THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVIII SATURDAY, NOVEMBER 29, 1902 No. 1405

CONTENTS.

TRADES-UNION matters are exciting, just now, a public attention which promises well for the future. In this country, publicity is the great purifier of politics, business and social relations generally, and the more frankly and thoroughly the interests of capital and labor are discussed, the sooner a healthy and intelligent public sentiment in regard to them will take the place of the atmosphere of lying, bullying and hypocrisy by which they have been so long obscured. The relations of the coal operators and their men, which are now under searching investigation, afford a lesson of which the public has begun to understand the importance, and it must be confessed that, so far, the operators have not gained much sympathy, and, for them, the loss of the credit which the public was once ready to concede to them is a misfortune, from the effects of which they will not soon recover. Their claim, that thousands of men were ready and anxious to work in the mines during the strike, but were prevented by fear of violence, does not seem to be substantiated. Undoubtedly, the disgraceful Pennsylvania statute, requiring miners to be licensed, kept away a great many men who would have been glad of the work; but the fact appears to be that, notwithstanding the assertions of the operators, a general feeling of dissatisfaction on the part of the miners with their wages, their treatment, and the conditions of their labor, had a great deal more to do with the strike than the operators would have us believe; and that Mr. Mitchell, instead of coercing, by his eloquence and intrigues, a hundred and forty-eight thousand prosperous and happy people into abandoning their work, did little more than put himself at the head of a movement which could not, in any case, have been long delayed.

THE singular unreasonableness of the operators in regard to the mere technicality of recognizing the Mine-Workers' Union does not add to the dignity of their position. That the Mine-Workers' Union exists is a fact beyond dispute, and to refuse to recognize facts is one of the surest indications of incapacity on the part of a business man. The operators say, we are told, that they cannot endure that men brought up in bituminous coal mines should claim to speak for anthracite workers; but if the anthracite workers choose bituminous miners to speak for them, it seems to the public not only tyrannical, but foolish, to refuse to listen to their chosen representatives. The operators say that a bituminous miner cannot possibly understand the conditions of the business of anthracite mining; but the anthracite miners would naturally instruct their representative in matters where such instruction was necessary, and the public cannot avoid the reflection that it has, for many years, been obliged to accept, as representatives of the anthracite operators, railroad presidents, who, to say the least, are not likely to know much more of anthracite mining than the bituminous workers. No one can deny that there is now, in this country, a strong tendency to consolidation, not merely of similar interests, but of those only indirectly allied. The anthracite mines are themselves mostly in the hands of railways; the great Steel Corporation makes rails, builds bridges and other structures, navigates ships, works mines, and carries on many other kinds of business; the Western packing-houses kill hogs and cattle, sell fresh beef, salt pork, sausages and beef extract, and make fancy soap, without public condemnation; yet these various industries are much more diverse than those of digging out anthracite and bituminous coal. That it may be inconvenient at times for the anthracite miners to depend, in conferences with their employers, upon men trained in another business, is quite probable, but that is a matter which, among reasonable men, would soon correct itself; and the operators, by struggling over a question purely nominal, not only discredit their intelligence as business men, to say nothing of their good faith in accepting the intervention of the President's Commission, but expose the public to great danger of the reopening of the conflict through what the miners would have reason to consider a violation of a solemn pledge.

AS usually happens, while the anthracite operators, as employers, are not exhibiting themselves to the public in a favorable light, the employed, in various parts of the country, also show signs of a disposition not yet quite regenerate. Fortunately, the antics of enthusiastic workingmen are much less to be feared than the obstinacy, unreasonableness, or cruelty of those who control great enterprises, or great masses of capital, and it is to be hoped that the display which has of late been made of the astounding tyranny and folly of certain unions may influence public opinion in such a way as to assist the respectable workingmen in taking the control of their affairs out of the hands of the reckless or corrupt schemers who now, in so many cases, manage the unions. It is quite as easy to teach workingmen as railroad presidents that all persons who use the power of combination to prevent other people from getting employment, or from procuring materials for their business, or to injure them in any way, are enemies of the community, and must be dealt with in the way that communities deal with their enemies.

IT is quite time that the reputable unions of mechanics engaged in the building trades should express themselves clearly and emphatically in regard to the blackmailing which is practised upon architects in their name. For several years men, sometimes in pairs and sometimes singly, have made the rounds of the architects' offices, at least in Boston, inviting subscriptions to what purports to be a book of some sort, to be issued under the auspices of a certain labor organization. Nearly all architects have a very friendly feeling for the skilled mechanics who help to transmute their designs into enduring materials, and, when the trick was first practised, many paid the two dollars asked for, or even more, supposing that they were contributing to the benevolent fund of a recognized union. A few weeks later, however, a second deputation presented itself, often in a condition suggesting alcoholic tonics, with another subscription-book. Those charitable architects who had already contributed to the first one were sternly told that this was a totally different affair, conducted by an organization which had nothing to do with the other, but which had it in its power to make a great deal of trouble for architects. Apparently, some of the younger members of the profession were frightened by these threats, for they have been made more openly year by year, until the blackmailers do not hesitate to tell architects who refuse to open their pocket-books that they are liable to have strikes declared against their buildings.

CONSIDERING the narrow income of most architects, and the friendly services which they are always willing to render, and do render, in multitudes of instances, to individual workmen with whom they are brought in contact, this system of compelling contributions by threats in the name of labor organizations is a pure and simple outrage. It is not likely that the working members of the unions know anything about the actions for which they are put forward as responsible; and it is not impossible that the collectors of contributions may be, at least in some cases, mere swindlers, masquerading under the guise of emissaries of labor associations; but it is significant that a motion made at a meeting of the Central Labor Union, in Boston, to investigate and suppress all attempts to collect money from architects by threats in its name, was quietly smothered, and there is reason to believe that some of the officials of the various unions and federations know more about

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the matter than they would be willing to acknowledge. However this may be, there is no doubt that the practice is one which every right-minded workingman would repudiate at once, and those who carry it on are bringing the organizations which they profess to represent into contempt among the people who have more influence than any others in the community in securing for workingmen, or, at least, for those workingmen employed in the building trades, the consideration and respect which they themselves feel for men who practise faithfully and skilfully the various arts whose difficulties they are trained to appreciate. It will be a sad day for the building trades when architects and workmen come to regard each other with suspicion and distrust; and the sooner the Federations of Labor, the Knights of Labor, the Central Labor Unions and the other influential and respected organizations of building workmen publicly denounce and repudiate those who use their names for extorting money from architects, the better it will be for the continuance of the relations between those who design and those who execute which have been for so many years pleasant and profitable to both.

THE death of Professor Ogden N. Rood, of Columbia College, has called forth some interesting expressions of gratitude from artists. Professor Rood, as every one knows, while very eminent in all departments of physical science, devoted himself at one period, with conspicuous success, to the theory of color, and published a work on the subject which has long been an authority among scientific men. It is, however, remarkable that artists, who, as a rule, consider "an eye for color" to be a heaven-sent gift, and despise scientific discussion, should have found in Professor Rood's work suggestions which they were not only willing to use, but to be grateful for. Mr. Ruskin, as will be remembered, summed up the duty of students in such matters by saying to his pupils, "Whenever any scientific man tells you that any colors are inharmonious, make a note of those colors, and put them together whenever you possibly can"; and this attitude suits many artists, and many more amateurs; but so accomplished a master of color as Mr. John La Farge is not ashamed to say that Professor Rood's writings were "a consolation to me long ago, in my attempts at disentangling what was right in my instinctive apparitions"; and other painters, little less distinguished as colorists, speak in similar terms.

MR. JULIUS F. MUNCKWITZ, for many years Supervising Architect of the Central Park, in New York, died at his home in that city a few days ago. Mr. Munckwitz was born in Leipsic, seventy-three years ago, but had spent nearly all his life in New York. From the time of the first laying-out of the Central Park he interested himself in its development, and was employed, almost from the first, in various ways in connection with this and other parks, becoming Supervising Architect and Superintendent of Parks in 1871. In that capacity he designed many of the buildings erected in the Central Park. His son, who bears the same name, some years ago succeeded him as Architect of the Park Department.

SOME student of chemistry might do worse than to undertake, perhaps as thesis work, the study of the alloys of aluminium and magnesium. All these alloys are easily made; most of them are less susceptible than pure aluminium to the action of alkaline reagents, and they are lighter than pure aluminium; while some of them have been recently reported to have shown a tensile strength greater than that of steel. If this report should be confirmed, and a compound metal could really be obtained, stronger than steel, and weighing less than one-third as much, at a cost comparable with that of pure aluminium, many industries would be revolutionized, and, above all, the art of navigating the air would receive a development such as nothing else could give it. Until now, although aluminium is a cheap and familiar material, it has not been found practicable to use it in balloons, for the reason that a greater weight of it is required, for a given strength, than of steel. M. Santos-Dumont, who has distinguished himself by his minute study of every detail of aëronautics, employs steel piano wire to suspend the cars of his balloons from the inflated portion, and steel is used in other places where tensile strength is required, while the engines and motors, which form a very large part of the load to be lifted into the air, are also of iron and brass, or copper. If an equal bulk of a metal weighing one-third as much could be substituted for these, an immense increase in power could be obtained, and it is hardly too much to say that the future of the navigation of the air depends upon the discovery of such a metal. According to the chemists, an alloy of equal parts of aluminium and magnesium is extremely brittle, but compounds containing not more than fifteen per cent of either metal are malleable.

THE recent accidents in Paris have greatly diminished the confidence and interest with which the public had begun to regard the modern advance in the art of navigating the air. According to Colonel Espitallier, however, who writes in *Le Génie Civil* as an expert familiar with the circumstances of both cases, each of the accidents was due to neglect of simple and obvious precautions. In the first case, M. Severo d'Albuquerque, a Brazilian, like M. Santos-Dumont, but, apparently, less methodical and cautious, had constructed a balloon of a somewhat novel type, propelled by means of two gas-engines. The car was suspended close under the balloon, and the two gas motors were, in consequence, brought dangerously near the atmosphere of mixed hydrogen and air which always clings to the surface of a balloon. Five years ago, a balloon in Germany, similarly constructed, took fire and exploded in the air; and Colonel Espitallier says that M. Severo should have taken warning from its example; but, instead of this, he even removed the wire-gauze casings with which the maker of the gas-engines had been prudent enough to surround their torches, and, at the same time, fastened up one of the safety-valves of the balloon. The remaining safety-valve was at the rear of the balloon, near the propeller, and almost directly above the rear gas-engine. The hydrogen which would inevitably escape from the safety-valve as soon as the balloon was exposed to the rays of the sun, or rose far enough into the air to feel the diminution of atmospheric pressure, was, therefore, likely to be churned up by the rear propeller, surrounding the end of the balloon with a large volume of an explosive mixture, close to the torch of the gas-engine. At its first trial-flight, with its owner on board, the machine behaved as, perhaps, it might have been expected to do. While it was high in air, a flash was observed at the place of the rear gas motor, followed by a second, and brighter one, as the whole mass of hydrogen in the balloon blazed up, letting the car and its occupant fall to the ground.

THE second accident, which occurred in the middle of October last, was not due to such rash neglect of ordinary precautions, but might, according to Colonel Espitallier, have been avoided by greater care and experience. A German Baron, named Bradsky, had been for two years in Paris, engaged in the construction of a navigable balloon, of a new and meritorious type. Being long and narrow, the balloon was exposed to the pitching due to the movement in it of waves of gas; and, to prevent these, it was divided into sections by silk partitions. Baron Bradsky had arranged for a trial of his invention on the morning of October 13, on the plain of Issy, which would give space for its manœuvres. Unfortunately, his confidence in the balloon was so great that he resolved to sail out to Issy from Paris in it, accompanied by M. Morin, an engineer, and an experienced aëronaut. From the very first, the balloon steered badly, and the wind, which was tolerably fresh, drove it toward the hill of Montmartre. In order to clear the lofty buildings on the hill, the aëronauts threw out so much ballast that the balloon rose high into the air. This caused the gas to expand, and a considerable quantity escaped through the safety-valve. The aëronauts then allowed more gas to escape, in order to descend again, leaving the balloon, when they had approached the surface, only partly filled. When they were within some three hundred feet of the ground, M. Morin spoke to a bystander, M. Aubert, asking him if there was an open space near, where the balloon could be brought safely to the ground. M. Aubert pointed to the village of Gonesse. The wind would not carry them in this direction, and the two aëronauts turned the rudder sharply, and quickened the speed of the screw. The sharp twist given to the balloon by this manœuvre seems to have caused a wave in the half-empty balloon, which caused the gas to accumulate at the rear end, lifting it much higher than the front. The bands and wires connecting the car with the balloon were not properly designed to resist a strain of this sort, and the front wires, on which nearly all the weight was thrown, gave way. As the car dropped, through the parting of these wires, the shock broke the next wires, and so on until the car broke entirely away from the balloon, and fell, killing both its occupants, while the main body of the balloon rose into the air, and was blown far out into the country.

THE HENNEBIQUE SYSTEM OF ARMORED-CONCRETE CONSTRUCTION.[1] — I.

IRON and steel have been used in the construction of railroads, steamships, bridges, office-buildings of stupendous heights, factories, exhibition-palaces, markets, theatres, apartment-houses, grain-elevators, water-towers, stand-pipes, smoke-stacks, and water-mains of hundreds of miles in length. Even churches have been built entirely of iron. It is due to the triumph of iron and steel engineering in the latter half of the past century that our profession is recognized to-day as one of the most honored of human vocations.

I ask, is steel really the most suitable material for all these purposes? Is the engineer (who is defined as a person employing the resources of nature with the least amount of human labor to the benefit of mankind) right in using steel only as the skeleton of his constructions? The universal reign of steel is irrevocably past, and we are returning with rapid strides to the old, time-honored masonry construction.

Not to brick or stone work, but to an artificial stone, *i. e.*, concrete, strengthened by steel. This composite material is variously called concrete-steel, ferro-concrete, or armored concrete. Concrete itself is not a new building material. Vitruvius Pollio, the famous writer on architecture and engineering, who lived in the beginning of our era, describes it as one of the most valuable building-materials,

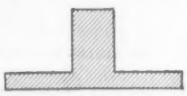


Fig. 3.

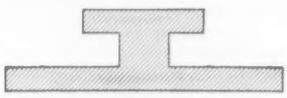


Fig. 4.

and as one which, centuries before his time, had been used for foundations, for walls and in all structures where great strength was required. The great dome of the Pantheon, in Rome, 142 feet in diameter, was built entirely of concrete, and it stands to-day, having braved the destructive influences of nature for nearly two thousand years. In the House of the Vestals, an upper floor of 20 feet span was a simple slab of concrete 14 inches thick. Even in Mexico there are buildings, the remains of an unknown civilization, which have concrete foundations, and in the Italian colonies of Magna Græcia, there is evidence that the ancient Greeks knew what concrete was and how to apply it. The walls of Reading Abbey, in England, were apparently faced with square blocks of stone on both sides, and the core and backing were made of concrete, with the result that, although the stone appears to have perished, the concrete, which was intended to play a secondary part, still remains.

At Badajos, in Spain, the walls of the castle and fortifications still show the marks of the boards used for the moulds. In all parts of the world there is evidence that concrete, as a building-material, was well known and largely used many hundred years since, long before the general introduction of steel and other artificial substances, now recognized as legitimate materials of construction. As Portland-cement was unknown eighty years ago, all the concretes named had lime for their cementitious constituent; but the excellent quality of the lime, and the apparent care and knowledge applied in the selection of the component parts, resulted in the construction of buildings superior in strength and durability to any of modern erection, sky-scrapers not excepted.

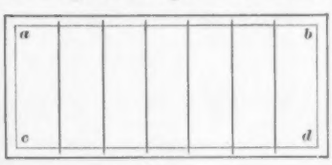


Fig. 8.

The use of concrete alone, however, is confined to that limited number of cases where economy in time and labor does not enter into consideration. This is because concrete has a comparatively high compressive strength, but a very low tenacity, thus forming, like cast-iron, a very uneconomical material of construction. To illustrate this point further, let us consider a concrete beam, *A B* (Fig. 1), of rectangular section, supported at the ends and loaded. The beam will deflect, the upper fibres will be in compression, the lower fibres in tension. The greatest stresses occur in the extreme fibres at top and bottom and are of the same magnitude. The nearer we come to the centre of the beam, called the neutral axis, the less will be the stresses. Their distribution in any section of the beam is graphically represented by the diagram *a a′ n b b′*. The greater the load the greater will be the extreme fibre stresses, and, in increasing the load, we reach a point where the ultimate tensile strength is reached and the beam fails. It fails because the lower part of it, which is in tension, is destroyed, while the upper part is strained to only from one-tenth to one-twentieth of its ultimate strength, concrete having a tenacity of about 200 to 250 pounds per square inch and a compressive strength of 2,000 to 3,000 pounds per square inch after two months, which might increase to 5,000 pounds after two years. This unfortunate property of concrete can easily be remedied by embedding steel rods where tensile stresses might occur. This expedient, however, is not new. Monier, a Frenchman, as early as 1876, took out his first patent on concrete-steel construction, and thousands of water-tanks, sewers and water-mains were built of concrete armored with wire nets, and a new field and new possibilities were opened, which will soon revolutionize our building-practice.

Fig. 1.

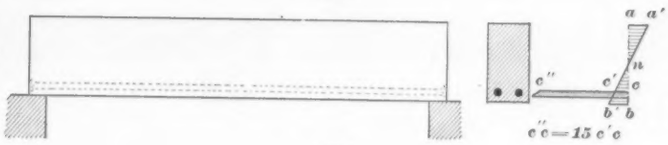


Fig. 2.

All rational combinations of concrete and steel are based on the following facts: —

First. — The coefficients of expansion of concrete and of steel are practically equal, as many scientists of Europe and America have demonstrated.

Second. — A perfect bond exists between concrete and steel. Their adherence has been determined by different authorities, and found to be 570 to 650 pounds per square inch.[2]

Third. — The concrete fully protects the iron against corrosion.[3]

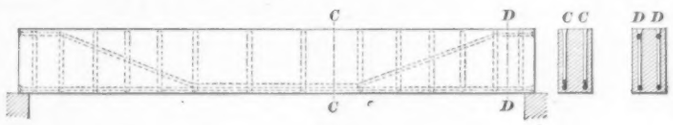


Fig. 5.

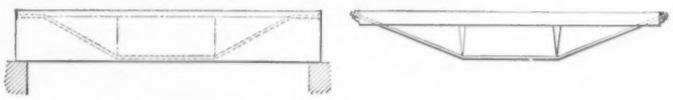


Fig. 6.

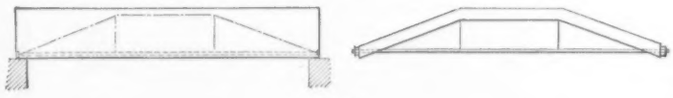


Fig. 7.

We know, besides, that iron nails were preserved by the mortar of Roman walls for 2,000 years, and in view of this fact can we doubt the preservative efficiency of our first-class Portland-cements?

Fourth. — The ratio of the moduli of elasticity of concrete and steel is as 1 : 15. In other words, if two fibres of concrete and of steel, respectively, of the same length, be subjected to equal elongations, their stresses will be in the ratio of 1 : 15.

Let us now revert to our concrete beam, embed steel rods in the lower part and apply our loads. The beam will again deflect, the upper fibres will be in compression and the lower fibres in

[1] A paper by Mr. Leopold Mensch, C. E., read at a meeting of the Civil Engineers' Club of Cleveland, and printed in the *Journal* of the Association of Engineering Societies.

[2] It may be interesting to know what the length of an iron rod, embedded in concrete, must be in order that it may fail by tension before rupturing the bond. If we assume the ultimate tensile strength of iron to be 57,000 pounds per square inch, we have the force required for breaking the rod bodily $= 57{,}000 \frac{\pi d^2}{4}$; for breaking the bond the force required $= l\, d\, \pi \times 570$; $l\, d\, \pi$ being = area of surface in contact. Equating these two expressions, we get, as minimum length, $l = 25\, d$. Thus, if a bar of round iron has a length of more than twenty-five times its diameter, it will break before it can separate from the concrete.

[3] An experience of 2,500 years has proved that concrete is absolutely indestructible, that it resists the disintegrating effects of air, moisture, water and steam, even of sea-water and of sulphuric and chlorine gases; and that, if the metal embedded in concrete were not thus protected by the latter, concrete-steel structures would be impracticable. Happily, however, wherever such work has been taken up after years of exposure, the steel has been found free from any trace of oxidation. To remove any possible doubt, Mr. Hennebique resolved to urge upon the city authorities of Grenoble, France, an official investigation into the preservation of steel in concrete. In that city a water-main, constructed on the Monier system, of 12 inches internal diameter and $1\frac{5}{8}$ inches thickness, laid in 1886, had borne, for fifteen years, a head of 75 feet of water. The sections of the pipe were 6 feet 3 inches long, and the iron skeleton was formed by thirty longitudinal rods, $\frac{1}{4}$ inch in diameter, one interior spiral of 5-32-inch wire and one exterior spiral of $\frac{1}{4}$-inch wire.

On February 2, 1901, 16 feet of this conduit were taken up. The tubes were found in a perfect state of preservation; the steel did not show the slightest trace of oxidation; the adhesion of the steel to the concrete, despite the slight thickness of the pipes, was such that it could be separated only by heavy blows from a sledge-hammer.

tension; but the diagram of stresses, which in Figure 1 was represented by $a\,a'\,n\,b\,b'$, is now distorted by the new stresses which are produced in the steel rods, forming the diagram $a\,a'\,n\,b\,b'\,c'\,c''$ (Fig. 2). We have learned that a perfect bond exists between the steel and concrete, therefore it is evident that the extension of each steel fibre is the same as that of the adjacent concrete fibre. But, by the fact stated above, this involves stresses in the steel fibres fifteen times as great as in the adjacent concrete fibres, since these are necessarily at the same distance from the neutral axis. This has the same effect on the moment-of-resistance of the beam as if we had added to the lower part of the section an area of concrete having fifteen times the area of cross-section of the steel rods (Fig. 3). This will at once be recognized as the section which, in rational design, is given to cast-iron g rders; but the great difference is that, in our case, we get a very considerable increase in strength of section with only a very small increase in weight. The more steel we embed, the less will be the tensile stresses in the concrete itself and the greater will be the part of the tensile stresses taken by the steel. In fact, in all rational designs the resistance of the concrete to tension is entirely disregarded.

Fig. 9.

Fig. 10.

Fig. 11.

But we have to guard against an excess of steel. If the ideal T-section becomes excessively wide at the base, the relatively small compression-flange, formed by the concrete, has to take too large a compressive stress, and might fail by crushing. We thus see that, in a given section, there can be but one proper proportion of steel to concrete. In building-practice there are many cases where the depth of the beam is limited, and where a very high capacity is required. In such cases we can further strengthen the beam by embedding steel rods in the upper part of the section, as well as in the lower part. This gives an ideal T-section, as shown in Figure 4. It is clear that we require a less area of steel in the upper than in the lower part, and we must maintain the proper ratio between the moments-of-resistance of the top and bottom flanges. Otherwise waste of material or failure of the beam will follow.

As in any steel and wooden beam, we have also to take care of the shearing stresses. The first engineer who grasped the importance of this consideration in connection with the strength of concrete beams was M. François Hennebique, and his scientific designs have made him the most successful concrete-steel builder in Europe.

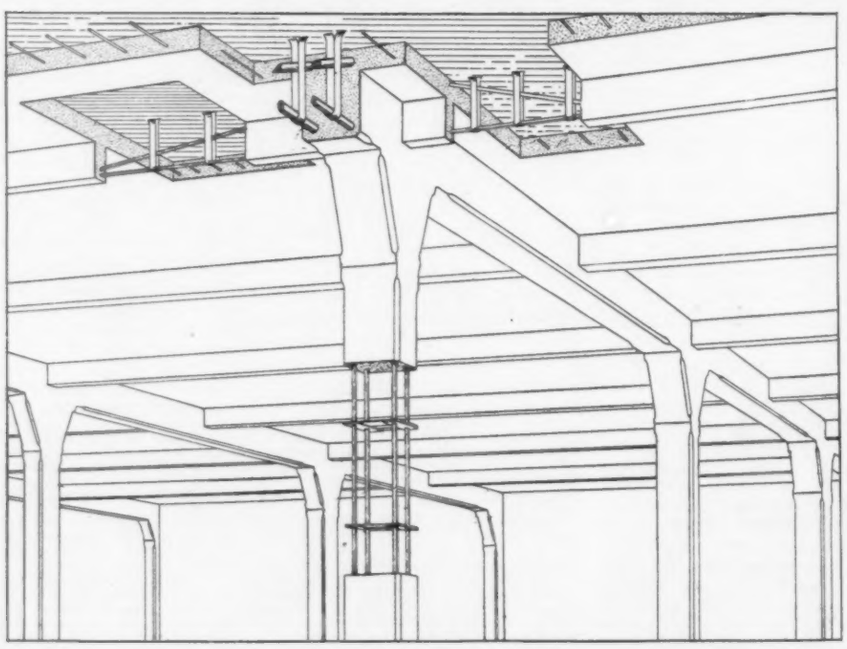


Fig. 12.

The girder (Fig. 5) which he has patented in all civilized countries of the world can hardly be improved. Its principle consists in embedding pairs of rods, in vertical planes, in the beam, one being always straight, the other bent upward near the supports, both being united by a number of bent straps, or stirrups.

The concrete, in connection with the steel rods, may be regarded as forming queen-post trusses, as shown separately in Figures 6 and 7; the place of the wood being taken by the concrete, and that of the verticals by the stirrups. These stirrups take up also the horizontal shearing-stresses, which are greatest at the ends near the neutral axis, and for this reason they are placed close together near the supports (Fig. 5).

Numerous tests, made by M. Hennebique, with girders with and without stirrups, showed the great gain in strength which results from their use.

It might be objected that we rely on the bond of the steel with the concrete; and that yet, in the most vital part of the beam, namely, in the centre, the concrete of the bottom flange will first fail when the beam is overloaded, and destroy the bond. This will surely happen; pieces of concrete may even drop out and lay the rods bare; but that is also where the real truss action of this combination commences, in which case we need the bond in the centre no longer; the steel rods will be strained in a much higher degree than before, the beam will very appreciably deflect, and at last failure of the beam will follow, either through breaking of the rods, through crushing of the concrete, or through simultaneous failure of both. But the dropping out of pieces of concrete long before half of the ultimate capacity of the beam is reached gives a timely warning, such as occurs neither with steel nor with wooden beams.

The theory of concrete-metal construction is at least as well known as that of steel beams; in fact, the successful builder in concrete-steel will guarantee his work with greater confidence than can the structural-steel works.

But economy and safety are attained only through scientific design, and the greatest calamities would follow if such structures were designed and built by so-called practical men.

One of the earliest applications of concrete-metal was in the construction of fireproof floors. Let us assume that we have to cover an area, $a\,b\,c\,d$ (Fig. 8), by a fireproof floor. In simple concrete floors we use steel beams, spaced 4 feet apart, and the whole is filled with concrete, as shown in section in Figure 9. It was soon found that these floors could carry a slightly greater load than that indicated for the beams alone, and that a more economical floor could be constructed by using T-sections instead of I-beams and placing them lower (Fig. 10). A similar floor was used in the building of the Citizens Savings and Loan Association in this city, only that T-sections of special shapes were employed. But M. Hennebique went farther. He substituted rods (Fig. 11) for the T's, a shape which is very easily procured in the market, and, especially to-day, at nearly half the cost of the T's. The girders, corresponding to

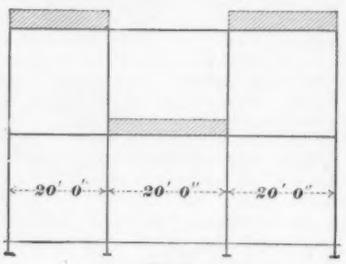
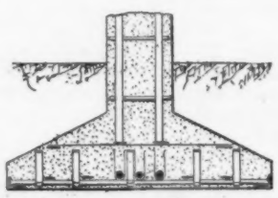


Fig. 13.



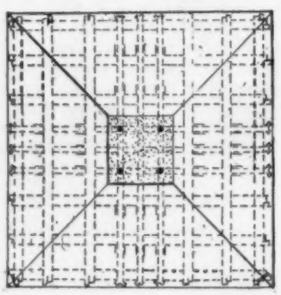


Fig. 14.

the steel beams in Figure 9, are substantially the same as shown in Figure 5. The slabs, between the girders, form a continuous beam, therefore tensile stresses are set up also above the girders. These are taken care of by horizontal rods at the bottoms of the slabs, and by bent rods approaching the top fibres over the supports. The whole floor forms the compression-flange of this composite girder, while the rods form the tension-flange; and the result is that we get a moment-of-inertia eighty to one hundred times greater than that of ordinary steel beams; and, as the ratio of the moduli of elasticity is only 1:15, we see that the Hennebique floors must be at least six times stiffer than steel girder floors.

In this connection I may cite a very interesting experiment made by the Engineering Department of the Orléans Railroad at the Austerlitz Station in Paris. A Hennebique floor, figured to carry a machinery load of 280 pounds per square foot, of a span of about 16 feet, was subjected, for a length of 17 feet, to a load of 420 pounds per square foot. The maximum deflection was $\frac{1}{8}$ inch, without any permanent set. In order to compare the resistance of this floor to shocks with that of steel-girder floors, this floor and a floor of the Quai d'Orsay station, built for the same purpose and of the same span, but consisting of I-beams and brick arches, were subjected to the blows of falling weights. The dead weight of the Hennebique floor was 60 pounds per square foot, that of the other 96 pounds per square foot. A weight of 110 pounds, falling from a height of $6\frac{1}{2}$ feet, produced, in the steel-and-brick floor, vibrations of an amplitude of $\frac{5}{32}$ inch, lasting two seconds, while a weight 220 pounds, falling from a height of 13 feet on the Hennebique floor, caused a maximum vibration of only $\frac{1}{32}$ of an inch, lasting $\frac{5}{4}$ of a second. Thus, twice the weight falling from twice the height caused only one-fifth of the deflection, with vibrations lasting only a third of the time.

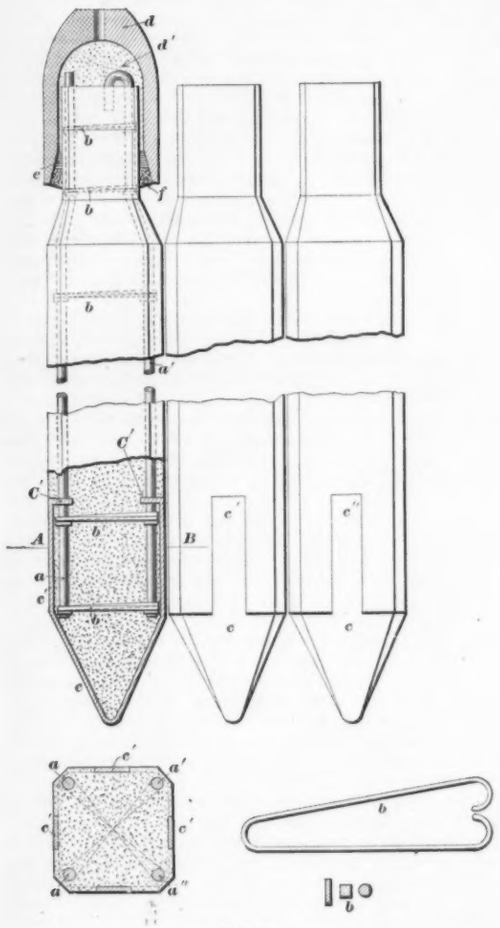


Fig. 15.

This is of enormous advantage in bridges, and especially in factory-buildings, not only because the lives of such structures are threatened by vibration, but also because freedom from vibration preserves the tools and makes better work possible.

The high price of steel, the long delays in deliveries of steel structural work, the difficulty (and often the impossibility) of securing economical sections, suggest the use of concrete-steel in the construction of wholly fireproof buildings.

Whether office-buildings, apartment-houses, residences or factories are to be built by the Hennebique system, the skeleton principle of construction is strictly followed.

If concrete walls are used they are strengthened by rods, and rarely exceed 6 inches in thickness. The columns consist of four or more rods, connected at short intervals by flat bars, and the whole is embedded in concrete. The rods (Fig. 12) are placed in the periphery only, thus giving the maximum radius of gyration and being in position to take any tensile stresses. The connections between the columns and the girders and beams are effected by ample brackets and are monolithic; and, as the floors are six times stiffer than steel-girder floors, the stresses, due to eccentric loading, are about one-sixth as great.[1] The columns can be so designed as to suit any exigency. Recesses can be formed for gas and water pipes and electric-wiring; brackets can be provided for transmission-shafts, electric travelling-cranes, etc. The diameters of these columns are only from 1 to 2 inches greater than those of steel columns without fireproofing; but for theatres and other architectural purposes they allow of a considerable reduction in width.

Hennebique columns were subjected to a severe test by the authorities of the last Paris Exhibition. The Palais de Costume was entirely built on the Hennebique system. The columns were 20 feet apart, and of such small diameter that the engineers doubted their resistance to eccentric loading, and applied a load of sand weighing 150 tons, or one and a half times the load for which the columns were calculated, in alternate panels of two stories (Fig. 13). The deflection of the columns could hardly be measured, and was a minute fraction of $\frac{1}{32}$ of an inch.

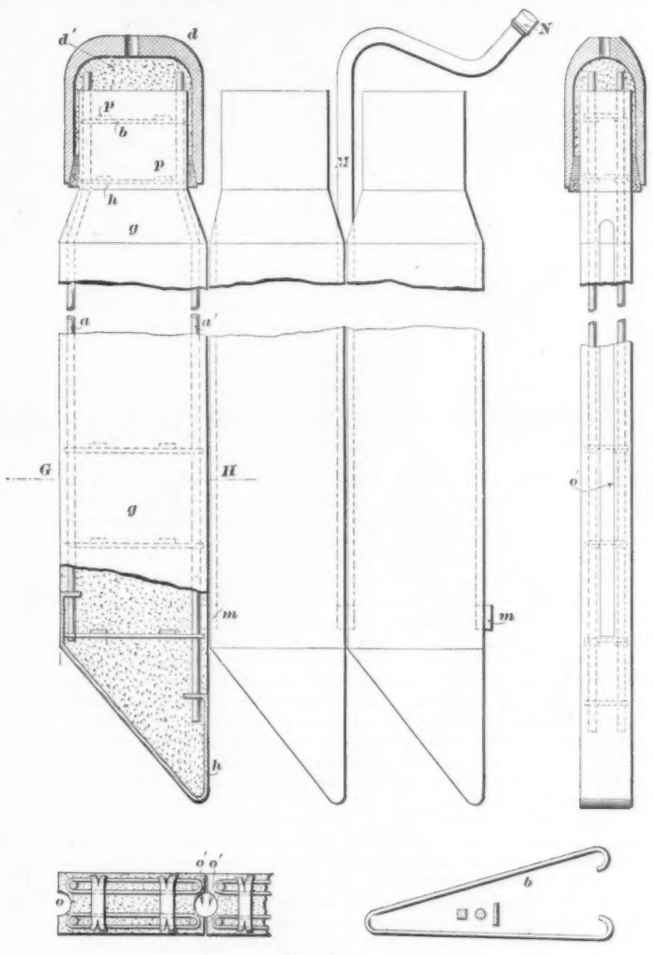


Fig 16.

A notable economy is obtained in the use of armored concrete for foundations. The ordinary methods heretofore in use can be described by saying that enormous masses of either concrete or steel beams were buried in the ground, making expensive excavations necessary, and cutting into the hard crust which generally overlies the yielding stratum. Hennebique's column-footings consist of a layer of concrete a few inches thick, in which are embedded steel rods in the two main directions (Fig. 14), and a monolithic truncated pyramid connected with the column they support. Such a footing may be considered a girder affected by uniformly distributed loads in an upward direction, and a nearly concentrated load acting downward in the centre. These forces tend to bend the pyramid in the two main directions, and this tendency is effectually resisted by the concrete in compression and by the rods in tension. The largest of these footings thus far constructed has a side of about 70 feet.

Where pile-driving is necessary concrete-steel piles are driven into the ground, and the columns are directly connected with them.

[1] See Handbook written by the author for Homan & Rodgers, London.

These piles are formed in moulds, and the concrete is strengthened by steel rods of suitable dimensions, connected at short intervals by stirrups (Fig. 15). At its lower end the pile is armed with a pointed shoe with side-plates, the ends of which are turned in, so as to lock the pile securely in place. The head of the pile is of less width than the body, allowing a clearance between the heads of two adjacent piles. In order to ensure uniform blows from the ram in the process of driving, and to prevent injury to the pile, the head is protected by a cap of cast steel and closed at its lower end by a clay ring held by a plug of hemp or spun yarn. The cap is previously filled with dried sand. A very regular cushion is thus formed on and all around the head, which cushion distributes the pressure in an absolutely uniform manner. This arrangement renders it permissible for the iron rods to project beyond the head of the pile, so that, in case of need, they may be connected with other parts of the structure or bent into hooks for convenience of handling.

The sheet-piles (Fig. 16) are strengthened by four rods, connected by wire clamps, which, in their turn, are cross-tied by flat-irons. At the lower end we have again a shoe, and the head is again of less width than the body, allowing room for the insertion of a cap. About 6 inches above the shoe on the longer of the narrow sides a projection, *m*, is formed, while the remainder of both narrow sides is grooved for the entire length. The projection on one of the piles slips into the groove of the next pile in ramming.

A special arrangement is provided to ensure the desired direction of driving. An iron pipe which fits the groove of the sheet-pile last driven, and that of the pile which is being driven, connects, by means of a hose, with a pump or water tank. This pipe serves also as guide, and the water forces out the sand which might jam the grooves, thus facilitating the driving of the pile. Once the pile is down to the desired depth, the pipe is withdrawn, cement is run between the grooves and a perfect water-tight joint and wall are established. Tongue-and-groove joints are also sometimes used.

These piles are somewhat more expensive than wooden ones, but are practically indestructible and of enormous resistance to bending. They are affected neither by the rise and fall of ground-water nor by sea-water, nor can they be attacked by teredos, which, in certain parts of the globe, destroy wooden piles in a very short time. What an ideal member in the construction of sea-walls, breakwaters, recreation piers, etc!

[To be continued.]

ROMAN AND ROMANESQUE FRANCE.[1] — IV.

ARLES.[2]

PLUTARCH, who gives a detailed account of the campaign of Marius in Gaul, 104–102 B. C., does not mention Arles; but in the "*Commentaries*" of Cæsar, and by other writers it is called a Roman colony of the Sixth Legion of Veterans; and it is probable that it was, after Narbonne, the most important place in that part of Gaul. Cæsar, during the siege of Marseilles, speaks of twelve vessels being built there (*naves longæ*) and armed ready for war in thirty days, so it must have been an important place with all the resources of a great city and shipyard. Honorius also, in a letter to Agricola, Prefect of Gaul, writes enthusiastically of the city, and of the crowds of merchants trading there; it was "the market of the world." In fact, "all the riches of the East, of fertile Africa, Arabia, Assyria, beautiful Spain and prolific Gaul . . . all send their produce . . . by sea and by land, in boats, in ships and in wagons." So, too, it was beloved of Constantine, and there his eldest son was born. It was from Arles that the Emperor started for his campaign against Maxentius, and it was during this journey to Rome that occurred the apparition of the luminous cross with the well-known legend: *In hoc signo vinces*. Moreover, the medals struck to commemorate the miracle, a hand holding a cross issuing from the clouds, had for the reverse the legend: *Aretas civitas*. After his victory over Maxentius, Constantine was baptized by Pope Sylvester, and, returning to Arles, he opened the celebrated Council in 314. It would be interesting to know where the Council was held, but history is silent upon the point. The Emperor embellished the city by erecting an Egyptian obelisk, and by decorating his palace with splendid colonnades and statues. He also constructed an aqueduct to supply the people with pure water from the mountains, and made Arles the political equal of Rome and Constantinople by establishing there the seat of the Governor of Gaul.

After the division of the Empire under Charlemagne, his son Charles became King of Arles and Provence. Charles le Chauve turned the city into a kingdom with a sovereign of its own, including Provence, Dauphiné, Orange, Bourgogne, Franche-Comté, Piémont, and Savoie as far as Genêve. For 250 years it was governed by eleven kings succeeding Bozon, and then by consuls. Troubles succeeded; during which, in the eleventh century, the great church of S. Trophime and its famous cloisters were commenced.

It is probably from this variety of ancestry, Greek, Roman, Gallic and, later on, Saracen, that the women of Arles have received their peculiar type of beauty — for there is no doubt that "*la belle Arlésienne*" is not a mere figure of speech. Their features are somewhat of the ancient Greek type — delicate straight noses, black velvety eyes, with faces of oval form. Their hair is generally dark brown, their complexions clear and pale. Some have olive complexions like the Italians — descendants, doubtless, of their Eastern ancestors. Others of Gallic origin are fair, with blue eyes and light hair. But the mass are dark-eyed with pale faces and beautifully chiselled features, holding themselves as if all the world belonged to them; grand creatures picturesquely clad, generally in black, with a *fichu* of lace over the shoulders gathered in at the waist; open necks with necklaces, and the quaint little *coiffure* on the top of a twist of hair. Such is the *belle Arlésienne* whom Bizet has immortalized; one can almost hear his music as they trip down the streets in the sunshine; and even when the icy mistral scuds round the corners like a whirlwind, they go on their way, nothing daunted, impervious alike to cold and its consequences, in spite of their uncovered necks.

Although the plain upon which the city is built is full of canals, rivers and dykes, it was far more so during the Roman period. The Rhone and the Durance spread their waters all over the country, and what are now shallow inland lagoons or marshes were then deep and navigable seas with innumerable islands. Montmajour and Les Baux, which are now hills rising from the plains, were then islands of a little archipelago; and Arles itself was connected with the sea by a series of navigable lagoons or canals.

The Amphitheatre suffered much from civic troubles. In the eighth century three square towers were erected for defensive purposes either by the Saracen Wali, of Narbonne, who obtained possession of Arles, or by Charles Martel, who expelled the Saracens in 739, the Amphitheatre itself being turned into a fortress, from which it degenerated into a small city of squalid hovels which remained until recent times. In an old print, the number of houses that were built into the colonnades may be seen, as well as several chapels; behind, to the left, is the tower of the cathedral, S. Trophime.

Arles is full of fine portals and niches at the street-corners supporting figures of saints; and considering that the Roman theatre, the Cathedral, the cloisters and the Museum all deserve the most careful study, it is somewhat amusing to read in one's guide-book that the city "may be visited in a few hours." Why, one could spend a few hours in the Museum only, filled as it is with bas-reliefs, capitals, sarcophagi, and innumerable fragments telling of Roman splendor in the old days.

An interesting, though not a very beautiful, object is the water-pipe stamped with the name of the Roman plumber — *C. Canthius Porthinus fac.*, which was discovered in the bed of the river. Many of the sarcophagi, both Pagan and Early Christian, have been brought from the Aliscamps, the ancient cemetery (*Elisii Campi*), where the empty and uncovered tombs are witnesses of pillage and desecration. A few of them are sculptured on the sides with Early Christian or Roman designs, but the mass of those bearing any artistic value have been carried off by public authorities or private individuals.

One very interesting slab in the Museum deserves some description. It is called the *Miracles*. It is divided into seven compartments by stems of trees and foliage, and where the stems divide and form a sort of arch, a bird is placed. In the central division is the "Blessed Virgin," the clumsiest of all the figures. On the right we see "The Turning of the Water into Wine," "Restoring the Blind Man's Sight," and "Curing the Lame Man." On the left: "The Miracle of the Loaves and Fishes," "Healing the Sick Woman," "Raising the Dead." In each division Our Lord is depicted as the same short-haired youth, unbearded, which is uncommon, if not unique. The costumes are Roman; also the type of features and short hair of the Apostles; two or three of the heads recall the busts of Marcus Aurelius and Pliny. The persons upon whom the miracles are performed are of diminutive size.

Of the other sarcophagus, "The Miracle of the Loaves and Fishes," it will be noted that the faces are of the same type, and that the two Apostles holding respectively the basket of bread and the dish of fish are clean shaven, as represented on the first slab. The head of Christ is of a nobler type, with long curly hair, but still clean shaven, and recalling the type we associate with the young Siegfried, Gothic or Gallic.

"The Tomb of Phædra and Hyppolitus" is of finer workmanship, probably by a Greek sculptor, not of the best period. The drapery and some of the heads are fine, but the proportions of many of the limbs are incorrect. Above this is the noble fragment of a draped figure found on the Camargue, and a headless and armless "Victory" of beautiful form.

The entrance to the cloisters of S. Trophime is an elegant pointed arch with graceful little columns of thirteenth-century workmanship. The cloisters are most ornate, and beautiful in the extreme, and are illustrative of architectural details of the twelfth to the fifteenth centuries. The older half is very rich in sculpture; on the outer face may be seen a bold specimen of dog-tooth ornament. Some of the capitals have a strong tendency towards Classical foliage. The first oratory at Arles was dedicated to S. Stephen, hence, his statue is placed by the side of that of S. Trophime, the first Bishop in an important position. The west front of the Cathedral is a very fine example of Romanesque work, and owes its exquisite state of preservation to the hard material (marble) of which it is built.

It is characteristic of the compatriots of our old friend Tartarin that every one of whom one buys photographs has "les plus belles photographies d'Arles." You assure the man in the Museum that you have seen as fine elsewhere, that you have even bought some at two or three of the various stationers. "Ah, now," he retorts, with

[1] Continued from No. 1398, page 15.

[2] In this series of papers, I have purposely tried to steer clear of repeating what has already appeared in the *American Architect* upon the subject; consequently, much that is noteworthy in all the towns of Provence has been omitted. This applies also to the illustrations.

a patronizing air, "you mistake." (Madame and Monsieur are apparently superfluities in this part of France.) "Mine is the only complete collection." Then, you go round the corner to Mademoiselle ——, and she impresses upon you with her grandest manner that hers are unrivalled. "Assuredly it would be impossible to find the like in all the city." Nor are you contradicted in the most m· assured and polite terms; the whole air of the Arlesien is: "It is a privilege to buy of me; but if you would rather not, pray do not trouble about it." Some of them have courteous manners, but their characteristic style is roughness; indeed, my only and unique experience of rudeness in France, north and south, was at Arles, where I inadvertently walked into a church, to find a workshop and its owner, who reproved me, to put it mildly, in most unmannerly language for not perceiving the board: *Defence d'entrer*. Churches usually are for the use of the public; but S. Césaire is a workshop and coach-house for hearses. Many are the desecrated churches in the dead cities of Southern France. S. BEALE.

A SEARCH FOR THE TIBER'S TREASURES.

PROF. CIRO NISPI-LANDI, the author of the latest scheme for exploring the bed of the river Tiber, is no mere "dreamer." A man of profound learning, he now holds the responsible position of inspector of the national monuments to the Italian Government, and is the author of several thoughtful works on ancient Rome. It was the Professor's historical studies and researches that inspired him with his great idea of searching the Tiber for treasures. They directed his attention first to the length of time during which Romans, rich and poor alike, cast into the slow-flowing river their most cherished possessions, and also to the period, unexampled in history, of thirty-four centuries in which the Tiber was the centre of momentous events. Professor Nispi-Landi's notions were strengthened by what he saw while in charge, several years ago, of the work of building the Tiber's embankment. The Professor noticed, as he tells me, that "whenever and wherever the Tiber was searched in the course of bridge-building or of the work on the embankment, ancient and valuable things always came to light." Generally they were valuable enough to pay the entire cost of the operations. For instance, one Italian bridge-building firm, in laying the two pillars of the Ponte Palatino, discovered antiquities to the value of several million lire. In adjusting the foundation-pillar of the Ponte Garibaldi three beautiful antique bronze statues, one of Bacchus and one of Venus, came to light, and in widening the Ponte Cestio antique jewelry, one piece of which was a wonderful gold collar of turquoise, and other valuable relics were drawn up from the depths where they had lain for years. In the course of the complete work on the embankment enough ancient works of art and other relics were discovered to stock one of the richest museums in Rome, that of the Baths of Diocletian.

"Most of the treasures," remarked the Professor, in response to one of my questions, "are certainly to be found in the most central part of the river, and have remained undiscovered for that very reason." He consented to give a hint of his plans. He has, for this purpose, divided the Tiber into "zones," or districts. They are eleven in number, No. 1 covering most of the Tiber in Rome proper, the others the course of the river outside the Eternal City. "We shall proceed," said the Professor, "by digging parallel trenches for the first zone, where the ancient source of the river is dried up, with the aid of steam-pumps, and where the Tiberine waters follow their natural course with pneumatic tanks modified and adapted to the special use of river exploration." The enterprise will be financed by Chevalier William Millar, a wealthy Anglo-Italian of Leghorn, who has implicit confidence in the savant's scheme. Just when the actual work will be begun is not yet decided. The permission of the State was given to the enterprise some time ago, but recently some "recommendations" have been made by the museum of antiquities. Compliance with them has delayed matters, and it may be some time before the delving begins in earnest.

Search in the Tiber always has been richly rewarded. The Professor goes back as far as the thirteenth century, quoting one of its historians, Falminio Vacca, who described how, a small boat having sunk near the Ponte Sublicio and several swimmers being engaged to fish it out, arrows, swords, breastplates, arms of every description, "and other beautiful objects" recognized as purely Etruscan, were discovered and brought to the surface. But, after all, it is necessary only to review one's Roman history a little to convince any one that there should be riches in the Tiber. That they were put in is certain, and Professor Nispi-Landi states that in all his research he has been unable to find any record of any large quantities of them having been taken out. The records of sacrifices to the Tibertine deity go back to the beginnings of Roman history. Even Virgil tells how Æneas promised Father Tiber that if he would protect him from peril, "Thou shalt ever be worshipped by me with homage and with gifts." The example of Æneas was followed by the generations that came after him. Sacrifices were made on the eve of great events, such as battles, during times of national peril, to make sure of having the god on the suppliant's side, during great rejoicings, and to commemorate illustrious men who had died. These were the great public sacrifices, of course, but private individuals in prosperity and grief offered personally similar sacrifices, generally the most precious things they owned. Back in the time of the Arcadians, men used to be hurled into the Tiber, but soon they were replaced by puppets and graven images, and after this the offerings of money, jewelry and precious things began.

It was not only the Romans who sacrificed to Father Tiber. The superstitions of all the Southern races seem to have been pretty much alike at this time, and whatever force was near the river made votive offerings to it. The Huns, the Goths and the Vandals all hurled a large part of the plunder derived from their sacks of Rome into the ancient stream. "Such offerings were," says Professor Nispi-Landi, "the cause which contributed chiefly and for the longest period to enrich the bed of the Tiber with precious relics." Another cause, however, was the casting into the stream by the Romans of their possessions in order to prevent their being captured by enemies. For instance, after the defeat of Maxentius Saxa by Constantine, say the records, "Not only a great number of dead and wounded men and an immense quantity of arms and valuable objects, but even the treasures of Maxentius and the military chest of his army were thrown into the river to prevent their falling into the hands of the victorious foe." To save them from the Huns, and, later on, from the French, marbles, bronzes, statues, busts and costly images enriched the Tiber. Add to all this treasure the hundreds of rich Pagan statues and temple ornaments thrown into the river by the Christians, and the property of all who conspired to bring about the assassination of Cæsar, which had a similar fate, and an idea will begin to form of the vast treasures on the Tiber's bottom.

This Italian scholar, whose works, "*Rome before Humanity*" and *M. Agrippa and his Temple*," are, by the way, well known in Italy, has not by any means contented himself with the conviction that treasures in the aggregate are below Tiber waters. He has drawn up for himself a list of individual relics of which history speaks, and has attempted to locate each in one of his "zones," according to the details which he has been able to gather as to its sacrifice. For instance, the Professor believes that the sacred candlestick of Moses, the object that he would like best of all to recover, will be found in its first zone, or in that part of the Tiber near the famous Castel Angelo, close to the Vatican and St. Peter's, probably that part of the river that most Americans have seen.

Says the Professor: "It is certain that religious objects were left untouched by the superstitious Alaric and Genseric; indeed, in 509 and 529 the candlestick was still to be seen in Rome. I regard it as certain that the emblem ordered on Mount Sinai, which stood in the Tabernacle of King David, which was carried round the walls of Jericho and was venerated by Cæsar and Pompey, was eventually lowered by the Jews down from the bow of Esculapius's ship on Tibertine Island in our first zone. The Jews themselves always have asserted that it is there. Consider that more than 1,900 years have passed since then, and that the candlestick was then about 1,550 years old, making a total of 3,448 years! What importance would its discovery have? Who should have the greatest claim to its possession? How much should be paid to the discoverers? It is not easy to answer these questions. Everything should be as wonderful as the candlestick itself."

Professor Nispi-Landi will be one of the most disappointed men in the world if he does not bring up from the Tiber's bed thousands of suits of rich armor, of swords and shields, the property of the wounded men who through custom were hurled into the river and those that fell in the fearful battles on the bridges. Among these he expects will be the armor of brave old Horatius Cocles and his men, who kept the Pons Sublicius against the Etruscan army and finally leaped into the Tiber. "There must be," he writes, "in that part of the river arms, coins, ornaments, jewels, such as buckles, collars and rings, all rare and valuable as the only relics of the Romans and Etruscans of those days." He expects to find the famous Minerva statue of Phidias, as well as those of Hercules, Mars and Venus, with the pearl of Cleopatra. He believes he will bring to light the solid gold statue of Claudius II, which once stood in the Capitol and which was thrown into the Tiber to save it from the Goths.

Probably one of the first questions that will come into the mind of any one who reads this story of Professor Nispi-Landi's great project will be: If the Tiber is so rich in treasures, why has no one tried to get them before, or at least why has no one thought of doing so? Well, for hundreds of years men of an ingenious turn of mind have been pondering upon doing and attempting to do that precise thing. For his scheme of searching the Tiber's bed, Professor Nispi-Landi claims no originality; he claims only to be the first man who has yet set doing it with the proper mechanical devices. The list of those who in modern times have attempted to make the Tiber disgorge is headed by the name of the learned Cardinal de Polignac, who planned to deviate the Tiber from its course for about two miles, and then to dig for the antiquities which he believed were discoverable. Pope Benedict XIV smiled on the Cardinal's project, but while the necessary capital was being gathered the Pope died, and his successor was dissuaded from aiding De Polignac, on the ground that the climate of Rome might be injured.

In 1773, Don Alfonzo Bruzzi undertook the exploration of the Tiber by means of a cofferdam of his own invention. The device did not come up to expectation, for the water rose and overturned it. Yet, for the short time it worked, enough was found to pay all costs and leave a profit. The scheme of Joseph Naro, in 1815, was not so successful. He, too, believed the Tiber to contain treasure, but he tried to get it by means of a kind of mud-scraper, a "grattina," as he called it, which, whenever an incumbrance was met, was planned to strap it and draw it up. Only fragments of statues, marble blocks and funeral columns were, however, brought up by the

"grattina." Garibaldi dreamed of searching the Tiber, but he, too, wished to deviate the course of the river, and this the Italian Parliament refused to allow. The most recent man of celebrity to consider exploring the Tiber was the late Prince Alexander Torlonia. He, however, wanted to keep so much of what he found that the Government refused to grant him permission to make a trial. The Prince had felt so certain of success that he offered to deposit as a guaranty for the work the sum of a million and a half of lire, $300,000.

Professor Nispi-Landi believes that he at last will succeed. He says: "I have now fulfilled all the formalities required by the Minister of Public Works, and the ministerial decree will enable us, with new means and a positive and practical prospectus, to see the great river searched at last, and the abundant riches of intrinsic and artistic value of every ancient epoch triumphantly recovered. Let only fortune smile on our enterprise and merit and riches are ours!" — *London Correspondence of the Springfield Republican.*

ILLUSTRATIONS

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

APARTMENT-HOTEL, NOS. 204–6 WEST 72D ST., NEW YORK, N. Y. MR. ELLIOTT LYNCH, ARCHITECT, NEW YORK, N. Y.

LES ALISCAMPS; — VIEW OF THE AMPHITHEATRE, ARLES, FRANCE: AFTER AN OLD PRINT.

See article on "Roman and Romanesque France" elsewhere in this issue.

DOORWAY TO THE CLOISTER OF S. TROPHIME, ARLES, FRANCE.

GATES TO THE JAMES RUSSELL LOWELL MEMORIAL PARK, CAMBRIDGE, MASS. MR. JAMES T. KELLEY, ARCHITECT, BOSTON, MASS.

[Additional illustrations in the International Edition.]

ENTRANCE TO "THE BREAKERS": ESTATE OF CORNELIUS VANDERBILT, ESQ., NEWPORT, R. I.

SARCOPHAGI IN THE MUSÉE LAPIDAIRE, ARLES, FRANCE.

ROYAL ACADEMICAL HIGH SCHOOL FOR THE ARTS OF BUILDING AND MUSIC, CHARLOTTENBURG, PRUSSIA. HERREN KAYSER & GROSZHEIM, ARCHITECTS.

These illustrations are copied from *Deutsche Bauzeitung.*

NOTES AND CLIPPINGS

Peterborough Cathedral's West Front. — The restoration of Peterborough Cathedral has been completed, the scaffolding has been removed from the west front, and "the finest portico in Europe," as Ruskin styled it, is once more revealed in all its beauty. The walls have been most effectually secured, and the gables rebuilt where necessary, the old stones being used. It is 18 years since the restoration-work was begun; it has been carried out at a cost of $400,000. — *N. Y. Evening Post.*

Right to use Flues in a Party-wall. — Between the two buildings at 853 and 851 Lafayette Avenue, Brooklyn, there is a party-wall 12 inches thick. The building at No. 853 was erected first, and the flues in it extend 2 inches beyond the centre-line of the party-wall. When the adjoining building was constructed, flues for it were provided in the wall on the other side. A Mr. McKnight, the original owner of both buildings, sold No. 853 to Simon Batt before he built No. 851. The latter building he sold to Adelaide Kelly. Her attempt to cut into the flues in the party-wall was restrained by an injunction, and the action of the Supreme Court in doing so has been upheld by the Second Appellate Division. The cutting into the flues by the defendant caused the plaintiff's house to fill with smoke. Mrs. Kelly's contention was that, inasmuch as the flues extend 2 inches into her half of the party-wall, she could lawfully connect with them. A case cited by her counsel recognizing the principle that where flues are constructed in a party-wall for the common use of the contiguous buildings and accessible to either, they may be used by either, and another case where flues were built in a party-wall for the use of both houses, cannot be used, said Justice Hirschberg, for the Appellate Court, as authority to confer an easement upon one owner to use flues designed for the other owner where independent provision has been made for the former, and the use would be detrimental to the latter's enjoyment of his unquestioned rights. — *N. Y. Times.*

Prof. McGee and the American International Archæological Commission. — Prof. J. W. McGee, of the Bureau of American Ethnology, one of the best-known scientists in the country, has been appointed by the President, through the Secretary of State, to represent the United States on the American International Archæological Commission, whose creation was recommended by the second International Conference of American States held in Mexico last winter. Each of the American Republics will appoint one or more members of the Commission, appointments to be for five years. Each Government interested will contribute to the expenses of the Commission on the same basis as that on which the Bureau of American Republics is supported. The idea of the Commission is to preserve the ruins of the principal prehistoric cities, establishing at each of them a museum to contain objects of interest found in the locality, and at such exhumed cities to establish conveniences for the visiting public. It will be the effort of the Commission to establish an American international museum in the city selected by the majority of the Republics participating in the work of the Commission which shall become the centre of all American archæological investigations and interpretations. — *Exchange.*

Right to Light and Air. — In the case of Stevens *vs.* Salomon, Justice Steckler granted an injunction restraining the defendant, who was erecting an extension to the rear of the building 19 West Forty-second Street, thereby shutting off light and air from the windows. The plaintiff was a tenant of the building before it was purchased by the defendant in August last. Salomon collected rent for September and October, and in the latter month leased the premises to plaintiff for three years and six months from November 1. Justice Steckler said in part: "When the lease was made there was no structure in the yard interfering with the light and air coming into plaintiff's rear room. Although it does not appear that the plaintiff had a right of access to the yard, the light passing into the windows from the yard was essential to the beneficial use of the premises. The evidence establishes that at the time the lease was made it was the intention of the parties that plaintiff should have such use of the premises. To the extent of the light and air coming from the yard into the rear room the plaintiff was therefore entitled to an easement in the yard, and an attempt to change the condition of affairs to her detriment may be defeated by an injunction." — *N. Y. Times.*

Taking down a Steel Chimney. — The tallest steel chimney in New York was recently torn down. The stack, which was 18 feet in circumference, consisted of thirty sections, each weighing a ton. In taking down the chimney the workmen rigged up a scaffold about 10 feet from the top. Perched upon this support, they punched out the rivets that held the adjacent sections together, and lowered the two sections, weighing two tons, by ropes connected with windlasses. The scaffold was then lowered to the next two sections, where the disjointing work was continued. The removal of the chimney was effected at a cost of about $2,000. — *Boston Transcript.*

Italian Street-boys and Architecture. — The façade of a beautiful old church in Siena has been seriously defaced by boys, who discovered that sparks were emitted when they threw stones at the marble. When some French visitors protested last winter to the guardians of the church, it was said that the sport could not be interfered with, because for generations the boys of the town had been accustomed to amuse themselves at night in this manner. Three of the ancient windows in the Church of St. Etienne du Mont in Paris have been broken by boys throwing stones at them. — *N. Y. Evening Post.*

The Ephesian Finds. — "The more important 'finds' made by the Austrian archæologists in Ephesus," says the *Athenæum*, "are temporarily lodged for exhibition in the 'Tempel' of the Vienna Volksgarten. The latest of these is a rediscovered masterpiece of Greek sculpture which originally stood in the splendid market-place of Ephesus. It represents a boy of two or three years old, sitting upon the ground and holding a duck with his left hand, and is supposed to have been a companion work to the 'Boy with the Goose,' by the sculptor Boëthus of Chalcedon, which was praised by Cicero and Pliny, but is only known through later copies."

Success of the Turin Exhibition. — The London *Times* correspondent at Rome says that the exhibition of modern decorative art at Turin closed November 15. The financial and artistic success of the exhibition, the correspondent observes, may be said to prove that what is known as the "new art" has taken firm root, and, having shaken off the grotesque and fantastic excrescences which marred its inception, is developing along lines assuring a future industrially successful and æsthetically wholesome. Incidentally, says the correspondent, the exhibition raises the question whether one of the effects of the huge modern fortunes may not be to create, especially in the United States, conditions under which masterpieces equal to the classic models may again be produced.

Bronze Household Gods of the Jews. — The Musée Guimet, in Paris, the great storehouse of materials for the study of the history of religions, has received from the traveller Dinghello, now engaged in archæological work in Palestine, a number of recently discovered bronze images which, no doubt, are specimens of the household gods of the Jews so often mentioned in the Old Testament, but of which none had ever before been found. They show undoubted Semitic features. There are a Baal and an Astarte with plaited hair, the latter with a crown. The height of these images is 37 centimetres. — *Exchange.*

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

THE AMERICAN ARCHITECT AND BUILDING NEWS

A WEEKLY JOURNAL OF CONSTRUCTIVE AND DECORATIVE ART

VOL. LXXVIII.—No. 1405.] SATURDAY, NOVEMBER 29, 1902. PRICE, { INTERNATIONAL ISSUE, 50 CTS / REGULAR " 15 "

Topographical Index of Advertisers.

[*For pagination, see Alphabetical Index on Cover* 2.]

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[PUBLISHED SATURDAY, NOVEMBER 15]

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IS PUBLISHED EVERY SATURDAY BY

The American Architect and Building News Co.,

211 Tremont St., Boston, Mass.

Advance Subscription Rates:

Regular Edition, $6.00 per year; six months, $ 3.50

[Foreign Postage, $2.00 Extra.]

International Edition, per year in advance, 16.00
" quarterly " 18.00

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

Address all business correspondence to the publishers direct.

Advertising Agents:

New York City:—
H. M. Carleton, Temple Court, 5 Beekman St.

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

BUILDING INTELLIGENCE.

(Reported for the American Architect and Building News.)

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

ADVANCE RUMORS.

Albia, Ia.—Plans and specifications have been prepared by G. O. Garnsey, Chicago, Ill., for a handsome opera-house to be constructed here, 56′ x 110′, seating capacity 800, and is to be built of pressed brick and stone. The interior will be finished in hardwood, heated by steam; cost, about $30,000.

Allegheny, Pa.—It is stated that the congregation of the Central Presbyterian Church will erect a $30,000 edifice.

Athens, O.—Plans have been drawn by Holmboe & Lafferty, of Clarksburg, W. Va., for a business block to be erected for C. H. Grosvenor and E. J. Jones; cost, $800,000.

Atlanta, Ga.—It is reported that George Foster Peabody has offered to present to the State University a new library, to cost not less than $50,000, providing the Legislature will appropriate to the University for maintenance the sum of $10,000 a year for two years, and enough money to construct an annex to the old library.

BUILDING INTELLIGENCE.

(*Advance Rumors Continued.*)

Baltimore, Md.—The Provident Savings Bank will erect a fine central building at the southwest corner of Howard and Saratoga Sts., as announced some time ago through the building committee and has employed Mr. Jos. Evans Sperry, an architect of this city, and Messrs. York & Sawyer, of New York, to prepare the plans. Until the plans are laid before the committee the exact character of the building will not be determined. The new structure will cost about $100,000 and will be erected on a lot 62′ x 94′.

The contract for the new pier 800 feet long, to be erected at Curtis Bay by the B. & O. R. R. has been awarded to A. R. Morrison, of Wilmington, Del., for $450,000, to be completed in 10 months.

The B. & O. R. R. has applied for a permit to erect a corrugated iron shed, 794 feet long and 138 feet wide, on its proposed import and immigrant pier at Locust Point, to cost $180,000.

Beaumont, Tex.—The citizens have voted to issue bonds to the amount of $75,000 for school and $40,000 for a city-hall, city prison and fire station.

At the recent election it was voted to issue $95,000 paving bonds, in addition to the $125,000 now being expended by the City Council in street improvements.

Boston, Mass.—It has been decided to build an extension to the club-house, now in process of erection for the Boston Tennis and Racquet Club in Boylston St., near Hereford St., the addition to front on the first named street, adjoining the main structure on the east. It will be four stories high, with a frontage of 30 feet and a depth of 56 feet and constructed

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

of the same materials as the club-house proper. Plans have been prepared by Parker & Thomas, and the contracts have been awarded to F. L. Whitcomb & Co. The estimated cost of the addition is $30,000.

The William Lawrence estate contemplates extensive changes and improvements of its property at 150 Tremont St., extending through to Mason St, an eight-story structure will replace the old. When completed the building in its entirety will be leased to a well-known business firm. It is the intention of the trustees to have the new building ready for occupancy by November, 1903.

The Beacon Hill Trust is the name of a new trust organized by Charles R. Evans and Leslie C. Wead, trustees. Title has been taken to the property formerly owned by the Woman's Club-house Corporation, situated at the corner of Beacon St. and Freeman Pl., and an office-building will be erected thereon.

Brooklyn, N. Y. — Plans for six dwelling-houses to be erected on Bay 14th St., 120 feet south of Bath Ave., have been filed by Mr. W. H. Fleming, architect and builder, of 1834 Bath Ave. The houses will be two stories high, 19′ x 35′, of brick and stone. Approximate cost, $21,000. Contracts to be let soon.

Plans having been prepared by Architect J. Kinsey, 7224 Fourteenth Ave., work is to be started at once on 6 two-story and attic brick and frame dwelling-houses, 22′ x 35′, on the north side of 73d St., by Mr. Judson Lawson, 202 W. 103d St., Manhattan, at an estimated cost of $21,000.

Buffalo, N. Y. — Carl Schmill, 97 E. Utica St., has prepared plans for a $100,000 church to be erected on Kent and Clark Sts. for the Parish of Corpus Christi.

Plans have been approved for a four-story brick apartment-house to be erected at 274 Summer St. and Ashland Ave. for Flora I. Thrale, to cost $50,000.

Centerville, Ia. — The citizens of Appanoose County have voted to erect a $75,000 court-house.

Cheyenne, Wyo. — The Rocky Mountain Bell Telephone Co. proposes to build an exchange to cost about $18,000.

Chicago, Ill. — Emil Gehrke, 145 Kinzie St., will erect an apartment building at the southeast corner of Evanston Ave. and Friar Pl. at Lake View from plans and specifications by Architect John S. Woollacott, of the Schiller Building. It will be a three-story structure, 135′ x 170′, of pressed brick and stone, to contain 24 apartments. Cost, about $75,000.

A stock company has been formed in which B. H. Barber, of Polo, and D. H. Burnham, of this city, are interested. The new company will construct the finest hotel in this city at the southwest corner of Michigan Ave. and Jackson Boulevard on the site of the Stratford Hotel. Architects D. H. Burnham & Co., of the Rookery, have been chosen to prepare plans for the new building, which will cost about $2,500,000.

The Secretary of the Treasury has awarded to John Peirce, of New York, the contract for the interior finish of the post-office, at his bid of $997,500, reserving the right to improve the finish if additional money is appropriated by Congress for that purpose.

A new hospital to be called "The Shore Inn" will be erected on Michigan Ave. and Eldredge Ct., to cost about $400,000. Dr. Franklin H. Martin and Dr. Bertram W. Sipply are among the physicians interested.

A permit has been granted to Jas. B. Waller for the erection of a three-story brick apartment-building, at 1293 Sheridan Road, to cost $47,000.

Cleveland, O. — It is stated that the Lake Shore R. R., the Pennsylvania R. R. and the Big Four R. R. will erect a union depot here at a cost of $2,000,000.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Denison, Ia. — The citizens of Crawford County are stated to have voted to erect a $75,000 court-house.

Guelph, Ont. — The contract has been awarded the Schultz Bros. Co., Brantford, for erecting the Macdonald Institute at the Agricultural College. This is one of the two buildings which are being erected from a gift of $125,000 by Sir Wm. Macdonald, of Montreal, Que.

Iola, Kan. — Architect W. A. Otis, Chicago, Ill., has prepared plans and specifications for a new church here for the Presbyterian Society. One-story structure of pressed brick and stone, to cost about $25,000.

Jersey City, N. J. — The Jarvis Terminal Cold Storage Co. will erect an eight-story fireproof building, 140′ x 150′, on Provost and 12th Sts., to cost $150,000.

Kansas City, Mo. — The Broadway Bldg. Co. is to erect at 616 to 624 Broadway a brick warehouse to cost $60,000.

The contract for a six-story building to be erected on 7th St. and Broadway has been given to G. L. Brown & Son, 221 Am. Bank Building; cost, $80,000.

The Baker-Lockwood Awning Co. is to erect an $80,000 building on 3d and Oak Sts.

The Methodist Book Concern will build a brick store at 1121 and 1123 McGee St., after plans by Shepard & Farrar, Bank of Commerce Building; cost, $15,000.

A press report states that the University Hospital is about to erect a $30,000 brick hospital at 1005 Campbell St.

Webster Davis will erect a $30,000 brick apartment-house at 1120 to 1124 Paseo St.

Laredo, Tex. — The Treasury Department has purchased a site at $11,000 for the U. S. Custom-house. Appropriation, $150,000.

Lexington, Ky. — The Upper St. Baptist Church has had plans made for erecting a $25,000 edifice.

The citizens have voted to issue $75,000 bonds for the erection of 3 schools.

Los Angeles, Cal. — It is stated that plans are about completed and contracts will soon be let, for the erection of the Santa Fe Hospital on Boyle Heights. Cost, $100,000.

Louisville, Ky. — A. E. Ferguson has taken out a permit for a $75,000 residence. Dodd & Cobb, Equitable Building, are the architects.

Manitowoc, Wis. — A resolution has been introduced in County Council providing for the erection of a court-house for Manitowoc County, to cost $100,000.

McKees Rocks, Pa. — A. M. Eilkie & Co. are stated to have secured the contract for erecting a four-story office-building, 50′ x 100′, for the Pressed Steel Car Co., to cost $100,000.

Memphis, Tenn. — Local press reports state that contracts will be let in April, by the Treasury Department, Washington, D. C., for building the $250,000 addition to the Federal Building here.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Milwaukee, Wis. — The Bd. of Aldermen has decided to erect a $75,000 school in the 1st Ward, and has recommended the issue of $150,000 bonds for a high school on the north side.

Newport News, Va. — The Eagle Shoe Co., capital $100,000, proposes to build a factory. V. M. Fleming, pres.

New York, N. Y. — The United States Realty and Construction Co. and the Lawyers' Title Insurance Co. have bought for about $2,000,000 the Trinity building, an old six-story office-building on plot 40′ x 259′ 9″ x 41′ 8″ x 264′ 4″, bounded by Broadway, Trinity churchyard, Trinity Pl. and Thames St. It is stated that the buyers intend erecting an eighteen or twenty story modern office-building.

Plans have been filed by Babb, Cook & Willard at the Bureau of Buildings, Manhattan, for a four-story and basement brick club-house, to be erected at No. 73 Cannon St., for Mrs. Potter, the wife of Bishop Potter. The club will be known as the Edward Clark Club. In the basement will be a coffee-room. On the other floors will be recreation rooms, two on a floor. There will also be a roof garden. The front will be of brick, limestone and granite. The cost is estimated at $55,000.

Plans have been prepared by John J. Deery, Betz Building, Philadelphia, Pa., for a church and rectory to be erected on 67th St. and Amsterdam Ave. for St. Matthew's R. C. Church, to cost $120,000.

A permit has been issued for a three-story brick hospital to be erected on Blackwell's Island opposite 54th St., to cost $30,000. Architects, York & Sawyer, 156 Fifth Ave.

Paola, Kan. — It is stated that the Ursuline Sisters will erect a $35,000 academy here.

Pittsburgh, Pa. — John Dimling is reported interested in the erection of a ten-story hotel on Forbes and Halket Sts., to cost about $1,500,000.

The congregation of the Holy Family R. C. Church will erect a school, at a cost of $35,000.

E. M. Butz & Co., Park Building, are reported to have prepared plans for a three-story apartment-house to be erected in St. Clair St., East End, for John C. Conley, at a cost of $30,000.

Rutland, Ill. — It is stated that plans have been prepared for a $20,000 school.

Sandusky, O. — Wm. F. Seitz, Jr., is at the head of a local company which proposes to erect a garbage disposal plant in this city, at a cost of $30,000 to $40,000. The company will be a branch of the Waste Utilization Co., of New Jersey.

San Francisco, Cal. — Salfield & Kohlberg, 339 Kearney St., have prepared plans for a seven-story hotel to be erected on Van Ness Ave. and Bush St. for Mrs. Sarah Rodgers. Cost, $150,000.

Santa Cruz, Cal. — A site is stated to have been selected for the erection of a $20,000 Carnegie Library.

Seattle, Wash. — The Board of Health recommends the construction of a crematory for the disposal of city garbage, and the proposition to issue bonds for same may be voted upon at the next special election.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

St. Louis, Mo.—The contract for erecting and completing the U. S. Government Building at the Louisiana Purchase Exposition has been awarded to W. O. & C. G. Burton, of Richmond, Va., for $268,980.

Stockton, Cal.—The Board of Education has rejected all bids for the high school as being too high, and contemplate changing plans to bring cost inside of $100,000.

Sullivan, Ill.—It is stated that a $25,000 home for Masons' widows and orphans will be erected near here.

Troy, N. Y.—Ground has been broken for a three-story brick building for the Trojan Button Fastener Co. The structure will be 25′ x 75′. The company expects to occupy the new quarters by next March, and the number of employés will be considerably increased.

Washington, D. C.—The congregation of the Foundry M. E. Church has approved the plans of Appleton P. Clark, Jr., 605 F St. N. W., for the new edifice to be erected on 16th and Madison Sts., to cost $120,000.

Westboro, Mass.—The general contract for a dining-room building and two cottages for the hospital has been awarded to Ernest T. Wilson, Natick, at $29,195, the plumbing to W. B. Frost for $1,890, and the heating contract to Laskey, Whitton & Jackson.

West Haven, Conn.—The Narrow Fabric Corporation is to move to this city from Waterbury, where it has been located a number of years. Plans have been made for the construction of a one-story brick building, 102′ x 205′. A boiler and engine house will also be erected and the plant will be equipped with electric power. The concern will employ 50 hands.

Wheeling, W. Va.—Henry Schmulbach is reported to be considering the erection of an opera-house on the site of the Musee Theatre, costing in the neighborhood of $200,000.

The Seabury Club has been organized by the men of St. Matthew's P. E. Church, with a capital stock of $150,000, and propose to erect a club-house. David W. Howard, H. C. Ogden, W. S. Brady, E. A. Hildreth, Peebles Tatum, W. A. Milligan and Wheeler Bachman are the incorporators.

Whitneyville, Me.—A local report is current to the effect that the International Paper Co. will build a large pulp-mill here on the site of the Sullivan lumber mill, which was recently destroyed by fire.

Winchester, Mass.—Work on the foundation of Winchester's $100,000 high-school building has begun. The architect is Herbert D. Hale, of Boston. Mr. H. P Cummings has the entire contract for construction, and hopes to have the building ready for the opening of the school year in 1903.

Worcester, Mass.—The directors of the City Hospital have petitioned the city council for an appropriation of $300,000 for additions to the present equipment of the hospital, including an isolation ward, a morgue and chapel, pathological, biological and chemical laboratories, kitchen building, a new power-house and a new two-story ward and out-patient building. The petition has been referred to the finance committee.

Yankton, S. D.—The citizens of Yankton County are stated to have voted to issue $40,000 bonds for a court-house.

APARTMENT-HOUSES.

Chicago, Ill.—*W. Fourteenth St., Nos.* 399-403, 3 three-st'y stores & flats, 21′ x 85′; $20,000; o., J. Linenthal, 589 S. Canal St.; a., A. L. Levy, 112 Clark St.; b., P. Quirmbach & Co., 753 W. Taylor St.

OFFICE-BUILDINGS.

New York, N. Y.—*Broadway and Duane St.*, eighteen-st'y bk. office-building, 111′ 8″ x 130′ 4″; $1,000,000; o., Barclay Realty Co., 280 Broadway; a., I. B. Colt, 287 Fourth Ave.

BUILDING INTELLIGENCE.

STABLES.

Chicago, Ill.—*Astor St., rear No.* 85, three-st'y private barn, 19′ x 35′; $6,000; o., J. T. Ryerson, 18-22 Milwaukee Ave.; a., Jarvis Hunt, Monadnock Block; b., Angus Brothers & Co., 407 Dearborn St.

WAREHOUSES.

Chicago, Ill.—*Canalport Ave., Nos.* 14-20, one & four-st'y boiler-house & storage, 48′ x 65′; 53′ x 111′; $35,000; o., P. Schoenhofen Brewing Co., Canalport Ave. & 18th St.; a., R. E. Schmidt, 172 Washington St.; b., Henry Appel & Co., 503, 172 Washington St.

PROPOSALS.

BUILDINGS.

[At New Kensington, Pa.]

The Lalor Engineering Co., 1305 Arch St., Philadelphia, has completed plans and specifications and will take sub-bids **until December 10** for a new plant to be constructed at New Kensington, Pa., for the Westmoreland Boiler Co. The plant will include a foundry, 50′ x 275′; machine-shop, 50′ x 80′; cleaning house, 30′ x 50′; boiler and engine house, 38′ x 75′; core house, 50′ x 175′, and a storehouse, 40′ x 75′. The buildings will be one-story high except the storehouse; this will be three stories high. All of the structures will be of brick and steel; estimated cost of the work, $90,000. 1405

TRESTLES.

[At Charleston, W. Va.]

U. S. Engineer Office, Wheeling, W. Va. Sealed proposals for furnishing navigation pass trestles for Dam No. 5, Kanawha River, W. Va., will be received at U. S. Engineer Office, Charleston, W. Va., **until December 12, 1902.** Information furnished on application here, or office at Charleston. W. E. CRAIGHILL, capt., engrs. 1405

PROPOSALS.

WALLS. [At Columbus, O.]

Bids will be received **December 9** by the State Bd. of Pub. Wks. for constructing concrete walls, on stone masonry, along water lines of canal between Liberty St. and Queen City Ave., and between 14th and 15th Sts. CHAS. E. PERKINS, Ch. Engr., Pub. Wks. 1405

TOPOGRAPHICAL DRAUGHTSMAN. [At New York, N. Y.]

Municipal Civil Service Commission, 61 Elm St., S. William Briscoe, Secretary. City of New York, November 19, 1902. Public notice is hereby given that an open competitive examination will be held for the following position: Topographical draughtsman (1st to 4th grades, inclusive). Thursday, December 11, 1902, at 10 A. M. ("Compensation not exceeding $1,200 per annum.") The receipt of applications for this examination will close on Friday, December 5, at 4 P. M. The scope of the examination will be as follows: —

Subjects.	Weights.
Technical knowledge	6
Experience	2
Handwriting	1
Arithmetic	1

The minimum per cent required to pass on the "technical" paper is 75. There is at present a large number of vacancies in the City departments paying $1,200 per annum. Persons who obtain a place upon the eligible list as a result of this examination are sure to receive appointment in the early part of the year 1903. Vacancies in the higher grades are filled by promotion of those persons occupying positions in the lower grades, and who have served six months in the department. Persons desiring applications and further information should communicate with the Secretary of the Commission. 1405

BOILER AND HEATING. [At Columbia, S. C.]

Sealed proposals will be received by the undersigned at Columbia, S. C., **until December 15** for a new boiler and heating apparatus for heating and ventilating the State Capitol at Columbia, S. C. Plans and specifications must accompany bid. Information as to requirements can be obtained from the undersigned. M. R. COOPER, secretary of State. 1405

PROPOSALS.

DRY DOCK. [At Manila, P. I.]

Bids are shortly to be invited by the Navy Department for the construction of a floating dry dock to be located at the Cavite naval station. The specifications have not yet been finally approved, but it is likely the dock will be similar in design although possibly a trifle shorter than the floating dock at Algiers. The contractors will be allowed a certain amount of leeway in the matter of length. 1405

STONE DORMITORY. [At Chilocco, O. T.]

Sealed proposals, endorsed "Proposals for Buildings, Chilocco, O. T.," and addressed to the commissioner of Indian Affairs, Washington, D. C., will be received at the Indian office **until 2 o'clock P. M. of Thursday, December 11, 1902,** for furnishing the necessary materials and labor required to construct and complete a stone dormitory and an addition to a dormitory, with plumbing, electric light and steam heat, at the Chilocco Indian School, O. T. For information apply to S. M. McCowan, superintendent Indian School, Chilocco, O. T. A. C. TONNER, acting commissioner. 1405

JETTY WORK. [At Galveston, Tex.]

U. S. Engineer Office, Galveston, Tex., October 10, 1902. Sealed proposals, in triplicate, for nearly $1,000,000 worth of jetty work, will be received and publicly opened as follows: For work as a whole, **until 10 A. M., December 10, 1902,** when they will be publicly sealed and kept **until 4 P. M., December 13, 1902,** and then opened. For Galveston South jetty, **until 2 P. M., December 10, 1902,** and then opened. For Galveston North jetty, **until 2 P. M., December 11, 1902,** and then opened. For Aransas Pass jetty, **until 2 P. M., December 12, 1902,** and then opened. For Brazos River jetties, **until 2 P. M., December 13, 1902,** and then opened. For information apply to C. S. RICHE, capt., engrs. 1405

STEEL WORK. [At Portsmouth, N. H.]

Sealed proposals, endorsed "Proposals for Steelwork and Skylights," will be received at the Bureau of Yards and Docks, Navy Department, Washington, **until 1 o'clock, December 27, 1902,** for furnishing and erecting certain steelwork and skylights in

(*Continued on page* xiv.)

CODE OF PRACTICE

FOR SUB-ESTIMATING AND SUB-CONTRACTING

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

ARTICLE I.

Obligation of Principal Contractor to Sub-Contractor.

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

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

* * * * * * * * * * *

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

ARTICLE II.

Award of Sub-Contracts.

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

ARTICLE III.

Penalty for not Awarding Contract to Lowest Sub-Bidder.

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

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

* * * * * * * * * * *

ARTICLE V.

Payments to Sub-Contractors.

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

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

* * * * * * * * * * *

ARTICLE VII.

Obligation of Sub-Contractor to Principal Contractor.

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

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

* * * * * * * * * * *

ARTICLE X.

Bids to Architects or Owners.

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

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

SUGGESTIONS.

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

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

A true copy.

Attest: WM. H. SAYWARD,
Secretary, M. B. A.

PROGRAMME

For a Competition for the Memorial Continental Hall

TO BE ERECTED BY

The National Society Daughters of the American Revolution,

IN THE CITY OF WASHINGTON, DISTRICT OF COLUMBIA.

In accordance with the authority given by the National Society Daughters of the American Revolution, during Annual Congresses held at Washington, D. C., Saturday, February 25th, 1899, and Saturday, February, 23d, 1901, the following Competition is announced by the Committee on Architecture, a Sub-Committee of the Continental Hall Committee.

THE BUILDING.

The plans shall be for a fire-proof structure to cost $300,000.00.

ELIGIBLE COMPETITORS.

The competition shall be limited to those who are invited or introduced to the Committee on Architecture by members of the Society.

FORM OF COMPETITION.

Two competitions will be held—an Informal or Sketch Competition (of which this is a programme), and a Formal Competition.

The object of the first competition is to choose three architects, or architectural firms, who may compete in a second and Final Competition.

Only those who have competed in the Informal Competition will be invited to compete in the Final Competition.

RIGHT TO REJECT.

The committee reserves the right to reject any or all sketches or drawings submitted.

Committee also reserves right to consider experience and general ability for design, detail and construction in executing the building.

AWARDS.

There will be no financial compensation in the first competition, but the architects chosen by the undersigned committee to compete again will receive $500.00 each for their work on the second competition. The $500.00 paid to the successful competitor to be considered as payment on account of his commission.

The architect receiving the first place in the second competition will be appointed to execute the building, and be paid for his services according to the rate established by the American Institute of Architects.

DRAWINGS SENT.

Drawings must be sent by express to Mrs. William Lindsay, D. A. R., Care Mr. Charles J. Bell, President American Security and Trust Company, Washington, D. C. None will be received in Washington later than January 25th, 1903.

JUDGES.

The first competition will be decided by the Committee on Architecture, subject to the approval of the Congress of the Society, and with the advice of an expert.

DRAWINGS UNSIGNED.

Drawings shall be unsigned, and all assumed names, devices or insignia of any description shall be omitted.

Enclosed with each set of drawings shall be a sealed envelope, containing the name of the competitor.

When the drawings are unpacked, a member of the committee will number each set of drawings; corresponding numbers will be placed on the sealed envelope containing name of competitor. These envelopes will not be opened by the jurors until after they have rendered their decision.

DRAWINGS RETURNED.

Drawings will be returned to competitors at their expense within ten days from the date of judgment.

QUESTIONS.

Any questions relative to this programme which may be raised by the competitors, may be addressed in writing to Mrs. William Lindsay, Chairman of the Committee on Architecture, D. A. R., The Osborne, 205 West 57th Street, New York City; provided these questions are submitted two weeks before close of competition.

SITE.

The property owned by the Society and upon which the building is to be erected, faces a public square; the lot is 210 feet, 9 inches, fronting on Seventeenth Street; and 161 feet, 11 inches, on C Street; and 170 feet, 10⅝ inches, on D Street. Slope of lot, North to South, fall of 4 feet, 4 inches. Elevation 14 6-10 to 19 feet above tide water. Map will be furnished to competing architects.

CHARACTER OF THE BUILDING.

It is intended that this building shall be a monument to the heroic men and women of the Revolution, as well as an administrative building for the Society, and the treatment of the design should be in keeping with this idea.

The style of architecture to be classic.

While stone is to be preferred as building material, the design should not be excessive in cost.

REQUIREMENTS.

As the space is limited, the committee does not deem it necessary in this programme for the preliminary competition, to definitely state the exact seating capacity of the Auditorium, said capacity, however, not to exceed 2,000. The Auditorium to be the main feature of the building.

Thirteen columns symbolic of the thirteen original Colonies shall also be a feature of the building.

Rooms must be provided of sufficient size for the following officers, and for the purposes designated below:

President General and one clerk.

Vice-President General in charge of Organization of Chapters and three clerks.

Recording Secretary General and three clerks.

Corresponding Secretary General and one clerk.

Registrar General and four clerks.

Treasurer General and four clerks (this room to include a steel-lined vault).

Historian General and two clerks.

Editor and Business Manager of Magazine.

A Board Room to seat eighty.

A Museum for Revolutionary relics and pictures.

A Library.

Several Committee Rooms to accommodate from five to fifty members.

A room for Curator.

The top floor for Dining and Kitchen purposes.

Arrangements shall be made for Heating, Ventilating and Lighting Plants, Cloak Rooms, Room for Janitor, Store Rooms, Elevators, Lavatories, etc.

The following drawings will be required in this Preliminary Competition:

A basement, first, second and third floor plan, and one section and two elevations, one of side façade, and one of front façade, at eighth scale, and a perspective sketch at eighth scale.

These drawings are to be made on Whatmann's paper, or white paper equally durable, with no landscape or other accessories except in the perspective sketch; all to be in black and white and to be submitted unmounted in pasteboard portfolios.

Finally, no other drawings than those required will be allowed and the committee will throw out of competition the drawings of any competitor who disregards the conditions in this programme.

(Mrs. William) Eleanor Holmes Lindsay, *Chairman.*

(Mrs. John W.) Mary Parke Foster.
(Mrs. Caleb) Elizabeth Clarke Churchman.
(Mrs. George M.) Martha L. Sternberg.
(Miss) Ella Loraine Dorsey.
(Mrs. S. V.) Eliza M. Chandler White.
(Mrs. J. Heron) Ellen Hall Crosman.
(Mrs. deB. Randolph) Jane Sumner Owen Keim.
(Mrs. A. G.) Mary Chase Mills.
(Miss) Mary Desha.
(Mrs. J. R.) Rachel H. L. Mellon.
(Mrs. R. S.) Georgia Stockton Hatcher.
(Mrs. Matthew T.) Julia G. Scott.
(Mrs. Charles H.) Frances A. M. Terry.
(Mrs.) Mary S. Lockwood.
(Mrs. Joseph D.) Althea Randolph Bedle.
(Miss) Eliza Titus Ward.

Committee on Architecture, a Sub-Committee of Continental Hall Committee, N. S. D. A. R.

Professional Ethics.

The following . . .
. . . CODE OF ETHICS . . .
Prepared in Conformity with the Best Standards of Practice, and Recommended to its Members by the Boston Society of Architects, was . . . . . .

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

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

*

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

*

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

*

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

*

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

*

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

*

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

*

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

*

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

*

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

*

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

*

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

*

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

*

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

*

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

*

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

[*See Alphabetical Index on Cover 2 for Pagination.*]

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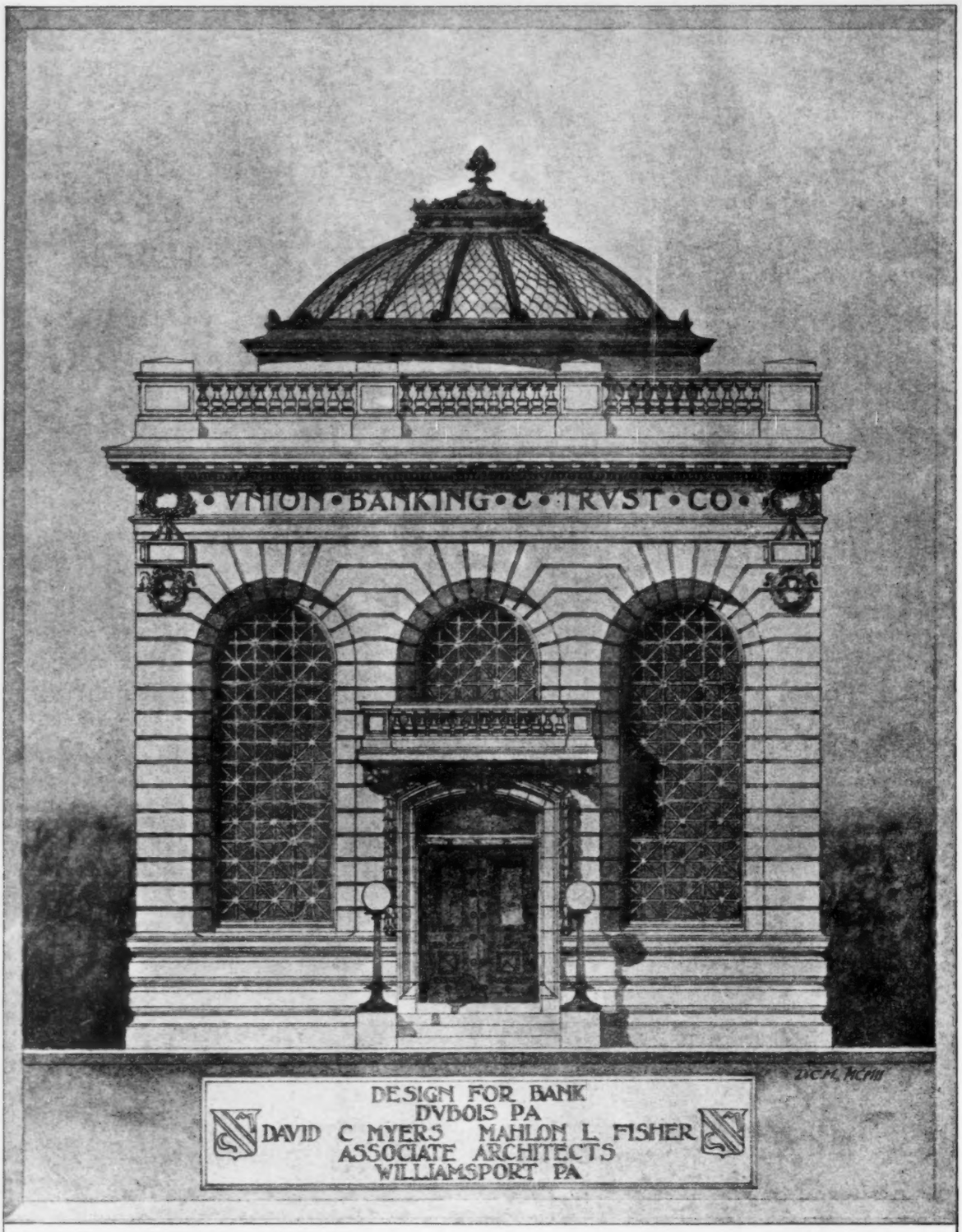
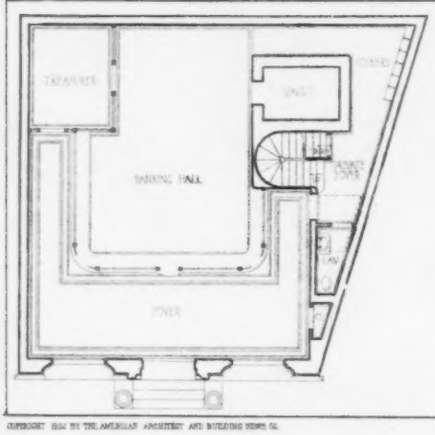
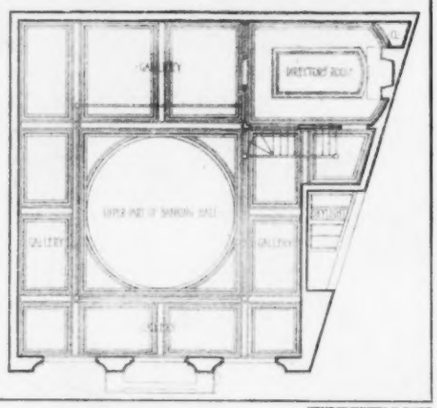
[Advertisers can be indexed only under a single head free of charge.]







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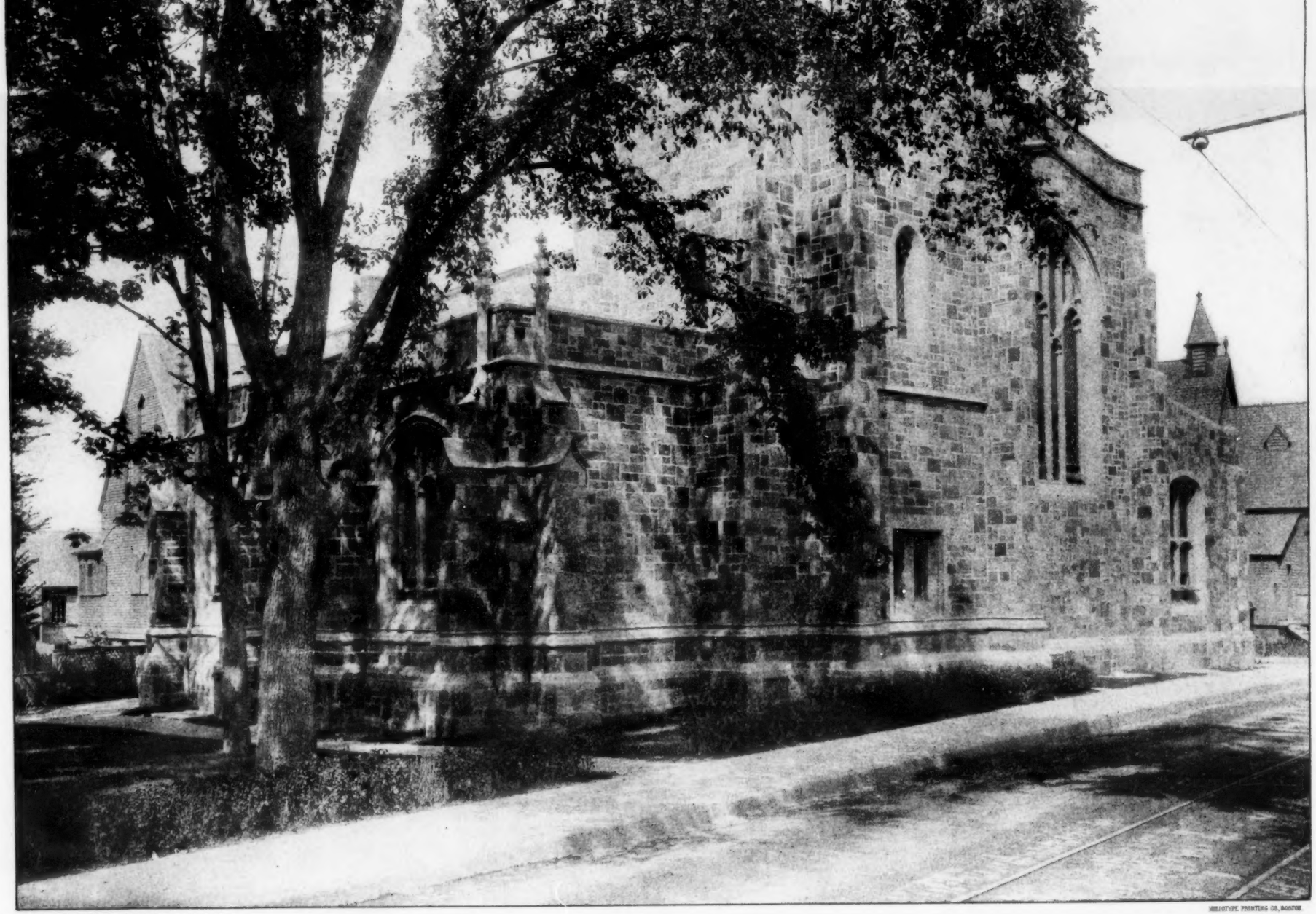

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