscan work analogous to these remains to us, probably because the Etruscans never conceived anything which

could survive a catastrophe. It is not necessary to have read Volney, to know that Palmyra was an immense city, peopled with palaces, temples and colonnades. We meet everywhere in Southern Italy and in Greece ruins which speak to us of Magna Græcia, of the age of Augustus, and of the exquisite genius of the Grecian Republics. Neither the sands of the desert nor political storms have ruined the pyramids of Egypt. There remains nothing visible at this time at places where formerly were Memphis, Thebes, Babylon, Nineveh; but tradition has preserved to us in the matter of these cities the impression of monumental grandeur which, even at so great a distance, still touches our imaginations.

One of the reasons, moreover, why the Etruscans did not have architecture that was truly monumental in character is the manner in which they were compelled to understand municipal life, and it is this very reason which brought it about that it is in military architecture only that they have accomplished anything worthy of remark. In a spirit of defence (and this is a thing which helps to prove that they formed one cohesive race) they chose by preference, for the sites of their cities, lofty places, isolated and in the neighborhood of water-courses. Often, almost always, they found themselves ill at ease in narrow and confined places. Air was lacking. It was with difficulty that they could bring themselves to build their houses within the city's walls; and this is why, in spite of the respect they have for their dead, they ordinarily relegated the necropolis outside the walls of the city, exposing it thus to devastation and profanation. Perhaps the nature of their religion did not demand a vast scenic environment, and this would explain the absence of great temples in their towns. This last point, which may, after all, be only a supposition in the light of the present state of knowledge, deserves to be investigated to the bottom.

In any case, the general knowledge which we possess from this time forth on Etruscan art permits a classification of their works, and this classification M. Martha has, for the first time, worked out in a rational and intelligent fashion. I will, therefore, follow his method, and I will purposely include ceramics and mortuary jewelry, which in a secondary manner can interest those who are particularly occupied with architecture, although these categories are connected on certain sides with the general line of Etruscan art.

In the first place, there are the tombs, which must be studied if one desire to acquire a notion of antiquity. What one first remarks is that the Etruscans have not always practised inhumation to the exclusion of incineration. The most ancient tombs which we know are those, called a *pozzo* [well], of the Villanovan epoch, because it

<sup>1</sup> Continued from No. 794, page 167.



is at Villanova, near Bologna, that the first were discovered. This tomb is in the form of a well, diminishing in diameter from top to bottom, which ordinarily measures a metre and a half in diameter by a metre and a quarter, or two metres and a half in depth. At the bottom of this well opens another, which is smaller, and serves as the receptacle for the urn which contains the ashes or the calcined bones. The form and richness of these urns is infinite. We can now affirm with certainty that these sepulchres belong to the first centuries of Etruscan history. Later, the method of inhumation was substituted for cremation, and one begins to find here and there caves in which are found outstretched skeletons, and finally a time is discovered when the cinerary urns disappear entirely, to give place to bodies embalmed and ordinarily enclosed in stone coffins, or laid out upon marble slabs.

Here it is that is made manifest the importance of ceramics and the arts of secondary importance in the study of the morals and general customs of a people. The Etruscans probably believed that man, after death, commences a second life, which was only a continuation of that which he had just finished. Their conception of the ideal hereafter could not go beyond this material resurrection. They were, therefore, in the habit of enclosing in the tombs the personal accessories of every-day life, the tools of trade, the arms and armor, for they furnish the means of following step by step the progress of the race. The oldest Villanovan tombs contain coarse vases, badly polished and without decoration, while little by little we see these funeral furnishings become more beautiful, more refined, until we find in the best cave-sepulchres—in those at Corneto, Orvieto and Volterra, especially—models of decoration which evince a very advanced degree of finish. In these last tombs, mural painting and sculpture play an important part. The designs with which the pots are covered served to initiate us into the belief and the manner of living of their possessors, for they often reproduce religious subjects or scenes from life, although one has to be on his guard in dealing with these documents, which more than once, in place of being Etruscan fabrications, may have been imported by foreign merchants. In like way, among the articles of the toilet, sometimes so admirably wrought and so rich, which might give us an approximate idea of the taste and elegance of the Etruscan ladies, there must be found many which have been brought from the outside world, and which would only serve, if we could exactly determine their origin, to prove the empire which exotic ideas exercised over the customs of the Etruscans. Let us not forget, in short, that the Greek merchant communities at a given moment must have occupied important places in the maritime cities of Etruria. Certain Etruscan cities, like Cere, for example, had treasuries in the sanctuary at Delphi. When Demaretes was driven out of Corinth by a revolution, he established himself in Tarquinii, in Tuscany, with the apparent certainty that he would find there many of his compatriots. Later, when the Carthaginians involved Etruria in an anti-Hellenic league, Tarquin, son of Demaretes, abandoned the city which his father had chosen, and, with a great number of Corinthians, fled to Rome, where, having become king, he made war against Etruria, to punish it for having espoused the quarrel of Carthage against Greece. At this time, consequently, the influence of the Oriental races in Etruria, and the commerce which brought this nation in contact with Grecian merchants, are beyond dispute. Moreover, one recognizes many amphoras ornamented with extremely fine and delicate designs, but bearing the signatures of Greek artists, which clearly show that the greater part of the objects having artistic worth are of exotic origin. I will mention at hazard, among the fine amphoras collected in the Gregorian Museum at Rome, one where is represented Achilles and Ajax at play, which is signed by the name of Enakias.

But let us leave these details, which, nevertheless, are full of interest, to speak with more definiteness of the development of Etruscan architecture, whose merits the Latin authors, beginning with Vitruvius, have so extraordinarily exaggerated. Let us first see how the Etruscans proceeded in their choice of materials. They had at their disposal granite of the island of Elba and island of Giglio, and the marble of Carrara, yet they never employed them. They preferred the volcanic and common calcareous stones, the working of which presents little difficulty, and, to crown their misfortune, they made great use of wood, especially in the framework, which exposed their buildings to the ravages of the flames and the deteriorating action of the weather. Is not this a proof that in their construction they did not aim at durability, and that they had the feeling that their works were not worthy of being shown to posterity?

On the other hand, they showed some capacity in fashioning rock *in situ*, especially when it was a question of rendering inaccessible the heights where they had built their cities. At other times they dug out tombs in the living rock, and at the entrance of these tombs cut façades and doorways, which present a certain interest, without, however, ever attaining the exceptional value of a monument.

In built-up work, the Etruscan system can be classified into three orders: 1. The polygonal order, where the stones are quarried in such a manner as to make four, five or six sided polygons, models of which are seen in the walls of a great number of central Italian cities, notably at Saturnia, at Pyrgi, at Cosa, at Præneste, Norba, Alatrium, Signia, Ferentinum and at Alba Marsoium, upon both

sides of the Tiber. 2. The irregular quadrangular arrangement, where the faces of the blocks have the form of a tetrahedron, cut without fixed rule—an arrangement of which numberless examples can be seen at Rusellue, Volterra, Cortona and at Vetulonii; and 3. Finally, the quadrangular arrangement, where the blocks have all the same form and dimensions; these are cut to right angles, plumb on all their faces, and laid so as to form even beds, parallel and with rectilinear joints. This fashion prevailed at Sutrium, Falerii and Ardea. It is by one of these three characteristic signs that one may readily recognize a wall of Etruscan origin, in which we always remark, also, that the blocks are laid one upon the other without mortar or ties.

The Etruscans, in the first place, practised the trabeate system of covering, which consists, as everybody knows, in placing stones horizontally upon vertical supports; but ordinarily the lintels and the architraves were of wood. Sometimes, nevertheless, they employed for this purpose monoliths of quite large dimensions. In one dome-covered tomb at Quinto-Fiorentino, near Florence, we see a doorway surmounted by a slab which measures 1½ m. long by .404 m. thick and 2.45 m. wide. In the matter of vaults they had not only the vault formed by corbels, but the vault with voussoirs. As is well-known the first style is composed of horizontal layers which overhang the ones below in such manner as to narrow, little by little, the opening, which is finally closed by a keystone. Sometimes the corbelling is almost rectilinear, and gives to the doorway an almost triangular shape. Sometimes the shape becomes slightly pointed. This system was known to the Greeks, Chaldeans and Egyptians, so that it is wrong to attribute its invention to the Etruscans, as certain authors have done. The vault with the voussoirs is a vault properly so-called, because it is formed of pieces with oblique joints, wedge-shaped, so that they are supported one against another. It appears that in the later days of their prosperity the Etruscans excelled in using this kind of vaulting, which is one of the most praiseworthy methods used in architecture from the point of view of elegance as well as solidity; but the use of this method of closing an opening does not date beyond the eighth or ninth century, and many reasons lead us to believe that it was not invented on the spot, but that it was introduced by the Phœnicians, to whom Italy owes so much instruction. In fact, Perrot and Chipiez declare, in their "*History of Art*," that the conception of the vault belongs to the Orient; but one can at least do the Etruscans justice by believing that it was through them that the vault became part of the patrimony of Occidental art. They are the ones who received the tradition from the Phœnicians and transmitted it to the Romans, who in their turn bequeathed it to us. It is almost the only thing which modern architecture owes to the Etruscans, who, however, themselves were indebted for it to the Orient.

As to the general configuration of their buildings, the Etruscans at first followed the circular form, then they adopted rectangular shapes. Whence comes this change, and why was the curvilinear form of plan first preferred in Etruria? In the first place, we know that the primitive habitation of all races had the circular form like the hut; but religious rites were not stranger to this usage. In the orientation of cities, sanctuaries and altars, the Etruscans, like the Greeks and Romans, followed principles consecrated by superstition. They consulted presages, and to aid these the priest ascended to the selected place, then with a curved stick (*lituus*) he traced above his head two lines crossing each other perpendicularly, the one extending from the north to south (*cardo*), the other from east to west (*decumanus*). The celestial vault thus defined was called a temple (*templum*). This function is often represented in certain Etruscan designs. The edifice when built must naturally correspond to the ideal form of the heavens, which was for the ancients the blue dome of heaven. This is one of the reasons why during the first centuries the buildings of Etruria were all more or less circular. Later, when they began to use wood in the framework of the roofs, they were forced to perceive that the rectangular form was more suitable to this mode of construction, and a reform took place without violating the religious traditions, for it was sufficiently *de rigueur* to construct a rectangle by joining the extremities of the *cardo* and the *decumanus* drawn by the priest. But in my opinion the principal cause of this innovation lies in the Grecian influence and upon this point I am quite of the opinion of M. Martha. It is known, in short, that Grecian architecture is exclusively rectilinear, and from the day when the Hellenic artists were called to work in Etruria they did not fail to make use of their own methods, superior to that used by the natives. In like manner as to the use of the column, the Etruscans in all probability learned everything from the Greeks. Before these reached Etruria, the isolated column as an element of support was almost unknown in architecture. But to adapt the Grecian column to their dwarfed and graceless style, the Etruscans made it more squat, more massive, more awkward. Then they made a jumble of the orders, and formed that which is called in architecture the Tuscan column, a hybrid conception which is connected with the Doric, through the curvature of its capital and its abacus and with the Ionic by its die, its torus, its astragals and listels which surround the shaft especially at its base.

As to details, Etruscan architecture has no real style. It united things at haphazard, without rule and without principle, and this irrational confusion ended in a disorderly eclecticism. The doors are of four kinds, two rectilinear, one of these being rectangular, the other trapezoidal; two curvilinear, one of these being the pointed door of the cellarways, built corbel fashion, and the other the

full-centred doorway which one sometimes meets in the tombs and upon urns. As for the windows we notice here the same lack of discipline, the same want of taste and originality. What particularly strikes one in all the details is the variety and the richness of the mouldings used on buildings of the last epoch. The Etruscans evidently borrowed from all the peoples of the East, whose passion for imitation they emulated, feeling the need of relieving the simplicity of their own lines by multiplying ornaments. They wrought their stone with the chisel and did not always stop at simple mouldings. Often they added figures to their decorations. On the pediment of a tomb at Sovana, for instance, there can be seen a marine divinity between two winged genii, and at Norchia the pediment of a façade conceived in the Greek style, in which were inserted figures. Polychromy, rather than sculpture, held a leading place in the decoration of the interior of the tombs. Almost all the funerary urns were painted, and the walls of certain tombs which belonged to personages of distinction were ornamented at Corneto and Orvieto, amongst other places, with paintings very skilfully executed. Finally, to end this portion of my study, I must say that terra-cotta work was also scattered with great profusion through Etruscan buildings.

Funerary architecture is that which had the most interest, from an artistic point of view, for the Etruscans. The chapters which M. Martha consecrates to this study are the most interesting, instructive and the most substantial in his book. He remarks with much justice that the Etruscans fell into the same contradiction as the Greeks, who had the conception of a soul which separated from the body after death to flit away to another region, and who, nevertheless, worshipped the corpse to such a point as to believe that the man was always living in the ashes of his body. This is why they interred with him his familiar animals, his tools and toilet articles, his arms and food. Every year at a stated time they came to share a repast with him. The departed spirits were often represented upon the bas-reliefs or the paintings in Etruria. Like the Greeks, the Etruscans believed that the departed spirits did not remain in the tombs. On the contrary they assembled far from the bodies in mysterious regions. The designs which present to us the different conceptions which Etruscans had of death and resurrection turn about the ideas which I have just mentioned. Sometimes we see relatives mourning about the bed of a dying man; tears flow in abundance; gestures of despair are multiplied, and this scene has usually for its object to rejoice the *manes* of the defunct and flatter his posthumous vanity. Again the relative that they mourn is represented upon a triumphal car, as in the celebrated urn in the Museum of Volterra. On another urn in the same museum, we see a spirit on horseback drawn by Charon and followed by a relative, who gives evidence of the most poignant grief. It is natural, then, with a people who had so high a conception of death that funerary works should be conceived in the most exalted style which the artistic knowledge of the times allowed. And one may say, in short, that all the faculties of embellishment of which the Etruscans were capable were brought into operation for the benefit of their tombs. These tombs, according to the locality and epoch, took the most diverse forms. Sometimes they consist of a pit, at the bottom of which are arranged the cinerary urns, and sometimes they have some resemblance to the dolmen of France and England; that is to say, they were composed of four stones set upright and covered by a single stone. Sometimes, also, they were perched like swallows' nests along the cliffs upon which the cities were built. They dug out, in full view half-way up these cliffs, niches destined to receive the urns or coffins. But the real Etruscan tomb, that which is most often met with, is that styled the cave tomb. It is very ancient, since at Corneto some have been found which date to the seventh century. These are of various dimensions. Generally it is very low in the stud, so low that a man of middle size can hardly stand upright. All the openings of the structures which have survived are, moreover, very low, and this has led to the conjecture that the Etruscans were for the most part of small size. Sometimes the caves followed one another and formed in some degree a complete apartment, and sometimes, also, several tombs dug in the thickness of the same hillock connected with one another by narrow and winding passages. Some of these tombs are decorated with a remarkable degree of luxury. About the cave there are benches of marble upon which were laid the coffins, and above the coffins were traced paintings which in certain tombs are of great sumptuousness. It would be impossible to give a complete enumeration of the objects which relatives deposited about the coffins. They are generally vases of clay or bronze, tripods, censers, articles of toilet, jewels, arms. Each dead man thus found, in the opinion of the survivors, the familiar articles of luxury and often his favorite games—there have been sometimes found dice and chessmen. The nature of the objects varies in their richness according to the age, the sex and the rank of the deceased. For external sign the Etruscan tombs often affected the form of tumuli. One detects them by the swellings of the ground. Then this manner of marking the place devoted to tombs was perfected, and they built at length square enclosures, towers, and finally veritable mausoleums. It can be said that the Etruscan tumulus varies from the simple hillock at Corneto, which is nothing more than a slight rise in the ground enclosed within a circular wall, up to the tomb of Porsenna at Chiusi, of which Varro has left us the description, and which consisted of a square block of cut stone, each face measuring 300 feet in length by 50 in height. Above this enormous pedestal rose five pyramids, one at each corner and one in

the middle, each being 150 feet in height, and having a width of 75 feet at the base. This brought the total height of the monument to 125 metres. There still can be seen at Albano, near Rome, the remains of a monument built after this fashion, although of smaller dimensions, which local tradition attributes to Porsenna, who, apparently, must have died twice. Finally, I ought also to mention the practice which the Etruscans had of marking the presence of tombs by funeral cippi or stelæ, whose form had infinite variety. Some have been found spherical, pyramidal, oblong, polished, sculptured, and some often bore figures and inscriptions. In certain Etruscan cities are discovered so large a number of these stones that they have been used to decorate the walls and alleys of gardens, and strangers can easily procure them for a slight sum.

The military architecture of the Etruscans offers only a retrospective interest, and cannot furnish any instruction for modern military science. Thus one may affirm that the art of fortifying cities was fairly well-known throughout all Etruria. The surrounding walls were solidly built and arranged so as to serve as a rampart and platform for the defenders. More than once we find fortifications built after the polygonal system, or cut from distance to distance, as at Cosa, by quite high towers, which proves, moreover, that Etruscan cities were fortified in such a way as to resist advantageously all means of attack in use at that time; thus, some of them—among others Falerii, for instance, Volsinii and Veii—opposed to the Romans a vigorous resistance, and were only vanquished by strategy after a long siege.

As for works of canalization and diking, the Etruscans must have acquired a notable degree of perfection. In constructing the railroads over the Tuscan marshes, subterranean works of canalization have been discovered, which were executed by the Etruscans for the purpose of making salubrious this part of the country in which the climate is so deadly and where the fever to-day kills so many people yearly, for the simple reason that these works have fallen into disrepair. They reclaimed the mouths of the Po, which had become marshy in the progress of centuries, and straightened the mouth of the Arno. They also built, or fixed the rules for building, the outlet of Lago Albano, which pierces the mountain with a length of two kilometres. As for sewers, they understood them admirably. They dug issues in the tufa for the outlet of useless water, and to-day we still see these ditches on the hillsides where formerly were Etruscan cities, as at Orvieto for example. There is reason for believing that the famous Cuniculus which permitted Camillus to put an end in so marvellous a way to the siege of Veii was nothing more nor less than a sewer. According to tradition Fidenæ must have been twice taken by means of the same strategy. But in this kind of work the *chef-d'œuvre* of Etruscan architecture is, surely, the Cloaca Maxima at Rome.

Although much has been written as to the religious architecture of the Etruscans, there are many points which still remain obscure. As it has been supposed that everything which the Romans knew in the art of construction they learned from the inhabitants of Etruria, students have set out from this point to discover in the Roman edifices the laws of Etruscan architecture, and this false idea has given rise to many misconceptions. As in the matter of the orientation of temples, for instance, people have been deceived. For a long time they believed that the Etruscan temples had a particular orientation. Now see, they have just uncovered the ruins of two sanctuaries at Orvieto (Volsinii) and at Civita Castellana (Falerii), and of these two sanctuaries the first had the façade turned to the south, while the other one faced to the southwest. M. Martha explains this difference in a plausible manner. The gods were thought to inhabit different points of the heavens, and the orientation varied, therefore, according to the god to whom the sanctuary was dedicated; but, after all, this is only a conjecture. In like way as to that which concerns the plan of the temple, opinions are not yet fixed. The opinion of Vitruvius, according to whom the form of the Etruscan temple ordinarily approached the square, is still believed in. As for the interior division, we do not know in a definite way how the Etruscans proceeded, and the best way is to suppose that they did not always arrange them in the same fashion, and that plans changed according to localities, according to the amount of money at the disposal of the builders, and probably, also, as M. Martha says, according to the divinity to whom the temple was consecrated. Indications which are drawn from sarcophagi and cinerary urns, where we see religious designs, are not sure guides, because these designs, often executed by foreign artists, may very easily reproduce religious edifices which have nothing to do with Etruria. The only thing which, unfortunately, is certain, is, as I have said, that no Etruscan building was built under such conditions of solidity and grandeur as to allow it to survive the centuries and the catastrophes of history.

As to private architecture, it is certain that the Etruscans did not take everything from the Greeks. The atrium, which the Romans borrowed from them, is their own invention. The atrium was the family hearth, the place of gathering, the reception-room, and about the atrium were arranged the other smaller rooms of the dwelling, whose number and size varied according to the social standing of the proprietors. When M. Martha wrote his book, the latest results of the excavations at Marzabotto were not yet known. These have thrown a great light upon the private dwelling of the Etruscans, and have made it possible to establish that the fundamental principles of municipal life and domestic architecture were taught by the



Etruscans to the Romans. When one knows what a Roman house is, one understands how an Etruscan house was divided. It must not be forgotten to render homage to the Etruscans for an original invention: I mean the overhanging roof—which serves to protect the walls of the house in wet weather—which remained the rule of Tuscan architecture to such a point that one does not find in all Tuscany a great palace which is not covered with this kind of roof.

H. MERU.

(To be continued.)

#### ELECTRIC-LIGHT WIRING INSTALLATIONS FROM A MECHANICAL STANDPOINT.



"All the Modern Improvements."—No. 23.

THE question is frequently asked by architects and owners of buildings, "Can electric-lights be installed with safety from fire, and will the installation give results that are satisfactory and permanent?"

The improvements made recently in materials and methods, allow us to answer in the affirmative.

Nearly all the troubles in electric-lighting plants have been caused by defective wiring, and on that part of the lighting system, more than on any other, depends the success of future service.

It may not be amiss to compare the early date of the

art of electric-light wiring with the present, and the probable future advancement in the methods of installation.

In the early days of electric-lighting, a wire, covered with cotton, and saturated with paraffine, was used; this in a short time was replaced by a wire covered with cotton and white lead, known as "Underwriters' Wire"; the insulation was supposed to be fireproof, and on that account, decreased the chances of fire; but while the insulation was non-inflammable, it readily absorbed moisture, which caused excessive leakage and some incipient fire. A few carefully conducted tests and experiments, proved that "protection against moisture was prevention of fire," and henceforth a moisture-proof wire was demanded, and the manufacturers in that line now offer us such high grade insulations as "Grimshaw White Core," "Okonite," and others.

Improvements in the method of installing the wires were also made. Formerly buildings in the course of erection were equipped with the fireproof insulated wire encased in wood mouldings, or inserted in zinc or lead tubes, but with the appearance of the moisture proof insulated wire, the former insulation was discarded for the latter, and instead of inserting the wire in zinc and lead tubes, it was fastened directly to the side walls and ceilings, and covered with plaster. The cut-outs and switches are now mounted on porcelain and slate, instead of on wood as formerly. More attention was given to the equalization of electrical pressure on conductors.

While these changes helped to improve the work, it was still a matter of chance that wires placed in a new building and imbedded in plaster gave satisfactory results. Conditions that could not be controlled increased the difficulties. A cut from the plasterer's trowel or a blow from a hammer on the insulation, destroyed its utility; and though the wires might be tested, the fault in some cases would not appear till the building was completed, when to remedy the defect, it would be necessary to cut the plaster to obtain access to the wires, or discard the faulty circuits and rewire on the surface of the plaster, in either case disfiguring the walls and causing extreme annoyance. Again, should changes be contemplated in the wiring, such as an increase of lights on different outlets, or a change to a lighting system where lamps of a lower voltage are used, we are once more confronted by work that is totally inaccessible, and to make the changes required, are forced to have recourse to the same expedients as stated before, and with the same results.

Although wiring installations gave better results than formerly, there was yet a large field for improvement; access to the conductors became absolutely necessary for controlling the system, making changes and rectifying defects which may occur after the work is

finished and the building completed, and to do so without cutting or defacing the walls, or interfering with the other portion of the lighting system.

It is evident that as long as the conductors are inaccessible, just so long will the results be uncertain, and as it is our aim to eliminate the objectionable features and secure a wiring system that possesses accessibility and freedom from fire and leakage, the question is: "What is necessary?" To which I reply: A high grade, moisture-proof insulated wire, together with a system of "raceways" or conduits, and a complete line of "fishing" or junction boxes.

The conduits should be of ample size, with smooth inner surface, so that wires can be easily inserted or withdrawn; they should be constructed of materials that will not stain or exude through plaster or paint, and should be non-combustible and moisture-proof; the action of lime or cement, or extreme variations of temperature, should have no effect.

The "fishing" or junction boxes should be equipped with shoulders or sockets for the entrance of the tubes, thereby making them a part of the conduit system, and preserving the continuity which is so essential in a system of this kind, and also enabling us to make the joints moisture-proof.

All cut-outs when single or in groups, should be located in the junction boxes.

The conduits should be installed in a workmanlike manner; they should not be run or looped from one outlet to another, but branches should lead to each outlet from the main conduit carrying the wire for that circuit, and at right angles with same; at the intersection of the branch and main conduits, a "fishing" box should be placed; the main conduits may be located in the cornice near the ceiling, or behind the base-board at the floor with the cover of the junction-box flush with the surface, thus keeping them out of sight and at the same time easy of access. The location of the conduits should be uniform on the different floors throughout the building.

An extra covering of metal should be placed on the conduits at the outlets, to keep them securely fastened to the wall, protect the ends, and take off the strain when inserting or withdrawing wires.

With a proper conduit and a complete system of junction-boxes, it becomes unnecessary to insert a single wire (with the exception of the main feeders) until after the installation of conduits is complete, and the building finished; the insertion of strings or drawing lines is equally unnecessary, for, should the string or wire break near the middle of its length, that circuit would be as inaccessible as though it were imbedded directly in the plaster.

The main wires can be inserted in the conduits at the time of installing the same, and placed in recesses in the walls, the covers of the recesses to be detachable.

In hotels, apartment-houses, office-buildings and other structures used for similar purposes, the largest part of the wires and conduits, together with the cut-outs and junction-boxes, can be located in the halls, so that in case of alterations or additions being required, the occupants of the rooms will not be annoyed.

Considering the advantages a wiring system of this kind possesses over previous methods, a comparison in cost will be favorable to the conduit system.

The indefinite manner in which electric-light wires are sometimes installed, has often placed the owner of a building, who contemplates changes, at the mercy of the company or contractors, under whose supervision the work was installed; they in turn delegate the foreman who had charge of the work in that particular building to attend to the changes required, and he usually tries to obtain the services of some of the wiremen who worked on the installation, because "they know where the wires lie."

It is apparent that the employment of a complete conduit system obviates these troubles, and also that instead of equipping a building with a wiring system suitable only for a special company's system of lighting, it can be fitted with conduits for electric-lighting, regardless of system, and in fact, similar to piping the building for gas; and should a change in system be desired in the future where lamps of a lower voltage are used, the change can be made without cutting or defacing the walls, and at a nominal cost, whereas, should this change be required in a building where the wires are imbedded in plaster, it would practically necessitate the rewiring of the entire plant, and at a cost at least equal to that of the original work.

While a conduit of good insulation is necessary, it should not be regarded as extra insulation or protection, to an extent where the insulation directly on the wire is decreased, it should only be treated as a medium to accessibility.

"Prevention is better than cure," and for that reason only one wire should be placed in a conduit. Although the fusible metal cut-out will usually break the circuit in case of a "cross," still, it is safer to guard against any formation of this nature, by placing each wire in a separate tube, than to invite it by insufficiently insulated wire, or inserting wires of different polarity in the same tube.

Only the best is good enough, and will in the end be the cheapest for all branches of electric-lighting.

The cooperation of architects is not only desirable, but necessary for the future advancement of electric-light installation work, and to their credit be it said, that they are ever ready to extend their help; already have their suggestions been of value to us, and should the necessity of securing separate recesses be explained, they will, without doubt, make provision for the work similar to that made for gas, steam, and water pipes.

<sup>1</sup> Portions of a paper by Mr. Augustus Noll, read at the National Electric-light Convention, at Providence, R. I.

THE NOMENCLATURE OF BRICKS.<sup>1</sup>

A View at Loches. From "L'Art Gothique."

**MR. PRESIDENT AND MEMBERS.**—Your committee, appointed by the Association in convention at Philadelphia to recommend to this Association for its consideration a brick nomenclature, beg leave to submit the following report:

Your committee has sent out a large number of letters, reaching almost every important brick centre in the United States, soliciting the different names and descriptions applied to the various kinds of brick made in the several States and Territories.

To these inquiries the members of the craft have, almost universally, given full and complete replies, and at the same time expressing a great desire

that the convention might arrive at a nomenclature that would be universally adopted.

We find that many of the same kinds of brick are known by a great variety of names, not only in different but often in the same localities.

We will therefore describe some of the leading kinds of brick, submitting at the same time the names applied to each, with recommendations.

The first division will be as to the degree of hardness.

First. Brick not hard enough for the outside course of outside walls are variously known as soft, salmon, backing-up, pale, light, chimneys, filling-in, inside-wall and foundry brick. As anything softer than salmon-brick is not, properly speaking, a brick, we recommend that all brick not hard enough to stand exposure in the outside of buildings be known as "salmon brick."

Second. Brick burned hard enough for the outside course of outside walls, not selected, are known as hard, common, building, paving, hard building, outside, hard red, strictly hard, select hard, rough hard, hard washed, kiln run hard, common hard and kiln run hard, one-half smooth, one-half rough. We recommend that all brick burned hard enough for the outside walls of buildings, but not selected or graded, be known as "hard kiln run."

Third. Brick set from the top of the arches to the bottom of the kiln are known as arch, bench, eye, over-hangers, foundation, cistern, cellar and hard rough brick. We recommend that all brick set in the arches or benches, which are discolored, broken or twisted in the burning, be known as "arch brick."

Fourth. Brick selected for the fronts or the outside course of outside walls are known as fall, outside, select common, reds, hard fronts, fronts, veneering, smooth hard, straight hard, common fronts, light hard, chimney tops, liners, select, select reds, headers, stretchers, dark fronts, stock, select hard, side and back walls, and Croton front brick. We recommend that common brick selected for outside walls of buildings be known as "front brick"; No. 1, light burned; No. 2, medium burned; No. 3, hardest burned.

Fifth. Brick used for sidewalks are known as pavers, sidewalk, hard, selected hard, hard burned and yard pavers. We recommend that such brick be known as "sidewalk brick."

Sixth. We recommend that "sewer-brick" shall mean good, straight, hard-burned brick.

Seventh. We recommend that "foundation brick" shall mean a good, hard, well-burned but not selected brick.

Eighth. We find that all the brick in the kiln (not strictly soft) are known as kiln run. Merchantable—one-half select and one-half soft. Merchantable—one-third select, one-third hard and one-third soft. Building brick, common building, average brick, and two-third front, one-third salmon. We recommend that all the brick in the kiln not strictly soft, taken together, be known as "merchantable brick."

Ninth. We find in two or three localities brick moulded in sand by machine or hand, not repressed but handled with extra care, burned in the best part of the kiln, and well selected for fronts are called headers, stretchers and Croton fronts. We see no reason why those bricks should not be classed with common brick and known as "front brick," which we recommend.

Tenth. We recommend that all the brick that are set in the kiln when burned be known as "kiln-run brick."

Eleventh. All the brick left in the kiln after the front brick, sidewalk brick and sewer brick are taken out of the kiln are variously called inside brick, sewer, cistern, inside walls, double coal, shrunken, clinkers, rough kiln run, and backing-up. We recommend that all such brick be known as "rough kiln run."

Twelfth. Brick made especially for the fronts of buildings by repressing or dry-pressing are known as pressed, repressed, stock,

fronts, sand-pressed, dry-press, line-brick, stretchers, headers and face. We recommend that all brick made by either the repress or the dry-press process, and selected or graded for the fronts of buildings be known and designated as "press brick."

We further recommend that press brick be graded as follows: First, as to color. The numerals No. 1, No. 2, No. 3, No. 4, etc., shall designate color; No. 1 being the lighter shade, and No. 2 the next shade darker, and so on for any number of shades.

Second, as to quality. Press brick shall be designated by the ordinals, as first grade, second grade and so on. We then have press brick No. 1 first grade, No. 2 first grade, and so on for any number of shades. No. 1 second grade, No. 2 second grade, and so on for any number of shades. No. 1 third grade, No. 2 third grade and so on for any number of shades or qualities. The numerals always denoting the color or shade, and the ordinals always denoting the grade. Extremely light shades may be known as No. 0 and No. 00.

We further recommend that all dry-press or repress brick, not selected for fronts, be known as "common brick," and be subjected to the same classification.

Thirteenth. In many localities the term stock brick is applied to a brick moulded either by hand or machine in rough coarse sand, and repressed without rubbing, so as to give the brick a rough sand finish. We recommend that such brick be known as "stock brick."

Fourteenth. We find a great many varieties of names applied to moulded or ornamental brick, among which are the terms stretchers, headers, bay-windows, trimmers, cornice, etc. We recommend that brick other than square brick be known as "ornamental brick," for the various kinds of which the committee is not ready to suggest a nomenclature.

Fifteenth. We find that the term "heads" and "stretchers" are often applied to the manner in which the green brick are set in the kiln; as you enter the kiln you see the ends of the headers and the sides of the stretchers.

Sixteenth. "Platting," "splatting" and "flattening" are terms applied to one or more courses of brick placed on top of a green kiln to hold the heat when burning. These brick are often set on edge or laid singly flat as in paving, and often two courses are laid flat one above the other. We recommend that all brick used to cover the top of a green kiln set for burning be designated as "platting."

Since preparing the foregoing, we have received a number of valuable letters on the subject of brick nomenclature, and representing many different localities, and because of the incompleteness of this report, we recommend that a further investigation should be made and reported to the Association at its next convention.

W. A. EUDALY, Chairman.

D. V. PURINGTON,

WILLIAM H. BRUSH, Committee.

EMMANUEL FRÉMIET.<sup>1</sup>—VI.

Falconer and Lady, Frémiet, Sculptor.

**D**URING the progress of this work for the Louvre Lefuel came out from time to time to see it and was delighted. "It was a real god-send, I can assure you. All amounting to seven thousand dollars."

This commission consisted of a group of three female figures holding up a large ball, and twelve of the most hideous monsters, all for a fountain, that Frémiet could conceive of. What luck for the whole family of Saurians! Their time had really come, and this portion of the paleontological crea-

tion have danced and spouted water ever since in joyous resurrection. Nor were they made on an unscientific basis, as the ever zealous professor had intimated in regard to the plesiosaurus, but from nature, from small objects, enlarged with the assistance of a microscope, and with all the exactitude of the sculptor's care.

Frémiet also made for Lefuel four large birds, a pelican, marabout, moulton and loo, as well as an ostrich and crocodile, receiving one thousand dollars for the models of the first four. All this work was cast in iron and sent to some estate in the provinces, the sculptor never knowing where.

The Salon of 1873, contained from Frémiet's hands, a "Falconer

<sup>1</sup>Report of Committee to the National Brick Manufacturers' Association in Convention at Indianapolis, Indiana, Thursday, January 22, 1890, on Brick Nomenclature.

<sup>1</sup>Continued from No. 796, page 204.



and Young Lady"; that of 1874, a "Joan of Arc, praying," all statuettes; that of 1875, the "Age of Stone," in bronze, and a statuette of a minstrel of the fifteenth century, and in 1876, an astonishing group called the "Gladiator and Gorilla," half life-size, in terra-cotta. This



Elephant for the Garden of the Trocadero, Paris. Frémiet, Sculptor.

group represents a gladiator, armed with a net and trident, who enters an arena to catch and slay his opponent, the gorilla, but the latter kills his enemy, tears off his scalp and places it upon his own head.

When Barye died in 1875, his position, which he had occupied for twenty years, as professor of drawing and modelling for zoology at the Museum of the Jardin des Plantes, became vacant, and a successor was chosen by competition, by the other professors of the



AKnight Errant of the Middle Ages, Lille, France. Frémiet, Sculptor.

institution. Frémiet was unanimously elected. The duties of this professorship require the giving of thirty lessons, during the months of May, June and July, for the salary of five hundred dollars.

In 1877, the government was constructing the palace and garden of the Trocadero, and commissions were given to four sculptors to make

as many large animals, life-size, to decorate the four corners of the great fountain, and the elephant was assigned to Frémiet. He received twelve hundred dollars for the plaster model.

The same year brought him the promotion to the grade of Officer of the Legion of Honor.

Hardly had he finished the "Elephant," when he received, to his great surprise, an order, from the Director of Fine Arts, M. Chennvières, for a colossal statue in marble of St. Gregoire de Tours, one of the statues which the government was having executed for the Pantheon. The sculptor could not imagine why he was selected to do this work, and what was still more strange was the good price he was to receive for it, four thousand dollars, the government furnishing the marble. Of this sum, eight hundred dollars were for the plaster model, which was to be only one-third the size of the finished work. It was nearly as much as he had received for his model of "the Age of Stone," and more by two hundred dollars than he had been paid for each of the equestrian statues of the "Gallie Chieftain" and "Roman Cavalryman." The matter excited his curiosity, but it was soon explained.

His old and valiant friend Gérôme, knowing about the projected

decoration of the Pantheon, had been to see Chennvières, and said to him: "Look here, you are fitting the building with pictures and statues. It has been the custom of the government to give fifty thousand francs for a picture, and for statues barely enough to pay for the clay. The sculptors are kept on the verge of famine, while the painters live in palaces. Now try in this affair to give the sculptors at least enough to live on, and see that Frémiet has something."

"St. Gregoire," in marble, and one of the sculptor's most splendid equestrian statues, a "Knight Errant of the Middle Ages," in plaster, were exposed in the Salon of 1878. The latter was bought by the State for sixteen hundred dollars and sent to the Lille Museum.

When the great exhibition of 1878 was preparing, Frémiet sent word to the art committee that he would like to contribute two works,

"The Age of Stone" and the equestrian statue of the Duke of Orleans, at Pierrefonds. It seems incredible, but is true, nevertheless, that the committee refused to accept the first. The sculptor was not represented at this exhibition, as, on receiving this decision, he refused to send anything.

Apropos of this, and of the general character of French art-committees, I am reminded of a little parable told by Aubé, which runs thus: "The governing powers of art in France appear to me like a pond of water, in which, like young fish, swim the art aspirants, and on the surface of which sail around the majority of artists, a motley lot of inferior men, and the Institute. Whenever a young fellow pops up in sight, through some vigorous and original work, the whole crowd hasten to tap him on the head and knock him under. But if he keeps on popping up, higher and higher every time, it becomes harder to put him down, and finally, when he gets well out of the water and they see he is a force they can't keep under, then they all crowd around and are very friendly." We shall see that Frémiet did not arrive at this delectable condition until nine years after, in 1887, when, at the age of sixty-three, he was awarded a Medal of Honor; and that he did not have full swing for an exhibition of his works until two years later, at the great exhibition of 1889. His contribution to the Salon of 1879, was one of his most admired statuettes,



Negro and Young Elephant, Carrara, Italy. Frémiet, Sculptor.

"St. Michael," and another, called the "Bully." In that year Frémiet executed an interesting decorative composition for M. Devillé, of Carrara, Italy. It was composed of a negro carrying off a young elephant, and looking back to see if the mother were coming, as the centrepiece; on one side was a sitting lion, content with the



The fallen Stag and Serpent at the Trocadero.

soft air of Italy, on the other a polar bear, gasping for breath. The figures were two-thirds life-size, and cost, for the plaster models, eighteen hundred dollars. They were executed in marble by their owner. Of the centrepiece, M. A. Sylvestre was kind enough to say that, "these two figures of man and beast, are treated in that natural sentiment, at once exact and delicate, which gives such a personal charm to the works of this eminent sculptor." Not long after the "Negro and Elephant" were cut in marble, there was an exhibition of old masters at the Palace of Fine Arts, which included only two works of sculpture, this one and Carpeaux's "Ugolino," both beautifully placed. The *Salon* of 1880 also contained this group, as well as a charming composition, statuette size, of the "Homage to Corneille."

It was about this time that the sculptor received from M. Turquet, under-secretary to Jules Ferry, Minister of Fine Arts, an order for a marble bust of Charles V, to be placed in the national library. It was a pleasant surprise, as Frémiet and Turquet were strangers to each other, and it not only gave the former much professional gratification, but it permitted him to add his commendation to that of many other artists, Rodin especially, as the reader may remember, of the exceptionally faithful way in which M. Turquet conducted the affairs of that administration. "Many fine things can be said of Turquet," says Frémiet. "He was more specially friendly to artists than had been many of his predecessors."

Equestrian work had not, in the meantime, been neglected, for the *Salon* of 1881, saw one of the sculptor's most richly decorative statuette figures, the "Grand Condé,"<sup>1</sup> in black bronze; and a "Monument to Miss Jenney," in gilded bronze and marble, made for a South American, in memory of a much-prized dog. For the latter work eleven hundred dollars were paid. Curiously enough this little affair won a good deal of praise for its charming arrangement. A copy of the "Condé" was bought by the Duc d'Aumale, for the Château de Chantilly.

Some time in the latter part of 1880, or early in 1881, Frémiet received a letter, which, in many respects, was the most gratifying communication that ever came to him. It was from the Roumanian minister in Paris, Collemaki Cartargy, and contained a request, expressed in the most appreciative terms, to make a colossal equestrian statue in bronze of Stephen the Great, for the city of Jassy, Roumania. This commission, doubly agreeable in coming from a stranger for a strange and far-off country, was the first indication he had ever received that his long list of equestrian statues had made an impression beyond that made by the works of ordinary sculptors. He was rejoiced to feel that there was one representative man in the whole world who gave him practical evidence that he had not worked in vain on this high plane of art. Yet it was so unexpected that it almost seemed untrue. Besides, he was to receive a fair price for it, twenty-six thousand dollars, pedestal included.

"Who designed the pedestal?" I asked. "I did," answered the sculptor. "I don't like to have architects design my pedestals, because they make them too large for the statues. They think the pedestal is the monument, and on top of a big pile of stone they stick the statue. I attended to everything about the entire affair," and, he enthusiastically added, "I found the minister one of the most charming of men. Nothing could have been more delightful than our intercourse."

This statue was in the *Salon* of 1882, as also the marble bust of Charles V, but it is now well out of the world, as is amply proved by the fact that after more than two years of persistent effort it has been found impossible to persuade a Jassy photographer to make a picture of it. Perhaps, after the usual Eastern period of historical sanction (twice the number of years that the monument cost dollars) some definite indication may be obtained of its actual appearance.

<sup>1</sup> See the *American Architect* for February 1, 1890.

Even Stephen himself had to wait over eight hundred years for sculptured honor.

In 1882, M. Ballu, architect of the new Hôtel de Ville, of Paris, asked Frémiet to make a large chimera, for the stairway of that building, but he refused, and the order was changed to an equestrian statue of the now famous "Porte Falot," or Mounted Torch-Bearer of the fifteenth century. It is life-size, in bronze, and cost nine hundred and sixty dollars, for the plaster model. This model and the statuette of the "Snake Charmer," in bronze, were in the *Salon* of 1883.

It was also at about this time that the sculptor entered, for some reason, the Philadelphia competition for the Washington monument making two sketches, one of which was equestrian and composed of thirteen figures. For both models he received four hundred dollars.

Frémiet was occasionally asked to compose some strange piece of decoration for a private residence. One of these was for the famous surgeon, Dieulefoy: this was in the form of an enormous plant, a species of ivy, with large leaves, and placed in the stairway. Behind it, attached to the wall, were two appropriately proportioned gilded butterflies, and among the leaves a big monkey reaching down to catch them. Another, for a rich art-collector on the Champ Elysées, represented an immense marabout in the act of defending her nest of young from the attacks of an equally large serpent. This was also in bronze, placed in an obscure niche with very rich surroundings, and lighted through the eyes of the birds, which were of blue glass. The effect of this arrangement at night is weird in the extreme. For this work the sculptor received the fair price of four thousand dollars.

For the stairway of Gérome's princely home he executed the combination of a great snake tied by its neck to the top of a tall gas standard, with its body winding around it.

Early in 1884, Mr. Alphand, the Director of Public Works for the city of Paris, commissioned Frémiet to make, in plaster, the enormous decorations for the fountain of the Trocadero, the central group of which consisted of a stag attacked by a serpent. Around this, in all sorts of fanciful positions, were a whole series of fantastic water-animals, turtles, etc., all spouting water, and joining in the general fray. They were finished in time for the national celebration, July 14. Four thousand dollars was the price paid for this resurrected menagerie. Since the above date M. Alphand has been trying to get the city authorities to have this great work cast in bronze, but without success. From time to time it has been necessary to repair it, but the weather worked faster than the repairers, and just before the great exhibition of 1889 opened, the noble stag, wearied



Bear and Man of the Stone Age. Frémiet, Sculptor.

with the unceasing squeeze of the serpent, and tired of rain and frost, fell over on the rocks below, carrying his slimy antagonist with him. Taking cruel advantage of the stag's helpless position, and in sympathy with the empty treasury of the city, Frémiet gave them both a lift by mending the broken body and head of the snake, and



raising the latter portion of the animal well above his fallen prey, as if in the act of striking the final blow.

But a year or two more and a rotten mass of plaster will take the place of what was once one of the most imposing pieces of fountain decoration in Paris. So much for the city's appreciation of Frémiet.

The subject of the "Bear strangling a Hunter," had not been forgotten nor the beautiful sketch of it destroyed, though the large model had gone to ashes with the burning of the Crystal Palace, in New York. The sculptor remodelled it, perhaps with more vigor than ever, and sent it in plaster to the *Salon* of 1885, under the designation of "Bear and Man of the Age of Stone."

It was bought by the State for eleven hundred dollars, cast in bronze and placed in the *Jardin des Plantes*, on a low pedestal, at the side of the office-building of that institution.

Always seeing a plaster cast of a gorilla at the Garden and regretting the destruction of the one he had made in 1859, decided Frémiet to make another group of the same subject, but differently and more compactly treated. Its appearance in the *Salon* of 1887 created an immense sensation, and, as usual, a wide division of opinion. The few best artists and art lovers pronounced it, independent of subject, a great masterpiece, while many wholly condemned it, because of its subject.

It is to be borne in mind that Frémiet had made, within thirteen years, no less than six works, four of which had been in the *Salon*, that were richly entitled to the highest professional recognition his country could give as far as medals were concerned, and that he was the author

favorably by the committee. The minister, a distinguished chemist, decidedly opposed its purchase, asserting, as the sole and convincing reason, that it was not "a scientific fact."

The committee, at once and unanimously, voted to refuse its purchase.

Times had, however, changed since the plesiosaurus incident, and Gérôme and Frémiet made up their minds that that decision would not be final. Ministers were not everlasting, and the chances were that a chemist would not always regulate the art requirements of France. In fact his retirement came early, and to his successor an appeal was made to do what his predecessor had refused. But he hesitated. "The — 'Gorilla' — was — not — like — the — sculpture — the — State — generally — bought. Ought such works to be encouraged? What influence would it have on the rising generation? Was it worth while to disturb the habits of the administration?" Grave questions all. And all asked in favor of that mass of inertia that had sat on Rude, Barye, Millet, Rodin, and every other living man in French art. Gérôme and the sculptor persisted, and the new Minister finally yielded, giving the generous sum of one thousand dollars for the group. As for having it cast in bronze, that could not be thought of, and so it was stowed away in the dark corners of the *Palais de l'Industrie*!

It is safe to say that as long as Gérôme lives, no Minister or Director of Fine Arts in France will be permitted to sleep easily until the "Gorilla" is in bronze and set up as an object of harmless mockery in the *Jardin des Plantes*. It is said that the present Director is favorably disposed, and with time will accomplish the desired end.

Of the hundreds of critical notices of the "Gorilla," that of Mr. Paul Leroi, in *L'Art* is one of the most comprehensive. He says at the close of an article on the sculptor, "To conclude, besides his statuette, so characteristic of 'St. Louis,' he sends this year to the *Salon* the group of a 'Gorilla carrying off a woman' a subject he had already treated more than twenty years ago, but which he then conceived very differently and with infinitely less majesty. One cannot like this subject: that is an affair of sentiment, and I do not propose to start any discussion on this point, having always indulged in the belief that to the artist belongs the most absolute liberty of inspiration, provided that he creates a real work of art. No impartial mind will dispute the fact that M. Frémiet has incarnated, to a supreme degree, bestial force concentrated in this creature of monstrous and formidable structure; and the desperate struggle of the human being — above all seductive and sensitive — crushed by the ferocious embrace of this colossal animal which does not appear to suffer much from the javelin which was struck into him by one of those who hoped to take away his prey."

"The contrast between the two figures of this group, the learned variety of drawing and modelling — so much brutal heaviness and giant energy so vigorously opposed to such feminine suppleness and weakness, all combined in this superior work, justifies the vote of the Medal of Honor, which crowns not only this recent creation but a whole career of talent growing continually and nobly consecrated, free from all intrigue, to the purest worship of art. Rude would be prouder than ever of his disciple."

*L'Art Français*, had the following from the pen of M. F. Javel: "The 'Gorilla' is a piece of art of the first order, as well for the boldness of its invention as for the energy of its execution. A grand



Symbolical Memorial to Cornélie.

of a list of equestrian statues, and other works, unparalleled in the history of French sculpture, yet he had not received from the *Salon* a single medal since 1851, thirty-six years before. A Medal of Honor had been suggested on several occasions, by a very few members of the jury, but the majority — always opposed to giving high recompenses to any one not a graduate of the *École des Beaux-Arts*, or for any work whose character was not in accord with its scheme, as in the case of the "Age of Brass," and "St. John," by Rodin — would not listen to such a proposition, preferring to support the disgrace of refusal and the acknowledgment of confessed prejudice. When, however, the "Gorilla" appeared there was a determination on the part of these few artists, members of the jury and others, that this occasion should not pass without Frémiet's receiving his just and too long delayed deserts, so far at least as the jury were concerned. Nor was it an easy matter to accomplish. But these men went to work, and they worked so persistently that, united with the remembrance of the neglect the sculptor had hitherto suffered, the growing impression, in spite of the subject, that the "Gorilla" was a great work of art, the merits of the important works already produced by its author, and the opinion, growing daily, that he was indeed a veritable master, they gained the day, and Frémiet received the highest recompense of the *Salon*, the Medal of Honor. This is the short story. To-day, if an allusion is made to the medal in the presence of a member of the Institute, or one of the old school sculptors, he will assert with great solemnity that the medal was not given for the "Gorilla," but in recognition of a life's work, a kind of aggregated accumulation of forty years' deserved honor.

The contest over the "Gorilla" was not ended with the medal. The State was expected to buy it, and of course there could be no doubt about it. But there was, and a funny one, too. The shadow of scientific exactitude was still on the war-path. When the buying-committee, headed by the Minister of Fine Arts, passed before the *Salon* sculpture, with the purpose of selecting such works as they thought worthy of such distinction, they arrived in front of this group, which had been included in the number already marked



The Grandfather, (Statuette). Frémiet, Sculptor.

dramatic breath animates it, and art here is in accord with nature. This gorilla who carries off a woman, is not perhaps a sight that is

to be seen every day at the Jardin des Plantes, from ten to four, but might be—in Gabon. It matters very little, any way, whether this rape has been committed or not, or if so, at what epoch, or in what country, it is the movement that the sculptor has given to his figures, the agony of the young 'captive' and the desperate luxury of the ravishing gorilla, that he has majestically rendered. The medal consecrates a long and brilliant career."

Expressions like these were very common: "What triumphant and tender savagery." "Striking scene, strong and vigorous work." "Learned anatomy studied with conscience." "The general lines of the group reveal an artist refined to the highest degree. All this suffices to make interesting this great piece of romantic sculpture."

But the wise were incredulous. "The shoulder of the brute is pierced by an arrow, and yet the arm holds a heavy stone that the ravisher might throw at those who disputed his conquest." "A gorilla could never carry off a woman." "Such finely-formed women do not live in the country of such beasts." "Still what will the artists care, they will give themselves entirely up to the charm they pretend to see in this shocking drama."

Passing by the group at the *Salon*, one day, Aubé said to his companion, also a sculptor: "After all, I guess Frémiet is the biggest fellow we've got." "Yes," answered the latter, "and of all Rude's pupils, Carpeaux among them, he is the only one that has not in some way flashed in the pan. Many of them promised well, and Cordier did some good busts, but they soon emptied their sacks. When Carpeaux came to ask Rude's permission to enter his studio, he said that he had had a vision of the Virgin, who told him that he was called to the high destiny of a sculptor. Since Barye, nothing has been done that can compare with this thing. And I think the 'Hunter of young Bears' as big as any thing Barye ever did. Yes, Frémiet is the biggest one there is. But, God of all the Saints! how he has been run over, rough-shod, by scores of inferior men! We don't seem to know anything about him."

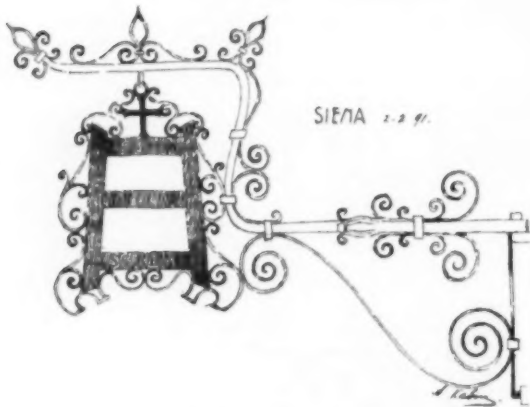
"Taine is right when he says that 'there was a time when artists were treated like men, but nowadays it is the fashion to starve them while living and make a great noise over their coffins.' And it's the nearest thing to artists Taine ever said. The fact is, my friends, if four of our sculptors were dead, or exported, we should have nothing left but a lot of weak imitators of the antique."

The sculptor's exhibition in the *Salon* of 1888, comprised two small subjects, "The Grandfather," one of the finest things in sentiment he ever executed, and a standing figure of that indescribable character "The 'Incroyable,'" both in silver bronze.

T. H. BARTLETT.

(To be continued.)

#### THE FAILURE OF BUILDINGS.



AN address on the causes of failures in buildings was given by Professor T. Roger Smith, F. R. I. B. A., a few weeks ago at Carpenter's Hall, London Wall, being the second of a course of free lectures given under the auspices of the Carpenter's Company. The lecturer restricted attention to failures arising from giving way of the structure, owing to the absence of the provisions and precautions which would have prevented it, and excluded from his survey those due to wear and tear. His first example was the collapse of the station-roof at Bricklayer's Arms, on the South-Eastern system, some forty years ago. Here a structure carried on a multitude of columns fell like a house of cards, owing to a single pillar being knocked down by an engine, and the lecturer recollected visiting the scene of the disaster, which was strewn over uniformly with broken slates, through which other debris protruded here and there. The accident was a warning as to the source of danger existing in carrying a large roof by very intermediate supports, and after its occurrence they were avoided. But there was a latent defect in the framing of the roof, which was not generally known at the time. The struts of the simple iron trusses were too short, and in putting together the trusses were so tightened up as to be actually weakened by the framing. Mr. Roger Smith showed in detail, by means of diagrams, the arrangement of the roofs at the London Bridge Station, belonging to the same railway company, where it was

also necessary to reconstruct the roof, or, rather, to support every truss by a timber-post, near the centre of the span, owing to the sagging of the framing. Here at London Bridge Station, as might still be seen, the load carried by each queen-post truss approached so nearly to the strain it was calculated to bear that there was danger of a permanent set and enormous pressure at the joints. The risk could have been easily avoided by putting the principals nearer together, adopting heavier scantlings, and by having a steeper pitch. Two sets of reasons combined to occasion the failure—one was the flatness of the pitch and general lightness of the scantlings compared with the heavy load they had to carry; the other the softness and comparative flexibility of fir timber. The old examples of framing often taken as models were executed, it should be remembered, not in fir, but in hard woods, such as oak or chestnut, in which the articulations of the framework were able to bear the strain, and would neither yield nor be crushed, while the general framework was stiffer. Much more strain was thrown on the feet of the principal rafters when a truss was flat than when steep, and this pressure became also a transverse rather than a longitudinal strain.

The design of a large timber roof was limited to the scantlings and lengths which the markets could supply; where greater strength was needed than single timbers could furnish, the main beams should be doubled, and where greater length of timber was required than could be afforded, the entire design of the roof should be rearranged.

At King's Cross terminus a much more ambitious roof failed, and had to be removed. There all the timber trusses sagged in the middle, and had to be replaced by iron ones. These King's Cross roofs were carried by trusses which depended mainly upon a laminated rib of timber, semicircular in outline; there were two roofs side by side of 100 feet span each, and from the first there was an unexpected amount of lateral thrust from the ribs. These laminated ribs were constructed on Col. Emy's principle of boards bent to a semicircular form, laid one on the back of another and bolted, the tendency being for the ribs to straighten themselves under pressure.

The ancient roof of Eltham Palace, a heavily-timbered hammer-beam structure of only thirty-six feet span, had spread and had thrust out the walls, partly owing to its flat pitch, but chiefly because the foot of the principal rafter came down on to the hammer-beam inside the line of the wall instead of well back; there was thus little to prevent the free end of hammerbeam from dropping, and so dislocating the whole framework. All these examples of failure in carpentry arose from inherent defects in the designs. A familiar instance of failure due to this cause was the sagging of the double-framed floors in superior houses built at the end of the last century.

There was at that time a strong wish to economise height, and we constantly met with old examples of floors framed in the manner shown in Tredgold's "Carpentry," where guides were thrown across a room having shorter binders tenoned into them, the mortises in the girders being very deep. The binders again were full of mortise holes, because the floor joists were tenoned into them, and ceiling joists are often mortised and tenoned into them. These mortises weakened the timbers, which shortened owing to shrinkage, and often the tenons of the joists or timbers were drawn out, the floors being generally out of level, and in many cases insecure.

Very large structures in carpentry were hazardous, being far less rigid than iron ones, and consequently the latter material should be preferred to wood, unless there were special reasons to the contrary. The author had once to examine a curious case of failure in the carpentry of a structure, due to injudicious alterations. The building had originally been a spacious two-storied one, covered by a Mansard roof, with a floor at the level of the feet of the rafters, the large beams which carried the floors having to do duty as ties. In order to convert this building into a scene-painter's studio, the intermediate floor, including of course the ties, had been cut away, the result being that the walls soon leaned so far outwards, owing to the spread of the roof, that the building had to be taken down. Had the owner, or his builders, had any knowledge of carpentry, the building would not have been rendered dangerous. Risk from ill-judged alterations was not at all infrequent. Gas-fitters had been known to cut right through the tie-beam of a timber truss in order to give passage to a gas-pipe, and the timbers of quarter partitions were cut through to widen old or make new openings. But the most common sort of failures due to injudicious alterations were cases in which the load carried by a building was greatly increased, owing to the idea that, as the structure and its foundations showed no signs of bursting, bulging, or cracking, there was a reserve of strength which might be drawn upon. The central towers of many cathedrals and churches were examples in point, that at Wells being an instance where the progress of settlements due to raising a tower was successfully stopped by throwing inverted arches across the openings in the tower, so as to stiffen the work.

In 1869 a failure occurred in the part of Somerset House occupied by King's College, due to a dissimilar cause—the employment of cast-iron for girders carrying a terrace floor. The girders which failed had little weight on them, and had carried it for many years. The untrustworthiness of the material was increased by the fact that the upper flange of each of the main girders was cut away where the smaller cross-girders were connected to them; and, further, each main girder was firmly held to the masonry of the main wall, and to that of the terrace by dowels. When the last strain came upon the girders, therefore, the flange gave way at the weakest point, and wrecked the whole structure. This failure confirmed the popular



prejudice against cast-iron, and showed the danger of pinning beams to the structure. The failure would not have occurred, however, had it not been for the excavations in front for the Embankment, Main Drainage and District Railway, showing the danger of tampering with foundations, equally in the case of massively-constructed buildings as in light ones. This removal of parts of foundations was a fertile source of failure and partial failure in buildings. In one case, where a wall of good height fell, not far from Somerset House, he had been credibly informed that no less than 60 feet of the wall was found to be without a bearing for its footings on the foundations just before the accident occurred. Fortunately in the case of subsidence of foundations the cracks and departures from the perpendicular were so formidable in appearance that, as a rule, they were dealt with before the defect was beyond remedy.

In every failure the first question suggested by experience was, What was wrong with the foundations? Pumping out water from a neighboring excavation was often the cause of sudden disturbance of foundations.

Again, a moist soil afforded a site on which a building of moderate weight rested securely until some neighbors began a large building by excavating to a great depth drawing off the water. When the pumping ceased the damage generally stopped; but this was not always the case where a new sewer was the cause of the subsidence, as water often followed the channel excavated for the sewer to be laid in. In clay soils on hill-sides much slighter causes often produced serious results, and the lecturer gave cases of evils arising both from letting water in and draining water off from such sites which had come under his personal observation, the former being a landslip arising from merely stripping a long narrow piece of turf to form a bed for vegetables.

Many failures had occurred from retaining-walls proving insufficient to resist the lateral pressure brought against them, and granaries, ice-houses, and stores required great strength of construction and to be securely tied. It was dangerous to remove any earth from the immediate neighborhood of foundations, especially while the work was green. The author had seen a large part of an ordinary semi-detached dwelling brought to the ground by the builder having begun to put in a drain parallel to the flint wall, and at a slightly lower level than the concrete. The earth under the concrete began to escape sideways into the drain trench, the concrete dropped, and the brickwork with it, bringing the wall down.

While he did not wish to speak of accidents due to fraud, he would point out that carelessness and stupidity were sometimes almost as formidable in their consequences as positive fraud, and so many persons were careless and so many deficient in common sense that the necessity of minute supervision and unceasing vigilance during building operations could not be too strongly urged. In a large suburban house, he had been called in at three or four different times to underpin parts of the external walls, principally because they were built without footings. The omission to bed drains in concrete had been a cause of structural failure, as well as injury to health.

The trouble with chimneys and copings owing to the omission of the precautions of laying the bricks in cement was too familiar to need illustration. Imperfect bonding and the use in 14-inch walls of half-headers had resulted in many a house having external walls in two thicknesses, one of one brick and one of a half-brick only, connected at rare and uncertain intervals. In many cases the half-brick skin bulged in huge blisters two to three yards over. Where the damp-course was omitted all the lower parts of the walls were soaked, and if ventilation was omitted from a boarded basement, decay would set in in the joists and boarding. Indeed, if in place of wet-rot dry-rot was set up, one of the most formidable forms of failure in a building was present. Where damp and absence of ventilation existed, many years' freedom from attack was no guarantee that the building would not be invaded with dry-rot directly one piece of infected wood, say of white fir, was introduced.

The most extensive case of failure the lecturer ever saw, that of the substructures of the Adelphi Terrace, was mainly due to the introduction into them of bond timbers, a custom now happily exploded, and the mischief there did not reveal itself for more than fifty years after erection.

Passing on to deal with failures in masonry, Mr. Roger Smith referred to the well-known cases of Norman buildings consisting of two skins of ashlar masonry inclosing a mass of loose stones and poor mortar. Although such walls sometimes stood for centuries, they at last buckled and yielded, three well-known modern instances of failure being the central towers of Chichester and Peterborough Cathedrals and the tower of St. John's Church, Chester. It should not be forgotten that it was possible for buildings to be tested by exceptional trials.

Setting aside the risk of fire, there were the perils due to unusually high winds and even to earthquakes. Were but a slight shock of earthquake, such as was experienced at Colchester eight years since, to occur in London, the results would be disastrous. Extremes met, and the damage done by the tooth of time was in the long run as serious as that wrought by an earthquake. Every building would wear out, given sufficient time, and even constant repair was not enough unless from time to time the repair amounted to actual renewal—an instance in point being the exterior of Westminster Abbey.

Passing to a general summary of his subject, the author said the

first lesson to be learned was that the foundation was very often in fault when a disaster occurred. Much more than half the cases of failure of buildings practically began here, and too much vigilance and suspicious care could not be exercised while foundations were being put in. Let the bottom of the trenches be carefully tested with an iron bar, and let any soft or defective spot be dealt with promptly and thoroughly, the utmost care being taken to prevent anything which should alter the condition of the soil under or round a building.

Another lesson was that the two common building materials—brickwork and fir timber—were not without their weak points. Brickwork had very little cohesion; a small settlement might result in long and wide cracks, and overloading would cause bulging; it was also readily attacked by bad weather.

Fir timber, though plentiful, strong, light, elastic, and as a rule, durable and cheap, was soft and unable to withstand compression on the joists. No strain that could be avoided should be put upon the joints of fir. The timber was hardly ever properly seasoned.

Another lesson was that where circulation of air was impossible, the walls would be wet and timbers would decay, giving a chance for the introduction and spread of dry-rot. His last warning was, beware of water. The greatest enemy to building in this climate was moisture.

In conclusion, the author remarked that when failure was threatened the first thing to be done was to attempt to read the meaning of appearances, and any symptoms of movement should be watched and tested. The next step was to check the progress of mischief by shoring, so as to gain time for investigation and repair, which constituted the third and fourth measures to be taken.—*The Architect.*



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

ARMORY FOR THE EIGHTH REGIMENT, N. Y. N. G., FOURTH AVE., NEW YORK, N. Y. MR. J. R. THOMAS, ARCHITECT, NEW YORK, N. Y.

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

"THE armory of the Eighth Regiment, occupying the entire front of the block on the west side of 4th Avenue, between 94th and 95th Streets, is," says the *Record and Guide*, "upon the whole the most impressive piece of military architecture we possess. It consists of an administrative building in front and a drill-hall behind. This drill-hall is in all cases a room as large as can be had that must be unobstructed by interior supports. It has a great area and a moderate height, and as an architectural problem presents very much the same difficulties as the train-shed of a railway station. Thus far architects seem to have found it, either as a train-shed or as a drill-hall, singularly intractable. The prohibition of interior supports deprives it of interior features, and its interest is only in its magnitude, while outside it consists of low dead walls. The architect of the Eighth Regiment armory has scarcely improved upon his predecessors in the treatment of this part of his task. The wide rear wall of his building is a flat expanse of brick that gives no sense of massiveness, since there is no display and can be no accentuation of the thickness of the wall, rising to a low and rather sprawling crow-stepped gable that masks the roof behind it. It seems as if some more effective treatment might have been adopted for a front, or rather a back, so extensive, though it is a fact that no designer has yet hit upon a treatment of it at once expressive and impressive. The side of the drill-hall shows what seems a clerestory, although it may be, in fact very probably is, but a vertical sash resting on the arch trusses of the roof. At any rate, it appears to suggest a motive for a corresponding treatment of the end wall, by dividing it into three, a centre higher than the sides, and separated from them by buttresses, which in so long and unbroken a wall always appear to be needed for strength, while the accident that occurred during the construction of this very building might very probably have been averted if the wall had been so reinforced. This arrangement was adopted with success in the rear wall of the Metropolitan Opera House and gave an architectural character to what would otherwise have been a perfectly uninteresting expanse.

"The treatment of the drill-hall is, however, almost the only exception we have to make to the manner in which the architect of the new armory has performed his task. The material is baked clay, and is almost entirely common bricks, selected for their color, which is excellent and deep. Terra-cotta is used in the crenellated copings that crown walls and towers, while a brown sandstone is introduced very sparingly indeed, the sills of the openings and the water-table being composed of it, and a column of which we shall speak presently. This monochrome of red is undoubtedly effective, especially where the parts are so simple and on so large a scale; but a slight variation in tint to a still deeper red, if it could be had, for the arches and other structural features, would have expressed the construction better, and might have been equally effective as color. In this, as in many other respects, the Casino may serve as a model for an architecture of baked clay.

"The front of the building on 4th Avenue is a wide gable like that of the rear, but here deeply recessed behind two powerful flanking towers. The lower story, between the towers, is occupied by a terrace, of which the front wall is pierced only by an entrance archway, is slightly withdrawn from the extreme projection of the tower, and is lighted from skylights that are, rather unfortunately, visible from the street. The interval between the wall of this basement and the great towers is filled out with "squinsches" of brick, and the junction is marked by turrets repeating in miniature the form of the towers, and thus giving scale to them. The recessed wall shows in its lower story a large arched opening at the centre; in the second, round-arched openings of moderate size, which in the third are slits extending into the high and shallow cornice. The effect of the whole is excellent. The towers are, in fact, of ample dimensions, while, as has been said, the repetition of their forms on a smaller scale in the turrets makes them look even larger. The uniform use of crenellations, alike over walls and towers, also gives unity and dignity to the front. In detail it is as admirable as it is simple, mainly admirable for the unmistakable character of brickwork in the design of every feature.

"The sides are equally effective until the building declines into the drill-shed. The feature of the north side is a subordinate entrance. From a stout dwarf column of sandstone, not more than a diameter high, with a foliated capital and a heavy double abacus, are turned outward two arches. One of these covers a window, while the other is a relieving-arch, under and behind which the arch of the doorway is burrowed into the thickness of the wall, thus very impressively displayed. On the north side is another doorway, equally good and massive, though less elaborate. The junction of the tower with the side walls is another point worthy of mention and praise. Below, the tower meets the wall and is merged in it, while in the third story its curve is continued inward, and shows under an arch thrown across in the plane of the wall. All this, that is to say all the administrative building, is highly successful and if the drill-shed is less so, its comparative unsuccessfulness can scarcely be imputed to the designer."

STORE FOR MRS. MARY S. VAN BEUREN, NEW YORK, N. Y.  
MESSRS. D'OENCH & STEVENS, ARCHITECTS, NEW YORK, N. Y.

This store is to be occupied by Messrs. Le Boutillier Bros. The building is 75' wide, 206' 6" deep and 75' high. The front is built of granite and buff-colored brick and terra-cotta, with terra-cotta cornice. All columns and girders are of iron and steel. The building was designed to be occupied as a retail dry goods store.

ACCEPTED DESIGN FOR THE TROY ORPHAN ASYLUM, TROY, N. Y.  
MR. H. LANGFORD WARREN, ARCHITECT, BOSTON, MASS.

HOUSE FOR DR. D. S. STEVENS, LYNN, MASS. MR. PENN VARNEY,  
ARCHITECT, LYNN, MASS.

A GAMBREL-ROOFED COTTAGE, EAST WATERTOWN, MASS. MESSRS.  
RODMAN & NORRIS, ARCHITECTS, BOSTON, MASS.

#### [Additional Illustrations in the International Edition.]

LE RABOT, GHENT, BELGIUM.

[Gelatine Print.]

THE "practical" American who may ask, of what use to him can be the publication of this plate? has but to turn to the view of the Eighth Regiment Armory in this issue to have his question answered. Although our loquacious *cocker* called this building the Château des Espagnols—he was given to ascribing everything of interest to the period of Spanish domination—we identify it as one of the old city gates styled Le Rabot, which is at the end of the Nouvelle Rue du Rabot on the northern side of the city. Its relation to the old walls and the manner in which it served as an entrance are not at all obvious.

BAVARIAN BANK, MUNICH, BAVARIA. HERR. W. MARTENS,  
ARCHITECT, BERLIN.

[Gelatine Print.]

HOLLAND HOUSE, LONDON, ENG.

HOLLAND HOUSE, or, at least, the central part of it, was built by Sir Walter Cope, a Gentleman of the Bedchamber to King James I. in 1607, and was at first known as Cope Castle. His daughter and heiress, Isabel, married Sir Henry Rich (afterwards Earl of Holland), who built the wings and arcades, and employed the best artists of the time in the decoration of the interior. The Earl was beheaded in 1649, by authority of the High Court of Parliament, for levying war against the supreme authority of the nation. Fairfax and Lysons were afterwards occupants of Holland House, and in one of the fields

Cromwell is said to have discussed State policy with Ireton. But eventually the Countess of Holland was allowed to repossess her house, and plays were acted there at the time when the London theatres were closed by the Puritans. The second Lord Holland succeeded his cousin as Earl of Warwick, but still continued to make the house his principal residence. His son and successor married the daughter of Sir John Middleton, and this was the countess who married Addison, and was the mother of that young earl to whom Addison exhibited the Christian manner of dying.

From about the time of the Restoration until 1749, Holland House was occasionally let, and among the tenants were Sir John Chardin, the traveller; William Penn; Mrs. Morris, the daughter of Bishop Atterbury; downright, incorruptible Shippen; and Lechmere, the lawyer. According to Sir James Macintosh there was a more illustrious tenant, namely, Vandyke, the painter, but this has not been confirmed by satisfactory evidence. William III was thinking of making Holland House a palace, but he preferred the house of the Earl of Nottingham. In 1749 it was let on lease at a rent of 182*l.* 16*s.* 9*d.* to Henry Fox, the first Lord Holland, who bought it in 1767, and in his family it has since remained. The terrace in front on the south side was formed by the late Lord Holland, who displaced for the purpose two Portland-stone piers designed by Inigo Jones, and which now stand at the entrance to the pleasure-grounds. The central room, seen on the ground-floor, is the "breakfast-room" with a projecting porch, and over it is the "gilt-room." The right wing contains the conservatory, with a lead flat over it, and the "smoking-room," which has "Lady Holland's sitting-room" above and the principal entrance-hall (not seen from the south) behind it. The windows between this wing and the centre light the staircases. Next to the breakfast-room, on the left, is the "china-scully" and "china-room," with the "miniature-room" and "yellow drawing-room" above, and the left wing contains the arcade, with the library and picture-room adjoining on the ground-floor. The principal library is on the first floor, over the latter. The position of the other of the remaining rooms could hardly be made clear without the aid of plans.

The entrance-hall is fifteen feet long and forty feet wide, and has borders and decorations of Italian tiles. There are eight busts in it. Three are by Nollekens, viz, the Duke of Bedford, Charles James Fox and the third Lord Holland; one, by Rysbraeck, of the Duke of Cumberland; one, by Chantrey, of Hookham Frere; one, by Prosperi, of the Duke of York; and the Napoleon and Henri Quatre are by unknown artists. The "smoking-room" adjoining on the ground-floor is now occupied by presses containing manuscripts and other documents, with a few relics of Charles James Fox.

The hall is an important feature in Holland House, with its ceiling painted by Mr. G. F. Watts, R. A. The staircase is most elaborately carved, and on the first landing is a bronze font, cast in 1484 by Michele Garelli or Cassel, a Fleming. The "breakfast-room," which is forty feet long and twenty feet wide, is on the site of the former entrance-hall, and the porch (which is decorated with mosaics) was once a portico for sedan chairs. The walls of this room are hung with old Genoese silk and velvet brocade, and panelled with four Arazzi from the designs of François Boucher, the subjects being Bacchus with Bacchantes, Apollo and the Muses, Vulcan and Venus, and Vulcan presenting Jupiter with thunderbolts. The doorways are arched, and hung with silk held by bands of fine tapestry. The ceiling is panelled and ornamented in Elizabethan style with white and gold pendants, the cornice is uniform, an earl's coronet and the letter "H" being repeated at intervals. There are some Napoleonic relics in this room and a bust of Fox by Nollekens, but of earlier date than that in the entrance-hall. The "china-room" adjoins, and the general effect of it may be considered as something like that of an old curiosity shop, but of one in Utopia, tidy, habitable and comfortable. The walls are hung with Cordova leather, and the china is so disposed that it can easily be taken out for use, and when not used be useful for ornament.

The "map-room" is close to the china-room, and has an antique appearance, although, like all the western rooms, it is modern, being converted from housekeepers' rooms and small offices by the late Lord Holland. The "west room," into which it opens, contains portraits of Charles II and of some of the court ladies, Dryden, Sir Charles Bunbury, Madame Lebrun, Canova, etc. But probably no portraits here are of equal value to those by Mr. Watts, who has been long intimately connected with Holland House. In the picture-room, which lies on the south side of the map-room, there are also portraits by Mr. Watts of himself in armor, Guizot, Thiers, Prince Jerome Bonaparte, Countess Walewski, Countess Castiglioni, Lady Holland and the Princess Lichtenstein when a child. There are two portraits by the late C. R. Leslie, viz, Lord Holland and his daughter, Lady Lifford.

The "print-room" is rich in examples of the different schools, including Marc Antonio Raimondi's "Lucrezia"; Stefano's "Capricci" and "Reposoir"; Dürer's "Virgin with the Monkey," "Melancholy" and the "White Horse"; and a large number of Rembrandts. In the fourth west room they are, amongst other paintings, three by William Hogarth, viz, a portrait of the first Lord Holland, a view of Ranelagh and a scene from private theatricals. A receipt of Hogarth's shows the humble prices he was paid for his engravings. "The March to Finchley" cost 10*s.* 6*d.*; "Paul before Felix" and "Moses brought to Pharaoh's Daughter," 7*s.* 6*d.* each; the prints of "Cruelty" and "Beer Street" and "Gin Lane," 1*s.* 6*d.*



each; so that nine prints were sold for 34s. In the journal-room on this floor is the portrait which Mr. Watts considers to be one of his best works, that of the Princess Lieven.

The "gilt-room" is on the south side of the first floor and the original architect is supposed to have been John Thorpe, the decorator being Francis Cleyn. All the decorations and paintings have been restored by Mr. Watts's own hand, or under his superintendence. The ceiling was, according to Walpole, painted in grotesque by Cleyn, but of this nothing remains. This room, it may be said, is reported to be haunted by the ghost of the first Lord Holland, who nightly visits the scene of his former delights, carrying his head in his hand.

Behind the gilt-room is the "Sir Joshua room," which is also called the "crimson drawing-room," from the color of the silk upon the walls. Among the portraits in this room are the "Musciplua," Charles James Fox, and several other portraits of the Holland family, Baretto and the famous picture of Lady Sarah Lennox, Fox and Lady Strangeways.

But the room of all others in Holland House which has been most heard of is the library; "that venerable chamber," says Macaulay, "in which all the antique gravity of a college library was so singularly blended with all that female grace and wit could devise to embellish a drawing-room." The walls are lined with bookcases, Cordova leather, about three feet deep, running along the upper part. The cornice is of oak, illuminated in gold, blue and other tints, with monograms and coronets at intervals. The ceiling is divided into seven vaulted compartments, set in oak, with a groundwork of blue, which is relieved by gold stars, and the compartments have alternately a skylight and a chandelier. Addison's table is now in this room — the very room, it has been said, "in which Addison is described to us, pacing to and fro; tradition (perhaps exaggeration) adds with a bottle of port at one end and a bottle of sherry at the other, in which he tried to drown dull care." At the northern end of the library is the inner library, well furnished with books, and containing some valuable portraits.

HOLLAND HOUSE, SOUTH FRONT.

HOLLAND HOUSE, EAST FRONT.

TURKISH BATHS, BLACKBURN AND BOLTON, ENG. MESSRS. STONES & GRADWELL, ARCHITECTS, BLACKBURN, ENG.

WE this week give views of Turkish baths at present in course of erection, one in Richmond Terrace, Blackburn, and the other in Great Moor Street, Bolton. The front of buildings, in both cases, will be of deep red brick, with buff terra-cotta dressings, from Messrs. Clark & Rea, Wrexham, for the Blackburn building, and from Burmantofts Company, Leeds, for the Bolton one. The internal arrangements are on the most approved plan, and the various bath-rooms, hot-rooms, etc., will be fitted up in the best possible manner. Both baths are being built for limited companies.



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

#### THE DARK AGES IN BOSTON.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—In response to Mr. Warren's reference to the article which was headed "The Dark Ages in Boston," I feel that, as Mr. Warren did not entirely understand my attitude, perhaps a word of further explanation is necessary. I acknowledge it is easy to condemn and difficult to create; that there is nothing more petty than the cynic who sneers and does nothing else, nothing more contemptible than the would-be critic who cries "wolf" and contents himself with agitating his listeners. I had thought that the first paragraphs of that article had summed up the faults to be found in the examples afterwards cited. They were directed at a class of designers who, by their choice of motives, by their very use of those motives after choosing, are, to say the least, ungrammatical, and to say the worst, are doing much to vitiate what taste is inherent in the community. The bad quality of their work was not in degree but in kind—and I had intended (I evidently failed) to define the kind before I spoke of the subjects to which that definition applied. Mr. Warren wishes me, I am sure, to define what people should approve, and not only what they should not. He will find in the remainder of the article several buildings most heartily approved, and one in particular, the building on the corner of Tremont and West Streets, which has everything which the Boylston Street buildings have not. The comparison speaks louder than any definition could do. The article in question has also called forth many inquiries as to what right I have to condemn in such a wholesale manner. That right is a wholly impersonal one, and worthless and invalid, unless backed by laws of good design which

are unquestionable. My claim is that such laws exist, that they are comparatively unconsidered by the community, that they are violated constantly by the profession of architecture, but that when they are considered, they are acknowledged as of great value in the result by most persons, professional or otherwise. That those laws are primarily constructive laws, and secondarily, laws of proportion, of scale, of values of light and shade and of color, and that though they are not necessarily simple to understand, their result is always simple in effect, and that any great departure from those laws is sure to result in inferiority of design. Mr. Warren wants an exposition of those laws. I have cited examples where they have been abused—it remains to cite examples when they have obtained. No one can do that better than Mr. Warren. C. HOWARD WALKER.

#### THE VENTILATION OF RAILROAD CARS.

CAMDEN, N. J., April 6, 1891.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Can you advise me whether the exhalations from the body (the breath, sweat, etc.) are supposed to rise or fall? this without regard to the heating or the temperature of a room filled with people.

I am looking into the ventilation of railroad cars, with windows closed, by "Exhausts" in the ceiling of the car; and "Intakes," either in the sides over the windows, or (which is objectionable) in the floor.

Will the air in the lower part of the car, that is occupied by the people, be satisfactorily changed by the ample change of air in the top of the car—say there are satisfactory Intakes a foot below the ceiling in the sides of the car, and a similar quantity of Exhausts overhead in the ceiling—will this change of air overhead manifest itself below in a car?

Your ideas in reply to these two questions will much oblige,

Yours truly,

R. M. PANCOAST.

[In an unventilated room heated to about ninety degrees, the breath would neither rise nor sink, but would diffuse itself in all directions through the surrounding air. In a room at ordinary temperatures, the breath will rise, rapidly at first, and more slowly afterwards, as it loses heat, diffusing itself meanwhile in the air about it. In a small room, this movement, which is assisted by the upward flow of the air warmed by contact with the body, carries the fouler part of the air in the room to the ceiling, whence it gradually returns from the sides of the room, through the chilling which it receives by contact with the cold walls. Throughout its whole course, the foul air is continually mixing itself by diffusion with the remaining part of the atmosphere, so that the degree of foulness is only relative.

The rapid change of air in the top of a car would, we think, be advantageous, as it would remove the accumulation of hot, foul air which usually collects in the upper portion, fed by the lights, and the breaths and exhalations of the passengers, and which spreads by diffusion into the fresher atmosphere below, much to the discomfort of the occupants of the car. That it would give perfectly satisfactory ventilation we are hardly prepared to say, as it leaves the passengers with only such air to breathe as has crept in at the doors and circulated for a season among their boots, with a little aid by diffusion from the fresh supply above; but we know the great difficulty of introducing fresh air at any point where the current can strike the body, without producing unpleasant draughts, and the plan proposed would at least have some merits.—EDS. AMERICAN ARCHITECTS.]



THE SHOT-TOWER INVENTED IN SLEEP.—Before Watts had his dream, the making of shot was a slow, laborious and consequently costly process. Watts had to take great bars of lead and pound them out into sheets of a thickness nearly equal to the diameter of the shots he desired to make. He then had to cut these sheets into little cubes, place the cubes in a revolving barrel and roll the barrel around until by the constant friction the edges wore off from the little cubes and they became spheroids. Watts had often racked his brain trying to discover some better and less costly scheme, but in vain. Finally, after spending an evening with some boon companions at the ale-house, he went home and went to bed. He soon fell into a profound slumber, but the stimulants he had imbibed apparently disagreed with him, for his sleep was disturbed by unwelcome dreams. He imagined he was out again with the "boys," and that as they were stumbling homeward in the dark it began to rain shot. Beautiful globules of lead, polished and shining, fell in a torrent, and compelled him and his bibulous companions to drag their heavy limbs to a place of shelter. In the morning when Watts arose, he remembered his dream. He turned it over in his mind all day, and wondered what shape molten lead would assume in falling through the air. These thoughts tormented him so persistently that at last, to set his mind at rest, he carried a ladleful of molten lead to the top of the steeple of the Church of St. Mary of Redcliffe and dropped it into a moat below. Descending, he took from the bottom of the shallow pool several handfuls of the most perfect shot he had ever seen. Watts's fortune was made, for he had conceived the idea of the shot-tower, which ever since has been the only means employed in the manufacture of the little missiles so important in war and sport.—*Mechanical World.*

PHOTOGRAPHY IN NATURAL COLORS.—If the statements in a communication to the Académie des Sciences by M. Lippmann are substantiated, another step toward the solution of the problem of photographing objects in their natural colors have been made. M. Lippmann's method is remarkably simple, and makes use of the ordinary reagents. The

sensitive film during exposure is floated on the surface of mercury. Suppose now a ray of blue light for instance strikes the sensitive film, it will pass through, and being reflected from the surface of the mercury behind, will pass out through the film again, interfering on its way with the incident ray. When the two rays are in the same phase, their effects will be additive, and the sensitive matter in the film will be strongly acted on. At a small distance farther on the two rays will neutralize each other, so that the film is there totally unacted on. In this way the thickness of the film is divided up into layers, on which the light has acted, half a wave-length apart, and hence when fixed and dried, it may be considered as consisting of a number of thin plates, of the half the wave-length of blue light in thickness, and will, therefore, give rise to a blue color when seen by reflected light, just as the thickness of a soap-bubble gives rise to the colors seen in it. Such is a general sketch of the process as described by M. Lippmann, who adds, however, that the sensitive silver salt, iodide, bromide, or whatever else may be used, must be distributed throughout the film in an almost infinitely divided state, and in a perfectly continuous manner. The film itself must be transparent. Owing to the fact that the thickness of an ordinary film is many times the wave-length of a ray of light, the colors obtained are said to be remarkably brilliant. They are moreover perfectly fixed, and the prints have been exposed both to a powerful electric arc-light and to bright daylight without any signs of fading. It should be added that if the prints are viewed by transmitted in place of by reflected light, each color is replaced by its complementary one. — *Engineering*.

**AN EMBARGO ON WORKS OF ART.** — While Americans and Frenchmen have been competing in a friendly way to secure the monopoly of excavating the artistic productions buried in some districts of Greece, the Italian Government has been prohibiting the transportation abroad of any artistic masterpiece. The Rome correspondent of the Paris *Figaro*, recently wrote as follows on this subject:

There is much excitement among artists, purchasers of ancient paintings, antiquarians, etc. The question is rather curious and of great importance; it relates to what is called here "the Pacca edict," which is the only law of the Pontifical Government maintained by the new masters of Rome. This Pacca edict, a Draconian one, forbids the exportation from Italy of ancient masterpieces and of antiquities having an acknowledged artistic value. An example will make me better understood.

A person owns a Raphael: and, being in need of money wants to sell it, and finds a wealthy foreigner anxious to buy the painting. "Stop there," cries the Government. "That work is included in the category of those which, according to the Pacca edict, cannot be exported from Italy."

"Well, if the law gives you a preemption right, purchase that Raphael yourself, and appoint a jury which will fix its price."

"I don't ask anything better, but, at this moment, the condition of finances—"

Then, even if I am in straitened circumstances, I am compelled to keep that work, which represents an important capital, and the sale of which would put me out of embarrassment!

That's the law.

*Dura lex.* And, naturally, a great agitation is raised over a demand for the abrogation of that law, the existence of which was undoubtedly justified seventy years ago, when Cardinal Pacca published his famous edict. The Pontifical Government felt compelled then to put a stop to the really disquieting dispersion of works of art. But a few years later the exportation frenzy had ceased, and without being legally abrogated, the Pacca law had fallen into disuse. Nobody thought any more of it, but now the Italian Government has considered it necessary to put it again in operation. People are now petitioning for its abrogation, finding it annoying that the State should oppose any sale of works of art, or antiquities, in regard to which it does not intend to use its preemption right. It happens, for instance, that, among others, Prince Borghese, who has made bad speculations, cannot derive any assistance from his admirable collection of paintings and works of art of all kinds. There is certainly an abuse in that. — *New York Tribune*.

**TO COLOR BRASS-WORK.** — A beautiful violet color is imparted to brass-work by the application of chloride of antimony, says a writer in *Work*. Get the work perfectly bright and clean by the usual methods, either in a lathe or by dipping, etc.; heat it over gas-flame or spirit-lamp, so that water will steam off it but not fliz, and then apply the chloride of antimony liquor with a piece of rag or pad attached to a piece of wood; when the metal has assumed an even color, polish by rubbing with a soft cloth perfectly clean and dry, and protect with a coat of clear lacquer. Should you prefer a darker color use either of the following recipes — (1) To one part oxide of iron, or iron filings, add 1 part arsenic and 12 parts hydrochloric acid. Dissolve the oxide of iron or filings in the acid, then add the arsenic, strain, and bottle for use. (2) One pint of strong vinegar, one ounce of sal-ammoniac, one-fourth ounce arsenic, one-half ounce alum; dissolve in the vinegar, and bottle. These mixtures are to be applied in the same way as chloride of antimony, and, as you are doubtless aware, the ultimate shades may be varied by treating with various lacquers. In all cases the work should be polished with a dry cloth immediately the desired color is obtained, and in the case of the two latter recipes the work should be lacquered at once; but with the chloride of antimony this is not essential. With regard to Florentine bronze the only recipe I know of is the following: The work having been finished bright and clean is covered with a coating of copper. Now make a paste with Spanish brown 12 parts, and black lead 1 part, in hot water. Dissolve a small quantity of oxalic acid — say as much as will fit on a sixpence — to one-half a pound of other ingredients, also in hot water, and thoroughly mix the whole; thin with hot water to a workable consistence and apply with a soft brush. When dry, polish with a medium brush. This done, the work is ready for lacquering, a pale lacquer being employed.

**THE USES OF SAWDUST.** — Sawdust seems coming to the front most wonderfully in various ways. The *Brick, Tile and Potteries' Journal* says that a French writer recommends the use of sawdust in place of the hair usually mixed in mortar. He made a composition of two parts sawdust, two parts of lime, five of sand and one of cement, which he alleges is very firm and will not peel off. It also states that the Technical Royal School at Charlottenburg has been making a series of experiments with sawdust, and has now proved that it can be used as building material. The sawdust is mixed with certain refuse mineral products, and compressed with a pressure of 1,500,000 kilogs, to the quadrameter into the form of bricks, and, after this treatment, the sawdust forms excellent building material, very light, impervious to wet and utterly unflammable. A slab of this substance was placed for five hours in a coal fire, and came out of the test intact.

**SULPHUR FOR EXTINGUISHING FIRES.** — A French savant suggests a new method for extinguishing incipient fires. He says: "The most simple and efficient of all substances for fire extinguishment is sulphur. This, by heat, absorbs oxygen and forms sulphurous acid, the fumes of which are much heavier than the air. The quantity required would be small, since 70 grammes of sulphur can make 100 cubic metres of air unsuited to aid combustion. Besides sulphur, which gives every satisfaction, both in its effects and from its low cost, we find a similar property in another active and cheap substance, ammonia. An automatic sulphur-extinguishing apparatus can be made of various forms. One consists of a large sheet-iron box of moderate depth and open at the top, hinged at one end or side to a protected ceiling and kept close up thereto by a cord or wire connected with a wire or strip, formed chiefly of cadmium, fusing at 144 degrees F. Inside the box is to be placed a considerable quantity of cotton wadding containing much powdered sulphur. On the heat of an incipient fire melting the wire or strip the box drops a short distance, a simple device at the same moment ignites the cotton wadding and a strong cloud of sulphurous acid gas is instantly evolved, extinguishing the fire by rendering the air unfit for combustion. — *Invention*."

[It would probably cost a fireman his life to enter a building after this apparatus had done its work.]

## TRADE SURVEYS

The volume of business being transacted throughout the country is about ten per cent below that of last year at this time, according to bank clearings. The total clearings for three months, so far as reported, show a decline of about nine per cent. Just at present, there are no indications of an immediate improvement. Business men are finding explanations for the dulness, which, while they may explain, are not at all satisfactory. Prices are still weak, and in some quarters there is a feeling that they will decline still further. Fortunately, labor agitations are not seriously threatened; rates of wages are becoming more fixed and stable in the various industries; grievances, as they are termed, are being quietly adjusted. Meanwhile, manufacturers of all kinds are quietly strengthening their organizations, and are acting more in harmony than ever. In addition to this, there is a stronger disposition among employers generally to render justice to employés, and to recognize many of the demands in advance, which in years past has been the beginning of bitter and frequently fruitless agitations. Of course, business men generally are anticipating an early and a general improvement. If called upon to give reasons for their faith, they would be unable to do so, excepting in a general way. The country has been expanding for years, they would answer, and an expansion must continue. They overlook certain influences which may or might postpone a general improvement for a long time. Reactionary periods have occurred, and may occur again; between 1873 and 1878 but little progress was made. The country was paying debts contracted by previous mistakes. The experience learned then has been since applied, and evils have been avoided that might have poisoned the blood of the body politic. It must be kept in mind that there are still dangers to be encountered. The farming organizations protest against some existing conditions, and policies have been commented upon very widely, but no effort is being made by either of the great political parties to place themselves either in harmony or in direct antagonism to this useful body of producers. One party cannot do so, and the other is unwilling. Business men recognize the possibility of a troublesome outcome if the agricultural classes succeed in upsetting both political parties, which is the programme in hand, if there is any. Constant interference of legislation with economic policies, with financial policies and with the general conduct of the Government is more or less hurtful, and would be especially hurtful if of a violently revolutionary character. Such a revolution is threatened. Financial men dread it the most. Manufacturers think they can survive, no matter what happens. People need machinery and supplies, and will have them. It is to be regretted that fundamental principles which affect the business interests cannot be established. Perhaps more account is taken of these agitations than they merit. Despite these constant agitations, the country has made rapid and wonderful progress. Our latest information from Southern points is that the spirit of investment has not been checked, excepting so far as railroad-building is concerned, in the Southern States. There has been an increase in new enterprises. In the lumber regions of the Northwest the winter has been one of great activity, and of good authority it is learned that a larger supply of logs is now waiting demand than has ever been furnished. The furniture manufacturers of the country are also armed to the teeth, so to speak, with material and with equipments for a busy year. Wagon and carriage makers are looking forward to an excellent season. Notwithstanding cereal products have not brought high prices, the farmers are getting ready to farm more and buy what they need. Railroad managers, while not extending their mileage, are putting existing mileage into better condition. Electricians report a heavier demand for their services and their equipments, and the large establishments are all now working to the limit of their capacity. The iron trade is still in a dragging and unsatisfactory condition. Textile interests report a favorable distribution of products. Hardware manufacturers have no complaint to make, excepting that competition is keeping prices rather low.



THE HISTORY OF THE UNITED STATES OF AMERICA





# General Report of the Board of Directors

for the year ending December 31, 1875

Presented to the Annual Meeting of the Board of Directors

held at the City of New York, on the 15th day of January, 1876

By the Board of Directors

of the

City of New York

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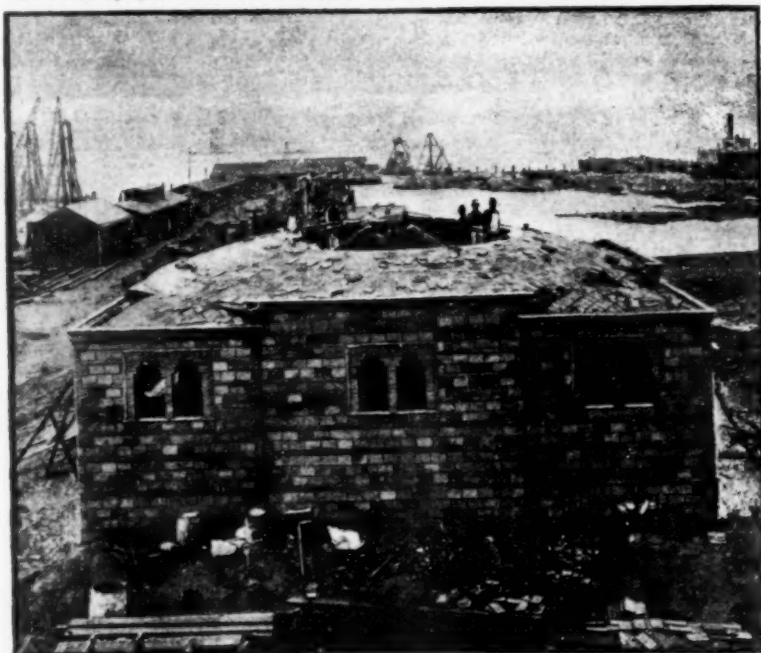
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By the Board of Directors

## Guastavino Fireproof Construction Co.

MAIN OFFICE, 57TH STREET, NEAR 11TH AVENUE, NEW YORK.

BOSTON, MASS.,  
PIERCE BUILDING, BACK BAY,  
TELEPHONE CALLPROVIDENCE, R. I.,  
SWARTS BUILDING, ROOM 42CHICAGO, ILL.,  
PHENIX BUILDING.MILWAUKEE, WIS.,  
NEW INSURANCE BUILDING.

Buildings completed or in process of construction, in which the Guastavino Fireproof Construction Company or R. Guastavino has obtained contracts, and put in Fireproofing.

## NEW YORK.

|                                           |   |   |   |   |                |
|-------------------------------------------|---|---|---|---|----------------|
| Edison Electric Illuminating Co. Building | - | - | - | - | New York.      |
| Sun Fire Company Building                 | - | - | - | - | "              |
| Corbin Building                           | - | - | - | - | "              |
| Lyons Building, Bleecker Street           | - | - | - | - | "              |
| Mt. Sinai Hospital                        | - | - | - | - | "              |
| Music Hall                                | - | - | - | - | "              |
| Arion Club                                | - | - | - | - | "              |
| Sidenberg Building                        | - | - | - | - | "              |
| Plaza Hotel                               | - | - | - | - | "              |
| Young Woman's Christian Ass'n Building    | - | - | - | - | "              |
| " " " " " " " " " " " "                   | - | - | - | - | "              |
| Manhattan Brass Foundry                   | - | - | - | - | "              |
| " " " " " " " " " " " "                   | - | - | - | - | "              |
| Lyons Building, Mercer Street             | - | - | - | - | "              |
| " " " " " " " " " " " "                   | - | - | - | - | "              |
| Lion Brewery                              | - | - | - | - | "              |
| Matthiessen Vaults                        | - | - | - | - | Woodlawn.      |
| Hammerstein Harlem Opera House            | - | - | - | - | New York.      |
| Fish Building                             | - | - | - | - | "              |
| Montauk Club                              | - | - | - | - | Brooklyn.      |
| Bloomingdale Building                     | - | - | - | - | New York.      |
| LaConcha Baths                            | - | - | - | - | Syracuse.      |
| Norton Building                           | - | - | - | - | New York.      |
| Atlantic Brewery                          | - | - | - | - | Staten Island. |
| Boston New Public Library                 | - | - | - | - | Boston.        |
| American Legion of Honor Building         | - | - | - | - | "              |
| Exeter Chambers                           | - | - | - | - | "              |
| Graffam Building                          | - | - | - | - | "              |
| Boston Gas Light Company Building         | - | - | - | - | "              |
| Bay State Gas Company Building            | - | - | - | - | "              |
| Harcourt Building                         | - | - | - | - | "              |
| Cox Stable                                | - | - | - | - | Brookline.     |
| Savage Building                           | - | - | - | - | Boston.        |
| Massachusetts State House Extension       | - | - | - | - | "              |
| Colorado Telephone Co's Building          | - | - | - | - | Denver.        |
| Denver Athletic Club                      | - | - | - | - | "              |
| Dover City Hall                           | - | - | - | - | Dover.         |
| Hitchcock Memorial Hospital               | - | - | - | - | Hanover.       |
| Philadelphia Market                       | - | - | - | - | Philadelphia.  |
| Morgan Stables                            | - | - | - | - | Newport.       |
| W. Fellows' Residence                     | - | - | - | - | Montclair.     |

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The above list will show the increase of their business and general facilities.



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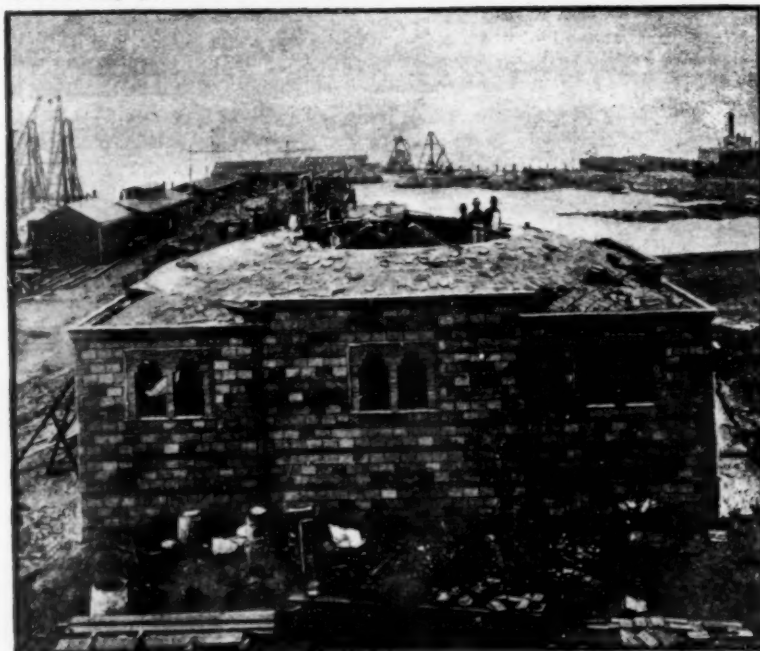
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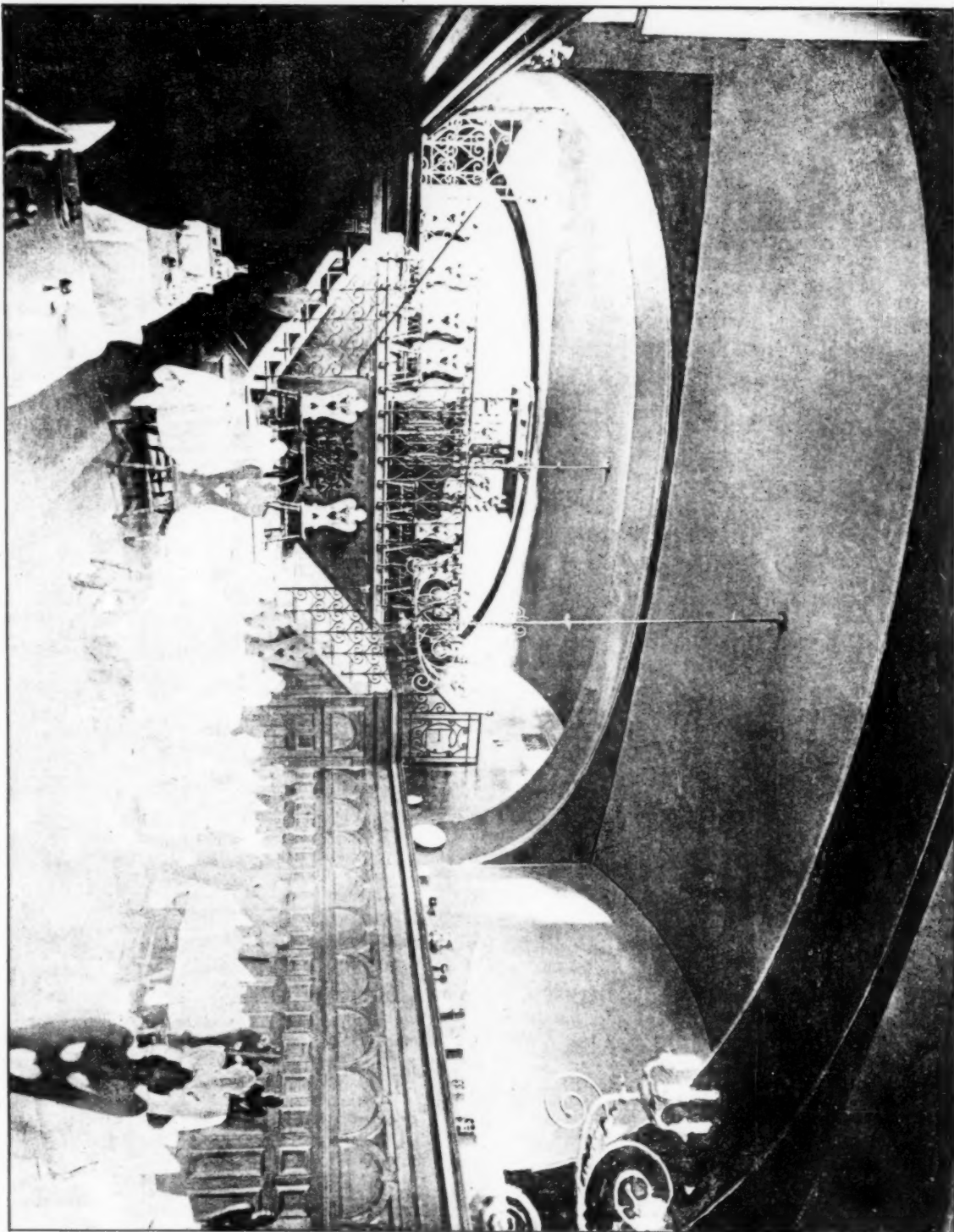


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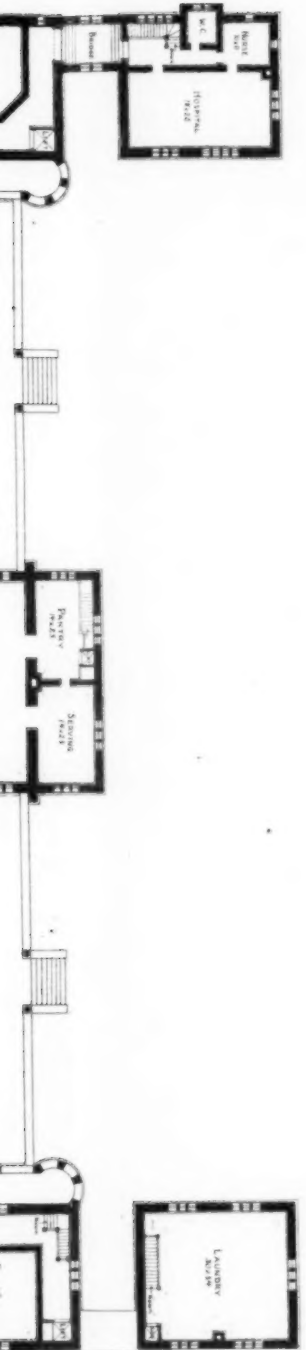
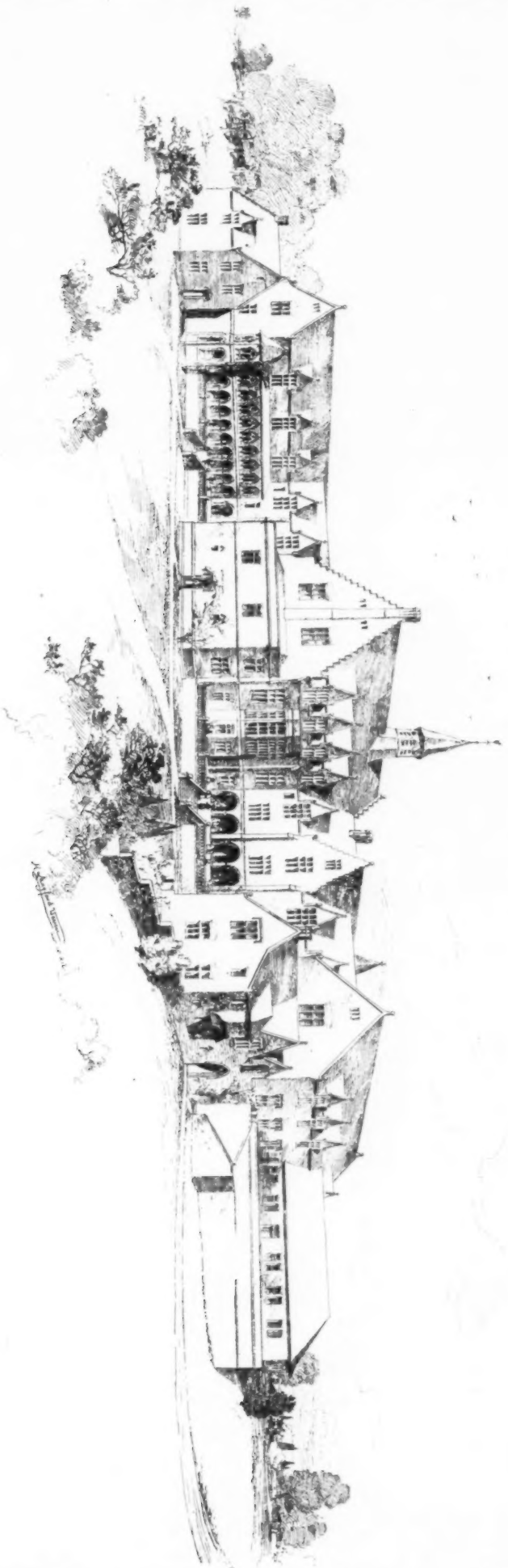
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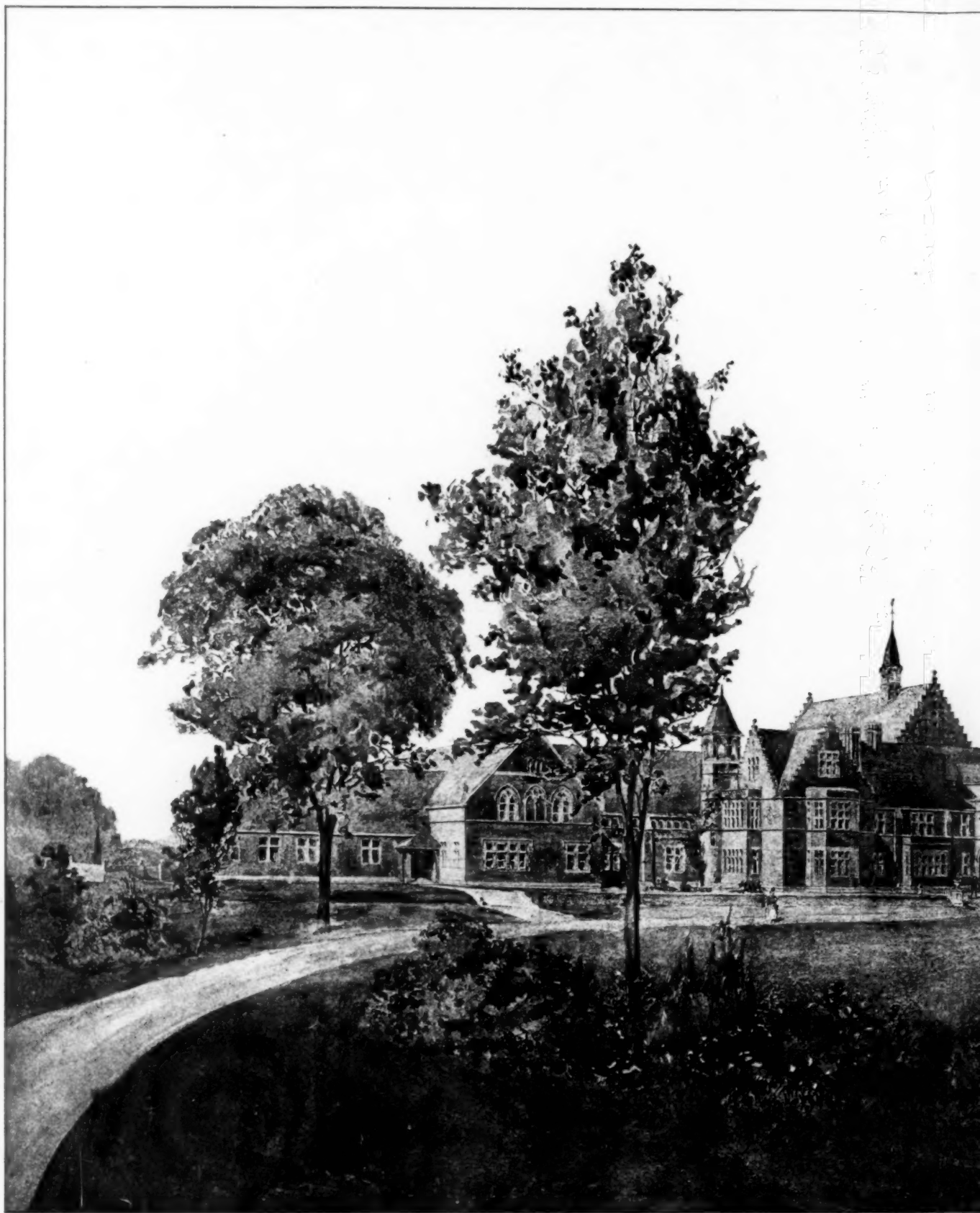
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