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DECORATION

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CONSTRUCTION

BOSTON MASS.

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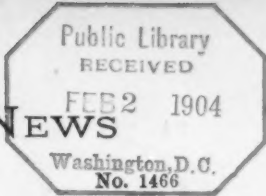
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THE AMERICAN ARCHITECT AND BUILDING NEWS

SATURDAY, JANUARY 30, 1904

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THE report of the inquest upon the Iroquois Theatre fire makes a melancholy showing of impudent disregard of the law, and of official shiftlessness and incompetence. The Building Commissioner testifies that he "told the Mayor" that not one of the theatres in the city was complying with the law, and that the Mayor turned over his report to the Council, which turned it over to a committee, which did nothing about it. It would be interesting to inquire whether "telling the Mayor" is the penalty provided for violation of the Chicago building laws. If so, the sooner fine and imprisonment are substituted, the safer innocent people will be in that city. The Building Commissioner made the usual excuse for the obvious infractions of the statute in the construction of the theatre, such as the omission of automatic sprinklers, the introduction of pine girders under the stage, instead of steel beams, the illegal arrangement of seats and exits, and so on, that he had only eighteen inspectors, and that this number was insufficient to do the work required, but that he had been unable to get more, as the city could not afford to pay the salaries of a larger number.

TO this claim it should be answered, on behalf of the public, that the examination of a new theatre was obviously the first duty of an inspector, whether he neglected all the other buildings in his district or not. It is incredible that an inspector should not "have time" to see whether a new place of public entertainment had automatic sprinklers, proper exits, and proper aisles between and behind the seats. A moderately experienced man would ascertain all these points in half an hour, and the opening of the doors of a new theatre to the public depends, or should depend, under the Chicago ordinance, upon the certificate of the inspector that the statute has been complied with. Commissioner Williams has been criticised, rather unjustly, for not having questioned his district inspector about the theatre. Whether he fulfilled his own duties or not is another matter, but a chief of a department is certainly under no obligation to ask all his subordinates every day whether they have been faithful or not. They are presumed to be faithful, and if he finds that they are not, it is his duty to discipline or discharge them at once, but not to spend his time in prodding them, for fear that they may neglect their work.

OF course, all deputy inspectors of the present day are singularly able, honest, active and intelligent, but we remember one of twenty years ago who had not reached the modern standard. We were making the rounds of a new building with the foreman, when the latter pointed out an individual leaning against a lamp-post across the street. "That's our inspector," he observed. "Do you own him yet?" we inquired, with what we acknowledge to have been unbecoming levity. "Oh, yes," said the foreman. "He comes here regularly every morning for money for a drink, and we don't see anything more of him." Naturally, there are no such officials now, but, if there were, we might look for just that sort of inspection that seems to be applied to theatres in too many of our large cities.

MR. OSCAR HAMMERSTEIN, whose long experience as a manager of theatres gives value to his ideas, is fitting up his own theatre in New York with a set of large and numerous automatic sprinklers, suspended over the stage so as to pour a flood of water upon it in case of fire. There is a good deal of sense in Mr. Hammerstein's observation, that "the law wants the people on the stage to save the people in front of the curtain, and by so doing kill themselves." The asbestos curtain and the automatic skylights over the stage, which, if they are used, keep the fire from breaking into the auditorium, and thus protect the audience, convert, as Mr. Hammerstein says, the stage itself into a raging furnace; and he thinks that the safety of the actors and scene-shifters needs to be looked after, if it can be done without increasing the danger to the audience.

ALTHOUGH, as Mr. Hammerstein says, theatre fires never begin in the auditorium, but always on the stage, it is to be remembered that the people behind the curtain have, usually, a much better chance to escape than those in front of it; and, although there have been some sad exceptions, theatre fires have not often caused serious loss of life on the stage. Mr. Hammerstein says that stage-managers, or chorus-girls, or carpenters, cannot be expected, at the risk of their own lives, to "drop a curtain that will make a furnace out of the stage itself, and roast every soul there." To the honor of the theatrical profession it should be observed that there has never been a theatre fire in modern times, during a performance, when some one on the stage did not risk his life to try to save the people in the auditorium; and it is not at all clear why the dropping of the asbestos curtain, with the consequent shutting out of the air-supply from the auditorium, should "make a furnace" of the stage. The natural supposition is that it would have the contrary effect. As to Mr. Hammerstein's sprinklers, while he is perhaps right in saying that something more than a "shower-bath" is needed to put out a stage fire, the eight-inch pipes which he proposes are unnecessarily large. If the ordinary automatic sprinklers, supplied by inch pipes, can put out a fire in a cotton-mill, as they have done in hundreds of cases, without any attention, there are not many stage fires that a good sprinkler would not extinguish when they first start; and it is the great advantage of the automatic sprinkler that it acts on the fire at the very beginning. Mr. Hammerstein proposes to put two eight-inch valves under the hands of the stage-manager, who can, by opening them, precipitate a flood on the stage; but the trouble with this plan is that, when the fire begins, it is always behind a piece of scenery, or somewhere out of sight. If the stage-manager's attention should be directed to it, he would think that it could be put out so easily with a pail of water that it would be a pity to turn on a "flood," and ruin thousands of dollars' worth of scenery and costumes, besides half drowning all the people on the stage; and the next thing would be the flight of the manager for his life, with the stage a roaring mass of flame.

PROFESSOR W. H. GOODYEAR, of the Brooklyn Institute of Arts and Sciences, recently delivered at Yale University a most interesting lecture, describing the results of new measurements made by him in Constantinople, in Northern France and in Germany, establishing, in most of the French churches, and in those of Santa Sophia, and of Santa Maria Diaconissa, at Constantinople, and in the seventeenth-century Schottenkirche, at Vienna, various forms of those refinements of profile and plan which Professor Goodyear has done so much to reveal to the artistic world. That intentional variations from true vertical and horizontal lines exist in all the best architectural work in all styles, from the Egyptian period down nearly to our own time, must be accepted as incontestable; and the problem which now presents itself, in the solution of which the practical experience of architects should be of assistance, is to ascertain why these variations were made, and how they were regulated. As to the reason for the variations, Professor Goodyear is undoubtedly right in saying that they were demanded by the artistic sense, which, as he thinks, in all ages of art, has found geometrical accuracy dry and repulsive, and has, under the guidance of the eye alone, made such modifications

of symmetry as satisfied it, without producing noticeable or offensive deviations from strict accuracy. That the deviations were intentional, and not accidental, as many persons still maintain, is shown beyond a doubt by many of Professor Goodyear's photographs, but it is still very difficult for us to enter into the artistic state of mind to which they are due, and still more so to appreciate the subtleties of irregularity of such a building, for instance, as Notre Dame in Paris, where not only are the two towers unequal in size, but the front bulges forward, the plan is unsymmetrical, and the piers lean backward.

POSSIBLY a little light may be thrown on the subject by recalling some of the rules of composition in the other arts.

No sculptor, for example, would think of making a statue exactly symmetrical, on account of the ridiculous stiffness of effect that it would have; and a great architect composes the lines of his buildings very much as a great sculptor does those of a statue. Every modern architect, indeed, complains that he can never get in his finished buildings the charm that they showed in the first freehand sketch; and it is easy to see that the superior attraction of the sketch lies in the almost imperceptible curvature of the lines, and the slight irregularities, due to the method of drawing. Norman Shaw's work offers many striking examples of this, houses which, in his beautiful pen-and-ink drawings, were filled with homelike charm, being often quite commonplace in execution. It is not his fault that they are commonplace when built with neatly plumbed angles, in face brick, and covered with selected tiles, laid to a perfectly plane surface, instead of being uncertain in the angles and wavy in the roofs, as he drew them; and the only reason why his buildings differ essentially from those, let us say, of Pierre de Montreuil, or Palladio, is that the latter incorporated in actual buildings the irregularities which Mr. Shaw, like them, instinctively loves, but only ventures to show in his drawings. In a simpler and more artistic community picturesqueness is recognized as a quality belonging to executed work as well as to sketches. Every one who owns a real hand-made Oriental rug, as distinguished from those woven in the prisons in India, under British supervision, or made on modern looms in Persia from patterns sent out from Germany, can see for himself that the Orientals always vary the width of the borders, and often the pattern, on different sides of the same rug. The native explanation of this eccentricity is that such variations "keep off the evil eye," which would blight a weaver who made his borders of the same width all around a rug; but it is obviously an artistic tradition, dating, probably, like the patterns of the best rugs, from a period long anterior to the time when Xenophon led his Ten Thousand Greeks from the plains of Persia to the sea through Daghestan, the Mountain Kingdom.

IT does not seem too much to hope that this delicate sense of composition in architecture may be reawakened in us, particularly among Americans, the most æsthetically sensitive of all modern people. All American women understand the difference between hand-made and machine-made embroideries and laces, and a few good architectural examples might set a fashion which would be widely followed. It would probably be found that the execution was not so difficult as might at first appear. The outward curvature of a pier, for example, although it would be a long and difficult matter to set it out accurately by means of offsets from a plumb line, is very easily produced, with approximate precision, by the workman on the stage, who has only to glance now and then downward, along the arrises of the mouldings, to keep an inclined straight line, or a curve, as nearly as is necessary. So with the curvature, in plan, of the nave arcade of a church toward the left, popularly supposed to typify the inclination of Christ's head on the Cross; while it would be an awkward thing to set out with transit and steel tape, nothing is easier than to manage with the eye an agreeable curve with a line of stakes, representing the centres of the piers. As to the bulging of the front wall, which is common to most mediæval churches, while the judgment of an experienced architect would be necessary to determine the amount of the projection, it would be very easy to execute it. In interior work, also, there would be no difficulty in raising a little in the middle the strip put on to guide the mould in running a cornice, so as to give an effect of lightness, or in leaning the columns of a mantel slightly toward each other, or slightly outward; and architects, and, with a little explanation, their clients, would find great pleasure in the development, in this way, of architectural expression.

THERE was a time when the agriculturist and the horticulturist found that, after their plants were started, a hoe to stir the earth around them, and a stick for inflicting punishment upon caterpillars, were all the implements needed to bring the fruit or flowers to maturity. Now, it appears, matters are less simple, and the modern gardener must carry on his back an electric generator, and in his hand a bottle of chloroform, in order to be able to compete with his neighbors. Some years have passed since Mr. Siemens, in London, tried his celebrated experiments in growing flowers by electric light, but electricity is still applied in horticulture, although in a different way. Now, by electrifying seeds, and the ground in which they are planted, results are obtained so important that the process is being widely adopted. It was found, some time ago, that the direct application of an electric current to seeds so old that there was little probability that they would grow at all caused them to germinate vigorously; and, as a corollary from this, it was inferred that a gentle current through the soil in which they were planted might make them also grow more vigorously, and mature earlier. After many experiments the most successful apparatus for producing this current has been found to consist in a number of small lightning-rods, made of galvanized-iron wire, pointed at the top, and stuck about six inches into the ground between the plants, the upper end projecting about twenty inches into the air. The theory is that the points collect atmospheric electricity, and convey it into the ground, where it promotes the decomposition of the mineral portions of the soil, besides stimulating the vitality of the roots. The effect on certain crops is said to be to increase greatly the yield besides bringing them to maturity much earlier than usual. Some experimenters have used the current from a dynamo, instead of atmospheric electricity, in the same way, but with less favorable results. As to the bottle of chloroform, which, as we are told, is now an indispensable part of the outfit of a French florist, its use is to produce artificial repose in plants intended to be forced for winter blooming. All deciduous plants rest naturally during the winter, and accumulate the strength with which, on the return of spring, they develop leaves, flowers and fruit; and, in order to make such plants bloom in the winter, when their flowers are of most value for sale, it is necessary to produce in them, during the summer, a state of artificial rest, which they, so to speak, mistake for their regular hibernation, and after which they can be revived and pushed into bloom during the winter. With roses, for example, the artificial rest is usually obtained by depriving the plants gradually of water during the late summer months, until the leaves fall off, and the whole plant assumes the air of one which has passed through a severe winter. After a few weeks, by beginning to water again cautiously in October or November, the buds are started, and the growth can, with care, be continued until the flowers open, in the middle of winter. Some plants are with great difficulty brought to a state of rest in this way, and the experience is a trying one, even for the most vigorous species; but it is said to have been discovered that, by fumigating a rose-house, for instance, with chloroform vapor for forty-eight hours, the plants lose consciousness so completely that no other rest is required, and that they can then be revived, and carried on to a second bloom without delay, and without injury. We cannot say that the theory of this, which appears to ignore the action of the roots of a deciduous plant, while leafless, in storing up sap for the development of the buds, seems to us quite convincing; but we are told that the process is so effective that it is in constant use by the Parisian florists.

AMERICAN engineers have been introduced by Professor Goldschmidt, of Essen, Germany, to a remarkable agent for treating metals. This substance, which goes under the name of "thermit," is simply a mixture of powdered aluminium and sesquioxide of iron, in what proportions is not stated. The mixture, which is not explosive, and will not burn when thrown into a fire, is ignited by a fuse of magnesium ribbon, and, when once lighted, burns fiercely, producing, it is said, a heat equal to that of the electric arc. The heat is, of course, due to chemical action of combination of the oxygen in the sesquioxide of iron with the metallic aluminium, but the process affords a very simple means of generating and applying great heat. With a small quantity of the "thermit" mixture, metals as refractory as nickel can be readily melted, and wrought-iron rails, or parts of broken machinery, can be solidly united.

THE PROTECTION OF STEEL FROM CORROSION.¹

INTRODUCTION.

IN our first report, No. IV, upon the corrosion of steel, the results given of tests to that date were more of a negative than of a positive character, indicating the causes of danger more than the methods of prevention. Subsequent experiments and investigations have developed methods of prevention, as yet limited, but effective in many of the most dangerous points where corrosion may occur; notably in the footings of steel-framed buildings when of necessity placed in damp ground. It may be suggested that however remote may be the causes of hazard in the superstructure, steel embedded in or adjacent to damp ground in the neighborhood of the currents of electricity of the trolley tracks, must be protected not only from the ordinary dangers of corrosion, but from the electrolysis, which is so destructive in respect to thick cast-iron water-pipes. Professor Norton's report will also suggest other positive elements in the case, while disclosing the causes of hazard yet more fully than in our previous report.

Whether or not the steel footings or supports of high buildings, when embedded in damp ground, may be corroded by electrolysis from leaking currents from an electric trolley track, is surely a problem which requires immediate solution. If there is such a danger, it may, perhaps, be met in existing buildings by encasing the footings of such buildings in an asphalt concrete, absolutely impervious to moisture. Dry steel may carry electric-currents without injury. The electrolysis or dissociation of the steel occurs when the current leaves the metal, passing into damp ground, or other wet substances. Possibly a remedy, if this evil exists, may be found by attaching a conducting wire to the steel footing and thus carrying the electricity derived from the trolley track to some other point. Of course such currents should be cut off if possible, lest they cause danger in steel-framed buildings above the footings or supports.

The subject of paints will now be taken up for thorough investigation, apparatus having been invented and methods of testing devised, which are submitted in this report. From the best information that I have been able to gather on this matter, it would appear that any paint on which reliance can be placed for the protection of steel or other metal from corrosion must be one which dries by evaporation or sets like hydraulic lime: it must not be one which hardens by the oxidation of the oil or any other ingredient of the compound in which lead or other pigments are mixed. Steel, having great affinity for oxygen, is corroded by the oxidation of the oil itself, while the outer surface of the paint, exposed to the air, may stop moisture from penetrating for a very considerable period of time, or until the oxidation of the body of the oil has released the lead or other pigments, thus exposing the steel surface to a humid atmosphere by the complete destruction of the paint.

Steel may be protected by paints, cement or coverings that have more affinity for oxygen than steel itself. Such coverings will absorb from the atmosphere, even when humid or loaded with particles of oxidizable matter, all that would tend to corrode before it reaches the steel.

It is in that direction that efforts have been made, and are now being made, for making paints or thin veneers for the covering of steel that will neither corrode it by their own contact nor permit corrosive elements to reach the steel. Such paints or veneers must not be brittle. They must be sufficiently elastic to yield to the contraction and expansion of the steel without cracking or chipping. We have information of one such paint, made for many years in England by a secret process, which has been used upon the British ships for a long period and now being made in this country. Under these conditions the investigations which we now propose to undertake seem to the undersigned to be of the gravest importance.

Respectfully submitted, EDWARD ATKINSON, Director.

BOSTON, MASS., December 26, 1903.

REPORT.

SINCE the publication of report No. IV, in which was given an account of some laboratory experiments which showed the great degree of protection afforded structural steel by Portland cement concretes, the experiments have been carried on continuously.

Results.—All the early tests which were carried out on perfectly clean steel have now been repeated on specimens in all degrees of initial corrosion, with the same results as shown in the case of the chemically clean steel. Doubt existed in the minds of some engineers as to whether the results as found with clean steel would apply to rusty or dirty steel. The method adopted in the early test was to imbed the specimens in blocks of concrete about 3" x 3" x 8", allow them to set under ordinary conditions and then expose them to changing conditions of warmth, moisture and to carbon dioxide, with traces of sulphurous gases and ammonia. Under these conditions unprotected steel vanished into a streak of rust, but protected by an inch or more of sound Portland cement concrete the clean steel was absolutely unchanged. We can now state further, that this same protection is afforded any ordinary structural steel of that degree of cleanliness likely to be found in use for building.

Specimens.—The origin of many of the specimens was rather obscure, as the more corroded ones were taken from scrap-heaps of steel works, many having been exposed to the weather for several years. Some had been in buildings as part of the structure, some in salt water, some in fresh water, some in damp ground, and the rest exposed to air under various conditions of dampness. The degree of rust on the specimens varied greatly, from a light yellowish stain to a scale more than $\frac{1}{2}$ inch in thickness.

Procedure.—The specimens were first cut to a size such that their length was not far from 3 inches and their width about 1 inch. They were of all thicknesses from $\frac{1}{8}$ inch to $1\frac{1}{2}$ inches. Some were cut dry, some in water, some with the mill fed with oil, and a part of these cut with oil were cleaned with gasoline, and a part with alkaline solutions, while a third part were left more or less oily. It was intended that the specimens should include everything met with in regular practice.

Each specimen was stamped and the blows of the steel stamp were sufficient to loosen any rust or scale that was not firmly attached, and a vigorous brushing with a soft wire brush removed any loose dust. Each piece was next weighed, and then calipered at several points, and incorporated in a block, or brick, of concrete, sufficiently large to cover it everywhere to a depth of $1\frac{1}{2}$ inches. The mixture was one part cement, two and one-half parts sand, and five parts broken stone in some cases, and one part cement, three parts sand, and six parts cinders in others. The cements used were Alpha, Lehigh and Alsen, and care was taken in selecting the sand and stone. The latter was of such size as to pass a 1-inch mesh. The concretes were allowed to set twenty-four hours in air and seven days in water, and were then divided into three groups, one being set out-of-doors, one stored in a damp and odorless basement underground, and the third being treated in the "corroders" or steam and carbon-dioxide tanks. These galvanized-iron tanks were supplied intermittently with steam, hot water, moist air, dry air and quite continuously with carbon dioxide for periods of from one to three months. There were a number of specimens which were further exposed in tide-water, in sewers, over furnaces, with constant contact of furnace gases.

Condition of Specimens.—After varying lapses of time from one to three months for the specimens in the "corroders," and from one to nine for the others, the specimens were broken out of the briquettes, cleaned by brushing, and weighed and calipered. Not one specimen has shown any sensible change in weight or dimension, except where the concrete had been poorly applied. Some specimens were purposely bedded in very dry concrete, and some in concrete partly set, and many of these were not well covered and the steel was seriously attacked where there were voids or cracks. Of the hundreds of specimens of rusty steel examined not one which had a continuous, unbroken coating of concrete, gained or lost anything in volume or weight by treatment which caused the practical destruction of some of the unprotected specimens. If loss by corrosion as great as $\frac{1}{1000}$ of the loss occurring with the unprotected specimens had been experienced in the case of the protected pieces it would have readily been noted.

Conclusions.—It would therefore seem that, if we admit that from a severe trial of a short duration we may judge relatively of the effects of the less severe but longer test of time, it cannot be questioned that structural steel is safe from corrosion if incased in a sound sheet of good concrete, at least for a period of years so long as to make the subject of more interest to our great-grandchildren's children than to us. We know that bare steel does not rust and fall down over night, and that much of the steel standing has been bare of everything that could protect it, for long years, and it seems to me beyond question that steel properly covered in concrete may well be expected to last far longer than the changes in our cities will allow any building to remain.

There is one limitation to the whole question; that is, the possibility of getting the steel properly incased in concrete. Many engineers will have nothing to do with concrete because of the difficulty in getting "sound" work. This is especially true of cinder-concrete, where the porous nature of the cinders has led to much dry concrete and many voids, and much corrosion. I feel that nothing in this whole subject has been more misunderstood than the action of cinder-concrete. We usually hear that it contains much sulphur and this causes corrosion. Sulphur might, if present, were it not for the presence of the strongly alkaline cement; but with that present the corrosion of steel by the sulphur of cinders in a sound Portland concrete is the veriest myth, and as a matter of fact the ordinary cinders, classed as steam cinders, contain only a very small amount of sulphur. There can be no question that cinder-concrete has rusted great quantities of steel, but not because of its sulphur, but because it was mixed too dry, through the action of the cinders in absorbing moisture, and that it contained, therefore, voids; and secondly, because in addition the cinders often contain oxide of iron which, when not coated over with the cement by thorough wet mixing, causes the rusting of any steel which it touches.

There is one cure and only one: mix wet and mix well. With this precaution I would trust cinder-concrete quite as quickly as stone-concrete in the matter of corrosion. It has been suggested that steel which has been rusted to a slight depth becomes protected by this coating from further rusting. Nothing could be farther from the

¹A report issued by the Insurance Engineering Experiment Station, Boston, Mass.

truth. A large number of specimens were rusted by repeated alternate wetting and drying to see if they finally reached a constant condition. Instead of doing this, they all showed an irregular but persistent loss in weight, on further rusting, until some had practically been washed away.

The increasing use of steel of small dimension in floors and roofs, twisted rods, expanded-metal, etc., has caused some question as to the advisability of their use in view of the possible great effects of corrosion, as compared with the effects of corrosion on larger members, but with sound concrete of a thickness of about $1\frac{1}{2}$ inches between the steel and the weather, I do not question the durability of these lighter members.

The destruction caused to steelwork by rust is certainly not more appalling in most instances, at least, than that caused by electrolysis. The action here is more apt to be local, and hence more dangerous, in that inspection or protection of other parts of a structure will not indicate or prevent impending disaster to the one member which may serve as the point of departure of the escaping electric current. No satisfactory treatment other than some sort of waterproofing has appeared to be successful, and study of this matter is going on at present in many places. It is a problem for the chemist rather than for the engineer.

The next step in this research is to find out in the same general way the degree of protection afforded by paint, and second, by brick and tile work. This is now under way and the rapidity with which the "corroders" destroy some paints is such that a report on this subject may be looked for in the near future.

The investigation of the relative efficiency of different paints as a protective coating for structural steel being now under way, it is desired that all kinds of paint be submitted to our test of exposure to varying conditions. To this end we invite all dealers and manufacturers of paint, for this purpose, to send samples to the amount of one gallon to Prof. C. L. Norton, Room A, Walker Building, Massachusetts Institute of Technology, with any directions for applying the paints to either clean or ordinarily rusty steel. The results of these tests will not be published without the consent of the persons submitting the paint to test.

Some pieces of steel will, after coating with the paint under test, be submitted to various corrosive influences, and the details of the exposure being such as will correspond in nature to the actual exposure of structural steel, but of an intensified degree, it is believed that relative results may be arrived at in a reasonably short time in this way. Respectfully submitted, CHARLES L. NORTON.

A PLEA FOR REINFORCED CONCRETE.

THERE have been so many failures in reinforced concrete buildings of late, that it becomes a matter of importance and self-protection for every engineer and architect designing in this type of construction to reflect and study their cause. If this construction is all that has been claimed for it by men of prominence, if large and important works of engineering have been successfully and economically accomplished, then, indeed, reinforced concrete has come to stay, and the engineer must awaken to its study, that he may hold his position in the line of progress of the engineering world. If, on the other hand, this type of construction is unscientific and theoretically unsound, then, indeed, it is his duty to condemn it and exert himself towards its non-adoption.

The writer has given this subject considerable study and feels such perfect confidence in reinforced concrete that he cannot bear to sit by quietly and allow what he considers a most beautiful field of construction to be ruined by the incompetence of the men who so largely work therein. He feels it his duty, therefore, to place his views regarding some of the failures of reinforced concrete before the public, and he trusts that architects and engineers may agree with him, and possibly be more cautious in the design of works of this nature, and in entrusting the same to men of competence and conscience.

The failures of concrete are generally due to one of the following causes:—

First.—Weak and insufficient centering.

Second.—Bad material and mixing.

Third.—Insufficient and improper reinforcement.

It is, of course, of primary importance, that the centering for these structures should be sufficiently strong to carry the dead weight of the concrete while it is as yet green and unset. In a number of failures which have been described in engineering journals up to the present, the centering collapsed under the dead weight, allowing the heavy concrete to fall on the floors below, and carrying these with it. Such failures as these are, of course, entirely inexcusable. The writer does not feel it important to lay stress on this matter of centering; common sense alone should dictate the importance of making it sufficiently strong.

Regarding the materials used for reinforced concrete, it is, of course, essential that these be of the very best grades. Portland cement is manufactured in this country of such excellent quality and at such a low price, tests are so readily made thereon with even the simplest appliances, that the use of poor cement is hardly excusable. As for clean, sharp sand, and broken stone or gravel, these are procurable almost everywhere. Regarding the mixing of concrete, there

are on the market at the present time a number of makes of very excellent machine concrete-mixers; and, where conscientious workmanship exists, no reason can be given for the poor handling of materials.

The writer sincerely believes that the majority of contractors who are working in this type of construction are conscientious, and that they make every attempt at good, honest workmanship. Unfortunately, however, only very few possess a scientific knowledge of the materials with which they are dealing, and their work at its best is mere speculation, which, if it stays in position after loads are applied, is considered successful, and if it falls down, is called a failure. Such a time for judgment is late indeed and the lesson generally costs the reputation gained after a life of hard toil.

Bad materials and workmanship are the generally credited causes for the failure of concrete structures, but the writer is absolutely certain that in the majority of cases where our leading engineering journals have held out in this manner, the causes were of a different nature.

Let us consider for a moment some of the types of reinforcement used for long-span floor systems at the present day. Among those most prominent, are expanded-metal, wire-cloth and plain or deformed rods.

Regarding the first two of these constructions, the writer has come into repeated contact with standard floors about as follows: spans up to 22 feet; thickness of floors, 5 and 6 inches, material cinder-concrete; area of reinforcement per foot of linear cross-section of floor, $\frac{3}{16}$ inch to $\frac{1}{4}$ inch; the floors being in the majority of cases a single slab. If a floor of 23 feet span were constructed of 6-inch I-beams placed side by side as closely as their flanges would allow, and such a floor subjected to the ordinary lightest live loading, together with the plaster and wood floor, the same would deflect from $\frac{3}{8}$ to $\frac{1}{2}$ inches. And yet, these concerns who pretend leadership in reinforced concrete constructions, have built them repeatedly of concrete, reinforced as above, using even cinders instead of stone, and producing concrete with only one-half the strength of stone-concrete. Are failures of such constructions as these to be made the argument for the abolishment of reinforced concrete? If, on the other hand, constructions such as these do stand, as proves to be the case with but few exceptions, then indeed we may expect in scientifically constructed works of this nature wonderful possibilities; and, for the progressive engineer, a new field has opened, wherein he may design with greater economy than he has ever done heretofore, where his structures may have the permanency of masonry and yet the strength of steel, with the fireproof, rustproof and rotproof qualities of concrete, together with that wonderful property of all cement construction, its increasing strength with age.

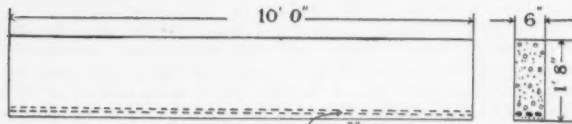
The writer has seen floors reinforced with expanded-metal as above described, deflecting as much as 3 inches, immediately on the removal of centering, after the concrete had been allowed to set for a month or more. How it could possibly do otherwise than deflect, was to him more of a problem than that it should fall down. In spans where the writer would deem it necessary to insert at least $\frac{3}{4}$ square inches of metal per running foot of floor, he has seen expanded-metal floors stand up with less than $\frac{1}{4}$ square inch. Who should be blamed for failures such as these? Is it a fault of concrete, is it poor mixing, or is it the ignorant boldness of a concern dealing in what they do not understand?

The writer knows of concrete floors 6 inches thick and 22 feet span, with nothing more embedded therein than a wire cloth, with occasional cables of similar wire, $\frac{1}{4}$ -inch in diameter, the total reinforcement providing a cross sectional area of steel per running foot of floor of about $\frac{1}{4}$ square inch. As already said above, even common-sense engineering should protest at a floor designed in this manner. If a floor were specified to be of such thickness and span, by all the rules in creation the writer could not calculate it strong enough with less than $\frac{3}{4}$ of a square inch of metal per running foot, and, although structures designed as above do stand, their factor-of-safety is probably one and a half at full loading, at rare occasions it may be two, and sometimes, a little less than one, in which case we have the natural collapse.

Our patrons of wire-cloth will tell us of the high tensile strength of the wire, but only recently the writer had occasion to test a sample of the most largely used brand and found its strength to be only slightly above 60,000 pounds per square inch.

The failures which have occurred through the use of plain or deformed rods, are also becoming quite common, and a little study of the method of failure will at once bring forth the large faults in design. The generally adopted arrangement of reinforcement with rods has been, to embed them along the lower edge of the concrete floor beam for the purpose of supplying the tensional strength in which concrete itself is so largely lacking. The principle of supplying steel in this locality is proper enough, and the generally adopted methods by engineers of computing the quantity of steel required at the centre possibly true enough, providing the beam actually failed there at test to destruction. But the fact of the matter is, a beam reinforced in this manner, and subjected to stress so that its shearing as well as bending-strains are developed, rarely fails in this manner, and our calculations for the beam have therefore been made for the wrong place in the beam. Such a beam will invariably fail by the shearing of the concrete at the ends, diagonally from the point of application of the load, or longitudinally along the reinforcement bars. Take for example a given beam, as shown in Figure 1, wherein the reinforcement is horizontal only. Assuming such a beam to be 6

inches wide and 20 inches deep, and to have three $\frac{3}{4}$ -inch bars embedded along the bottom edge. Such a beam, if the full safe strength of the metal were developed, should have a carrying capacity of about 25,000 pounds uniformly distributed, and if a factor-of-safety of four has been assumed, it should carry 100,000 pounds before failure. Now regarding for a moment this beam in shear, its cross



sectional area is 120 square inches, and assuming the safe shearing value of concrete to be 50 pounds per square inch, the beam would only carry a safe load of 6,000 pounds in shear, instead of 25,000, as it should do when bending-moment alone is considered. The writer has made a number of tests on concrete in shear, and has rarely obtained results larger than 250 to 300 pounds per square inch. It is evident that a beam thus reinforced is exceedingly weak in shear.

Vertical shear is, however, not alone to be considered. The matter of longitudinal shear along the steel reinforcement is of equal importance. In an ordinary steel girder it is generally agreed that the vertical shear is transmitted into the bottom horizontal chord within a distance equal to the depth of the girder. There is no reason to suppose that this principle does not apply with equal truth to reinforced concrete girders, and according to this the shear of 12,500 pounds should be carried from the concrete into the steel within a distance equal to the depth of the girder; which means, that the safe adhesion between three $\frac{3}{4}$ -inch bars and the concrete within a length of 20 inches should be 12,500 pounds. Ordinarily, where a large body of concrete surrounds a bar, it is safe to count on an adhesive strain of about 50 pounds per square inch, which would produce a safe loading of about 12,000 pounds, but in this case the bottom of the concrete beam has been so cut up with steel that even if the required adhesion were there, the layer of concrete immediately surrounding the bars would not be capable of transmitting this strain. If the steel is to receive a stress of 12,500 pounds, the concrete must transmit the same into it within a length of 20 inches. It is ridiculous to assume that a layer of concrete 6 inches wide, cut up by three bars such as this, is capable of transmitting safely such a stress.

The general method of failure above described is, therefore, a common one, and whether the rod be plain, twisted, corrugated or bulbbed, adds very little to the strength of the concrete. It is the layer of concrete immediately surrounding the bar which is incapable of transmitting the longitudinal shearing stress, and which fails; the matter of adhesion is but a small factor in comparison with this. But, neglecting even this inability of the concrete to transmit such shearing strain, the writer has seen reinforced-concrete beams constructed by some of the leading reinforced-concrete concerns in this country, where the bottom of the beam was so cut up with twisted and otherwise deformed rods, that a portion of it fell off without any load whatever being on the beam, and leaving the rods entirely exposed thereby.

To take up the vertical shear, it is generally recognized, that some form of vertical reinforcement is necessary, and Hennebique, as well as other constructors in concrete, has supplied stirrups set up loosely about the rods. To the writer such stirrups seem unable to accomplish the necessary results. In the first place, shear cracks generally occur as shown in Figure 2, being inclined to the vertical at an angle of about 45 degrees. If vertical reinforcement is necessary at all, it should cross these lines of rupture at right angles to hold together the concrete at places where the natural tendency is to open up. In the second place, if this vertical reinforcement is to carry strains at all, it should carry the same into the bottom chord member, and should therefore be rigidly connected with the same. These two principles seem to the writer just as important of observance, as the placing of steel in the bottom. Hennebique supplies the stirrups, but, in the first place, he sets them in a wrong direction, and secondly, he makes absolutely no connection between them and the main steel bars.

To review the matter of vertical reinforcement, therefore, it seems to the writer that designs wherein vertical reinforcement is entirely omitted are very dangerous, and where this reinforcement is in the form of vertical stirrups, they are decidedly faulty, although perhaps

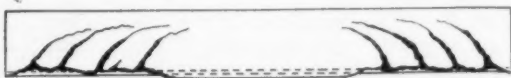


Fig. 2

not equally dangerous. In the calculation of a steel structure, the engineer is very careful about the design and detail of every joint. Neglect to take into account a single connection may cause failure. Why, then, expect a reinforced-concrete construction to take its full loading when only half way reinforced? It is true many accidents have occurred, but it is also true that the field of reinforced concrete

is remarkably new and difficult; it requires great care and accuracy, and should be handled by men of understanding only.

Would a construction engineer, under ordinary circumstances, submit the safety of his structures to the design of an ordinary layman, unacquainted with the materials at hand? If he insists upon experience here, how much more so should experience and careful thought be insisted upon in the design of reinforced concrete, where the structure is of a composite nature, and everything about it is absolutely new. But the fact of the matter is, that nine-tenths of the concerns now erecting buildings in this material, neither employ an engineer nor have the slightest theoretical knowledge themselves in the calculation of the structures with which they are dealing.

Constructions in reinforced concrete designed by engineers have failed but rarely, because as a rule these men have used their technical knowledge with an inborn conservative caution in design. But where men have lacked such technical knowledge, they have invariably entrusted the work to concerns who specialize in concrete, and who have been paving or sidewalk contractors before. Such contractors are not so much to blame. They have faith in a material which, if well made, has wonderful properties indeed, and they are willing to risk their all for it. But anyone who entrusts this construction with them is certainly guilty of gross negligence; for the problem requires fully the same scientific study as the steel skeleton-frame, and demands the most skillful engineering knowledge. It seems pitiful, indeed, to see a contractor bear blame for the downfall of a structure such as was recently illustrated in the *Engineering News* as having occurred at Corning. The writer is acquainted with the contractor mentioned in that journal, and knows very well that this party makes no claims whatever at engineering knowledge. The concern which supplied this reinforcement had pretended to engineer contracts wherein this is used, had made fences their main business before, but suddenly discovering that steel imbedded in the bottom of concrete loaned efficiency thereto, it plunged deeply into the field of reinforced concrete and hesitated at no constructions, no matter how difficult or how scientific.

Another matter wherein engineers are possibly at fault, is the careless manner in which formulas are sent about by some parties with the assurance that structures will be safe if they are designed in accordance with them. On a recent occasion the writer visited the engineering office of one of the leading railway companies, where, in order to satisfy themselves regarding the uses of reinforced concrete for culverts, and the accuracy of the formulas advanced by some well-known concerns, a number of experiments had been made, using one of the generally accepted types of deformed rods. Beams were designed for safe loads of 20,000 pounds. It had been assumed in their calculation, that the steel was to carry the entire tension of the beam, and naturally fail at test to ultimate destruction. The beams failed with loads in the neighborhood of 21,500 pounds, showing a factor of safety, therefore, of a little above one, instead of six or seven, as should be required for such structures. These beams were built with the usual horizontal reinforcement only; not even stirrups had been recommended. A single one of some twenty or more similar tests recently published in one of our leading engineering journals, made at a well-known university, on 8' x 12' reinforced concrete beams, 11 feet span, showed failure at 18,700 pounds. The safe strength according to generally adopted formulas, if the steel had been strained to its complete tensile-strength, should have been about 8,000 pounds, showing a factor of safety a little above two. In all of these cases the beams failed, shearing the concrete as usual, long before the ultimate strength of the steel came into play.

The writer does not believe, however, that the failure of beams reinforced in the usual manner, at a load less than the theoretically calculated load, is as bad as the fact that the concrete has failed in preference to the steel reinforcement. He believes that a test structure should fail by the parting of the steel. Concrete, as well as all masonry, is granular and brittle, and fails invariably by a sudden collapse in shear. In order that a structure should carry a moving load, especially in railroad work, it should be an elastic structure capable of yielding under strain, and of large deflection before destruction. For this very reason an engineer does not allow a high-carbon steel to be used in steel bridge-construction, subjected to rapidly shifting loads. If the concrete carries an undue proportion of strains, and if this is a brittle material, then indeed such a construction is dangerous, where subjected to sudden impact. It is like dropping an anvil on a cube of glass. If, on the other hand, the principal stresses are taken up by the steel, and if the concrete is subjected to compression alone, and if it is known that at ultimate destruction such a structure fails by drawing the steel in two at place of maximum bending-moment, then indeed we have an elastic structure. Good mild steel will stretch as much as twenty per cent of its length before failure, and a structure properly reinforced so that slipping of steel is impossible, and where shear, both vertical and longitudinal, are well provided for, should deflect as much as 12 inches or more before failure, depending entirely on the span and depth of beam. Such a construction as this would be scientific indeed. It would possess the rigidity of concrete together with the elasticity of the steel. It would have resistance, and give ample warning before failure when overloaded. Such construction alone seems safe to the writer for use on building and railroad work, and any construction wherein concrete fails by shear most decidedly dangerous. Almost any structure that can be built of steel can be erected in reinforced concrete, at an economy of as much as fifty per cent at times. All of the advantages of steel may be obtained without any

of the disadvantages, if concrete is properly reinforced; and combined with these advantages are the beautiful and remarkable properties of the permanency of good concrete.

What if a material may be subjected to rough treatment! Should this be a reason for discarding it? If in a structure costing twenty or thirty thousand dollars a saving has been made of from five to ten thousand, would this not be ample to pay for the employment of a good, careful inspector? Why do we insist on a mill inspector, a shop inspector and a building inspector, for steelwork, and on the other hand allow sidewalk contractors to erect our most costly reinforced concrete structures? Does the blame lie with the contractor? No, by no means, no. Whoever turns responsible scientific work over to a man lacking knowledge of the materials with which he is dealing is just as much, and even more so, to blame.

The writer feels himself somewhat at a disadvantage in discussing reinforced concrete, being a patentee of several methods of reinforcement; at the same time, self-protection as well as the interests of all engineers specializing in this class of work, demands that some reason be given for the large number of failures repeatedly occurring. In the writer's early practice a large amount of concrete work was done for him by a number of concerns representing well-known systems. It was the wretched, unscientific work of these parties which compelled him, for his own self-preservation, to study this new field, in order that he might prevent them from having catastrophes in his own buildings, for which they had previously submitted every sort of guaranty with bonds. Observing these wretched methods of reinforcement, and studying the failure of concrete beams, he decided upon certain methods as being most theoretically perfect, and subsequently secured patents for same.

Although the writer lays great stress on the nature of the material used, and its mixing, he believes that the matter of reinforcement is a dozen times more important, and he ventures to say, that even the poorest mixture of concrete, if it were properly reinforced, would carry large loads before failure. Under safe loading the concrete should not be stressed more than 400 pounds per square inch in compression, and a mixture must be very weak indeed, which will not stand four or five times that weight. If the nature of the reinforcement be such that the concrete is subjected to compressive stress only, and the steel takes all tensile strains, whatever their location may be, then failure seems almost impossible under safe loading.

In concrete structures erected by the writer, the centering has at times been removed with perfect safety at the end of three days. Surely the concrete has not set to sufficient hardness to carry heavy strains other than compression at that length of time. Tension and shear had been entirely provided for in these, and the writer knew very well that even at the end of three days, the concrete had sufficient hardness to carry three or four hundred pounds per square inch in compression, and, therefore, the safe load.

Proper reinforcement is the first essential; good material and mixing are only secondary as compared with this. The writer has embedded his system of reinforcement in a beam of ice, of 14 feet span, and otherwise of the usual dimensions of a concrete beam, and then imposed heavy loads thereon. Surely, great shearing and compressive resistances were lacking here; surely even the poorest mud concrete should equal this construction, and yet the beam stood up like a rock under loading. Is this sufficient proof that proper reinforcement has something to do with the safety of reinforced concrete structures?—JULIUS KAHN, *Assoc. M. Am. Soc. C. E.*

THE ARCHITECTS' SCHEDULE—A SUGGESTION.

AT the Convention, in Cleveland, of the American Institute of Architects a schedule was adopted for the general practice of architects throughout the United States.

As it was impossible at the Convention to adopt a schedule which could be mandatory on all the Institute, owing to the different conditions of practice in the different portions of the United States, I nevertheless think that it is possible to have a schedule among local Chapters which shall be mandatory on its members, and which shall not only set forth the charges made to our clients, but which shall also state the architect's position in respect to his client in a business way.

I therefore submit to the readers of this article the following suggestions for their criticism or approval, with the hope that the practice of architects may be improved. These I have termed "Schedule of Professional Practice and Business Relations between Architect and Client."

GEORGE H. INGRAHAM.

PROFESSIONAL SERVICES, BASED ON SCHEDULE OF MINIMUM CHARGES OF AMERICAN INSTITUTE OF ARCHITECTS.

1. PROFESSIONAL services consist in making the necessary preliminary studies, general working drawings, specifications of all materials involved, large-scale and full-size details, charge of accounts, contracts and certificates, general direction and supervision of the work, for which the charges, upon actual cost of work involved, are as follows:—

- (A) New work (except new work under \$10,000) . . . 5 per cent.
- (B) New work under \$10,000 7 per cent.
- (C) Alterations or additions to existing buildings . . 10 per cent.
- (D) Work costing less than \$1,000, special price, according to time and expense involved.

NOTE.—The above percentages do not include surveys, landscape-work, plumbing and sanitary work, heating and ventilation, electrical work, mechanical work, hardware, gas and electric fixtures, designs for elaborate interior and cabinet-work, mantel and furniture designs, decoration, travelling expenses, clerk-of-work's fee and special fees, which are charged as follows:—

2. Surveys charged at actual cost to architect.

3. Landscape-work, plumbing and sanitary work, heating and ventilating, electrical work, mechanical work, hardware, gas and electric fixtures, elaborate interior and cabinet work, when drawings and specifications are executed and work selected and supervised by architect, will be charged at ten per cent of the total actual cost of the work completed, unless a special expert is employed; then the charge will be cost of expert's fee plus two per cent of the total actual cost of the work, on the understanding that the expert superintends the work.

4. Mantels and furniture designs will be charged at the rate of ten per cent or more of cost, according to character of design.

5. Decorative designs and advice will be charged at rate of ten per cent or more of cost, according to character of work.

6. Travelling expenses will be charged at actual cost of travelling expenses and hotel expenses. If time of travelling or superintending requires more than two days' absence from the office, an additional charge at the rate of twenty-five dollars per day for architect, and for assistant at cost to architect, will be made after the two days have expired.

7. On important buildings it is usual to employ a clerk-of-works, whose office is the constant supervision of the work for the interest of the client. He is appointed or dismissed by the architect, and employed at the client's expense.

No deduction from architect's commission is made if clerk-of-works is employed, when architect superintends work also.

NOTE.—The supervision of an architect (as distinguished from the continuous personal superintendence of a clerk-of-works) means such inspection by the architect, or his deputy, of a building or other work in studios and shops and in process of erection, completion or alteration as he finds necessary to ascertain whether it is being executed in conformity with his drawings and specifications or directions. He is to act in constructive emergencies, to order necessary changes, and to define the true intent and meaning of the drawings and specifications, and he has authority to stop progress of the work and order its removal when not in accordance with them.

8. Special Fees.

(A) Charges will be made for consultations where no work or drawings are executed in proportion to importance of question involved, and for personal services at rate of twenty-five dollars per day during office hours. Evening and Sunday consultation extra.

(B) Charges will be made for all legal fees that may from necessity arise in connection with the work, except legal fees necessary for making contracts.

(C) Charges will be made for changes and alterations in plans or for new plans caused by client after working-drawings are made, at actual cost to architect of the time and expense involved.

(D) Charges will be made on all extras made by client at the same rates as general work.

(E) Chemical and mechanical tests, when required, are paid for by client.

9. Special agreements between architect and client to be in writing. Otherwise it is understood that agreements will be made as according to this schedule.

PAYMENTS ON COMMISSION.

Until an actual estimate is received, the charges are based on the proposed cost of the work, and payments are received as instalments of the entire fee, which is based on the actual cost valued as if executed with labor and new materials at the market price.

The architect's payments are due from time to time during the progress of the work, as the drawings are completed and work supervised, as follows:—

On Completion of Drawings and Supervision for Work included in No. 1—A, B, C, D:—

(a) Preliminary studies alone, one-fifth of total general commission.

(b) Preliminary studies, working-drawings, specifications, three-fifths of total general commission.

(c) Preliminary studies, working-drawings, specifications, large-scale and full-size details, seven-tenths of total general commission.

(d) Supervision of work, accounts, correspondence, contracts and certificates, three-tenths of total general commission.

For work under Nos. 3, 4, 5, one-half commission when contracts are ready to let; balance when work is completed.

For work under Nos. 2, 6, 7, 8, thirty days after presentation of bills.

Each bill is a credit on final payment.

Work Abandoned or Suspended:—

For work abandoned or suspended, charges will be made for condition of work at point client orders work abandoned or suspended.

DRAWINGS, SPECIFICATIONS, ESTIMATES AND COST.

Preparation.—In preparing designs, after consultation with client, the architect agrees to use his best judgment. He cannot guarantee, however, that the design, before estimates are actually made, will not exceed client's cost, or architect's approximate estimate. He will use every effort to keep the cost as low as possible, but he is not to be held responsible should actual estimate exceed proposed cost.

Estimates and Cost.—If estimates are made while drawings are in the pencil state, before being inked-in or blue-printed, the architect agrees, where said estimates exceed the client's stated cost, to make changes in plans to reduce cost, if possible, without any extra expense to client.

If client is in a hurry for the work and orders architect to finish up drawings, specifications and blue-prints for estimates, then client must stand the expense of making over his plans if they exceed his cost.

Drawings furnished.—Architect will furnish one set of blue-prints and specifications to client, and two sets of blue-prints and specifications to general contractor upon the work.

Extra prints, other than above stated, to be charged at actual cost to architect.

Property in Drawings and Specifications.—All drawings and specifications are instruments of service, and are the sole property of the architect, to be returned to him when work is abandoned or completed.

The architect's ideas are what the client pays for, not the drawings.

Architect's Responsibility.—The architect understands that in issuing written orders for extras or allowances to contractors that he will endeavor to confer with client for his sanction of and for his signature on same, but where not possible to do so, in constructive emergencies that may cause serious delay to the work, he understands that he has full authority in such cases to issue written orders in the name of the client. If client wishes to give architect full authority to issue written orders for all allowances and extras, he must so empower him in writing.

The architect agrees to use every endeavor to see that the contractors complete their work within stipulated time, but in no case is it possible for him to guarantee that they will do so.

It is important that all dealings between client and contractors be transacted through the architect or his office.

When the contractor follows the client's positive instructions, the architect does not assume any responsibility whatsoever.

The best results for client will be obtained when architect has full charge of all branches of work. He cannot be held responsible for different parts of work for which he is not paid to look after.

The architect recommends that in asking for estimates, only parties of good responsible and financial standing be invited. When contracts are made with contractors who are irresponsible, the architect is not responsible for their deficiencies.

Sub-contracts.—It is understood that the several works involved in the erection of a building shall be let in a general contract, except plumbing, heating, electrical work, etc., as may be agreed upon. If the client desires to sub-let the several works, such as mason-work, carpenter-work, plastering, etc., two per cent will be charged in addition to the schedule rates hereinbefore named, if architect has full charge.

The above conditions and terms of payment are understood between us (unless otherwise stated in writing) in so far as they apply to the work involved, and to a faithful fulfilment of the same, we bind ourselves, heirs, administrators and assigns, by setting our signatures and seals hereto.

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ARCHITECT,
In witness of,

Seal.
Seal.

GEORGE HUNT INGRAHAM.

BOOKS AND PAPERS

A VERY prominent and successful architect who has come in contact with a great many draughtsmen and young architects used to say that whenever he found a young man who was a thoroughly good free-hand letterer, that young man was pretty sure to develop sooner or later into a first-class architectural draughtsman. The converse, that a good architect is necessarily a good letterer, by no means follows, but it is undoubtedly true that the man who has the feeling for making the lettering on a drawing appear to advantage is one from whom we should expect interesting architecture. Considering the importance of lettering on architectural drawings, it is somewhat remarkable that so little attention has been paid to it. We have two books on the subject before us. The title

of Mr. Wilson's book¹ is in a certain sense a misnomer, for the lettering which he describes, and for which he lays down such careful rules of procedure, is far from being free-hand. It is rather of a mechanical kind which we find upon engineers' drawings, but for such the work is very carefully described, and the descriptions are made of great value by the accompanying illustrations, showing not merely the finished letter of the various kinds, but the way in which the strokes are made and their order. The lettering he shows is thoroughly neat, appropriate, and one could learn a great deal from studying the book. Its lack is simply in matters of taste. Mr. Brown's book² is especially characterized by the beauty of the letters themselves and the good taste with which they are disposed for display. They are not as well analyzed and the construction is not made as clear as in the first volume, so that really the beginner would need both books to acquire full facility in rendering, the one for its solid practical worth and the other for its artistic beauty.

ONE would suppose that the only preparation necessary to enable one to measure up the woodwork for a building would be a fair knowledge of arithmetic and a common-sense acquaintance with a two-foot rule, but there are a few special points which have to be considered, and these are clearly and concisely set forth in a small volume,³ which, though intended primarily for the mechanic, would at times be of a certain value to an architect.



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

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COURTYARD DETAIL OF THE SAME.

NOTES AND CLIPPINGS

USE OF PEAT-GAS IN IRON-MAKING.—The use of peat-gas for fuel purposes is of long standing in the iron and steel industry of Sweden, in which it is preferred to coal-gas, on account of its much greater freedom from sulphur and phosphorus. At the rolling-mills peat-gas is used in the plate-furnaces, with the result of reducing the formation of scale, particularly in rolling thin steel plates. The use of peat-gas has contributed largely to improving the quality of Swedish steel. Peat,

¹"Free-hand Lettering." Being a Treatise on Plain Lettering from the Practical Standpoint for Use in Engineering Schools and Colleges. By Victor T. Wilson, M.E. First Edition. New York: John Wiley & Sons.

²"Letters and Lettering." A Treatise with 200 Examples. By Frank Chouteau Brown. Boston: Bates & Guild Company.

³"How to Measure up Woodwork for Buildings." Describing the Simplest and Most Accurate Methods to be Followed when Figuring up all the Woodwork Required for Either Brick or Frame Houses. By Owen B. Maginnis, Architect, Inspector of Buildings of the City of New York. New York: Industrial Publication Company. 1903. Price 50 cents.

like wood, particularly green wood, is naturally suited, on account of its large percentage of moisture, to steady production of mixed gas, rather than to the alternate generation of first water-gas and then producer-gas, as with dry fuels, such as coal. — *Journal of the Franklin Institute.*

THE GERMAN EMPEROR'S GIFT TO THIS COUNTRY. — Professor Uphues's statue of Frederick the Great, presented by Emperor William to the United States, has been ready to be shipped for several weeks, but no intimation has come from Washington as to when the authorities want it sent. The newspapers in opposition to the Government or unfriendly to the United States continue at intervals to comment on the "contemptuous disregard of his Majesty's gift shown by the United States," and find fault with the policy of conciliation towards "the Yankees, who mistake German courtesy for weakness." — *Exchange.*

THE ASSOUAN DAM AND THE SPHINX. — One effect of the great masonry dam at Assouan, and of the increased irrigation of Egypt during recent years, was unlooked for. A dozen years or more ago an hour's downfall of rain a year was a novelty, where now fifteen or eighteen days of heavy rain fall. Although of such recent occurrence, consequent disintegration of ancient stonework can already be traced. The great Sphinx is a case in point. The surface has been thoroughly sodden by the rains, and the fierce sand-storms which follow have made a sensible effect upon the great monument. It is curious that the work of the modern mason is thus helping to destroy ancient stonework which has stood for many centuries. Incidentally this has thrown considerable light upon the weathering of stone. It is evident that the marvellous way in which the ancient Egyptian masonry has been preserved is due chiefly to the rainless character of the climate. For ages the regions of the lower Nile were watered solely by the river, and beyond the limits of its annual overflow the ground was perfectly dry. So much was this the case, that the tents left by Napoleon's army lay on the sands for nearly a century, bright and unrotted. But even eighteen or twenty days of heavy rain during the course of twelve months have made an astonishing change. Doubtless the surface of the stone was in a state of incipient disintegration, although apparently sound. And this has caused the rapid change evident during the past few years. But it is quite certain that the amount of rainfall is a most important factor in determining the life of a stone building in any particular district. — *Stone Trades Journal.*

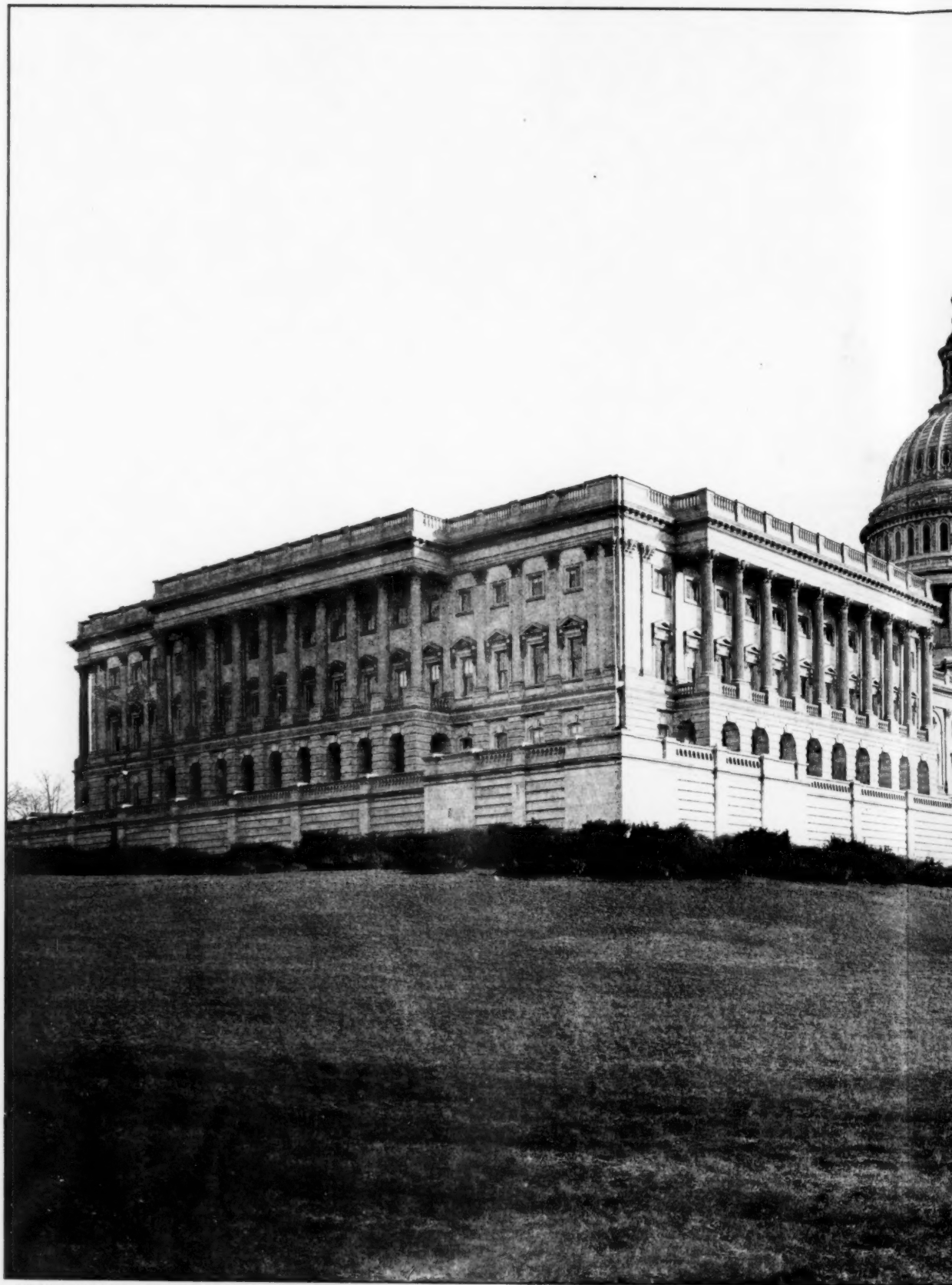
THE INSTITUTE OF FRANCE AND THE CHATEAU DE LANGEAIS. — It will be strange if the French Institut should become the proprietor of many palaces. There are people in France who consider that body to be more enduring than any form of government, whether republican, monarchical or imperial. The example given by the Duc d'Aumale when he made over Chantilly is not unlikely to be followed by others possessing renowned buildings which they wish to have preserved. The Château de Langeais, on the banks of the Loire, is a building which looks well from every point of view. The skyline is broken by a great number of chimneys and conical roofs, and a Scottish traveller might well imagine he saw before him one of the great northern mansions. The connection of the structure with Louis XI also recalls associations of Quentin Durward. It owes its historic importance to the circumstance that in it the marriage of Charles VIII and Anne of Brittany took place. The hall in which the ceremony was performed remains almost unaltered. The original building was founded in the eleventh century, and for many years the castle seemed as if it were destined to be the property of whoever captured it. In our time it fell into the hands of M. Jacques Siegfried, who has been careful to restore it as far as possible to what it was in the thirteenth century. The entrance is reached by a drawbridge protected by towers. In the inner court there are three towers. On the work of restoration M. Siegfried has expended a large sum of money, and he may have had a foreboding that if it was purchased it might be modernized. Possession will not be obtained by the Institut until after the death of M. and Madame Siegfried. A part of the park will be reserved for an asylum for old people founded by Mlle. Siegfried. It is a noble gift of which the members of the Institut may well be proud. — *The Architect.*

DURANGO'S IRON MOUNTAIN. — James A. Le Roy, Consul of the United States at Durango, Mexico, writes to the Department of State concerning the iron mountain at that place, giving interesting details, as follows: "This solid mass of iron ore, close to the International Railroad Depot at Durango, has figured in story and fable ever since the Spaniards and the Mexicans from the South first reclaimed this region from savages akin to the Apaches, more than 300 years ago. Writing in 1803, Baron Humboldt, who did not quite reach Durango in his explorations, but who had seen samples from this mass of iron, called it 'that enormous mass of malleable iron and nickel whose composition is identical with that of the aërolite which fell near Agram, in Hungary, in 1751. It is asserted that this mass at Durango weighs nearly 1,800 myriagrams, or 400 times as much as the aërolite discovered by M. Rubin de Celis in Olumpa, Tucuman.' Humboldt evidently thought that this might be the world's greatest aërolite. Geologically, examination shows it to be a very remarkable 'dike,' emerging from a rocky plain at an elevation of 6,300 feet, rising from 400 to 650 feet in height itself, and forming a tremendous lump of iron ore one mile long and one-third of a mile wide. It has been calculated to contain 500,000,000 to 660,000,000 gross tons above the surface, with no notion of what may be below. The ore is a hard, specular hematite, carrying on an average sixty per cent of metallic iron, much of it going higher, and some even to sixty-seven per cent. It is suitable for practically all processes of iron and steel making. One might think that such property as this, where 'mining' consists simply in knocking

down the sides of a mountain to obtain a rich iron ore, in a country whose industrial expansion is demanding larger and larger importations of iron and steel, would be better than the best proverbial bonanza of gold. The fact is, however, that the Mexican National Iron and Steel Company, an American concern whose mining claims cover about one-half the mountain, has never until lately been a paying concern. This seems to have been due, first, to the fact that it was formerly operated with a view solely or primarily to sale of stocks, and, in the second place, to the difficulties in securing at a reasonable price fuel with which to operate it on a paying basis. Charcoal can be obtained near here, made from the timber on the Sierras to the westward, but its production has always been limited and relatively expensive. Coke was formerly brought from the United States, and at such prices that the marketing of the company's iron products in Mexico, except at nearby points, was, when the high freight rates were added, very commonly at a loss, or no gain in competition with American iron products. As stated, Mexican coke is now obtained, and at considerably lower prices. Moreover, the concern is being managed primarily as a business enterprise. Facilities are being added for an increased output, and everything augurs great prosperity for this institution, which now turns out in its foundry and machine-shops steam-engines, hoisting machinery for mines, stoves, and simpler products, such as nails, as well as bar iron. The steel plant, which the company's name implies, may soon be added. Railroad extensions now promised to Durango will have a very direct influence in developing this business. The railroad to the Pacific Coast would open up the great timber-clad regions of the Sierra Madre, disposing in large part of the fuel problem. A projected branch of the Mexican Central, bringing Durango much closer to Mexico City, and, in particular, introducing an element of competition in freight-hauling, would inevitably extend the market for the company's products much more rapidly than it could be met." — *Exchange.*

THE CITY OF MEXICO. — This is a city with an immense future. You can safely enter this remark in your notebook. You can refer to it ten years hence, and underscore it approvingly. By that time all the troglodytes and pessimists will have been buried in the expanding cemeteries or be dwelling, quite at their ease, in the handsome residential sections of the city, already filling up with progressive people. Twenty years ago — cobblestones, people living over shops and offices, not one fine display of merchandise of the luxurious sort anywhere to be seen, plateglass windows unknown, and ladies shopping from their carriages, the assistants bringing out the goods for inspection; people all huddled inside the "hull of the city" for fear of robbers and what might happen in "the next revolution." Sad-visaged men of prominence standing in their zaguan doors, predicting "terrible times" and asserting that they were "going back to Europe." They did not go back; they all stayed here and accumulated wealth; the "next revolution" was always nipped in the bud by a great statesman who was never slow to stop the plotters, and who by diversifying employments made it easy for every industrious man to win his bread. The old city grows and grows; new streets, a keen demand for electric-lighting, sewers and water; the municipal administrators hardly able to keep abreast of the calls upon them. Smooth asphalted streets with swift automobiles gliding over them; charming and elegant homes furnished with everything that modern luxury can furnish; great shops existing to supply the demands of taste and wealth; the middle class rising into power and influence; nowhere any sign of halt or retrogression. As a capital of a country which is all alive with new activities, with wealth fast accumulating in the interior, this city is bound to keep pace with it all; hither come, already, rich men from all over the republic to establish their new homes; here they find their "Paris." Here are clubs, the theatre, splendid shops, the luxuries they crave. Hence this capital grows like a young giant. The City of Mexico is on its way to a vastly greater population, to a splendor and an elegance of which we now catch prophetic glimpses. Lucky is the young man who is growing up with it, who has a stake in its real estate, who is to be one of the substantial citizens here in the year, say, 1930. — *Mexican Herald.*

ARCHAEOLOGICAL EXCAVATION IN CRETE. — Miss Harriet A. Boyd, instructor in Greek at Smith College, who has been conducting the excavations for the American Exploration Society at Gournia, Crete, in a letter detailing the results of last season's work, says: On the eastern slope of the low acropolis we uncovered a new quarter of town, a block of houses bounded by paved streets. The new street which connects the valley road with the top of the hill rises by twenty steps like the streets of Naples. The houses are built flush with the road and close together. They are of about equal size, and although small, are well built, on quite the modern plan of cellar, ground floor and upper floor. It must not be supposed that these three stories remain, but there is ample evidence of their former existence. Forty houses have been cleared in addition to the palace, and Gournia, as it stands to-day, is beyond comparison the most complete and best preserved town of its period above ground. It refutes a statement made by Prof. Percy Gardner of Oxford in his "New Chapters of Greek History," published in the nineties. He writes, on page 97: "There is a broad line dividing mythical from political Hellas, which seems to coincide with the great break made in the continuity of Hellas by the Dorian invasion. On the more recent side of that line, we see vigorous communities choosing their own governments. . . . On the older side we see the castles of magnificent princes standing among the huts of their dependents." This is quoted by Mr. Warde Fowler in his "City-State of the Greeks and Romans" as a true picture of pre-Hellenic life. Gournia tells a very different story. Instead of huts clustered about a castle we see a well-built bourgeois town and every evidence of settled civic conditions. — *Exchange.*



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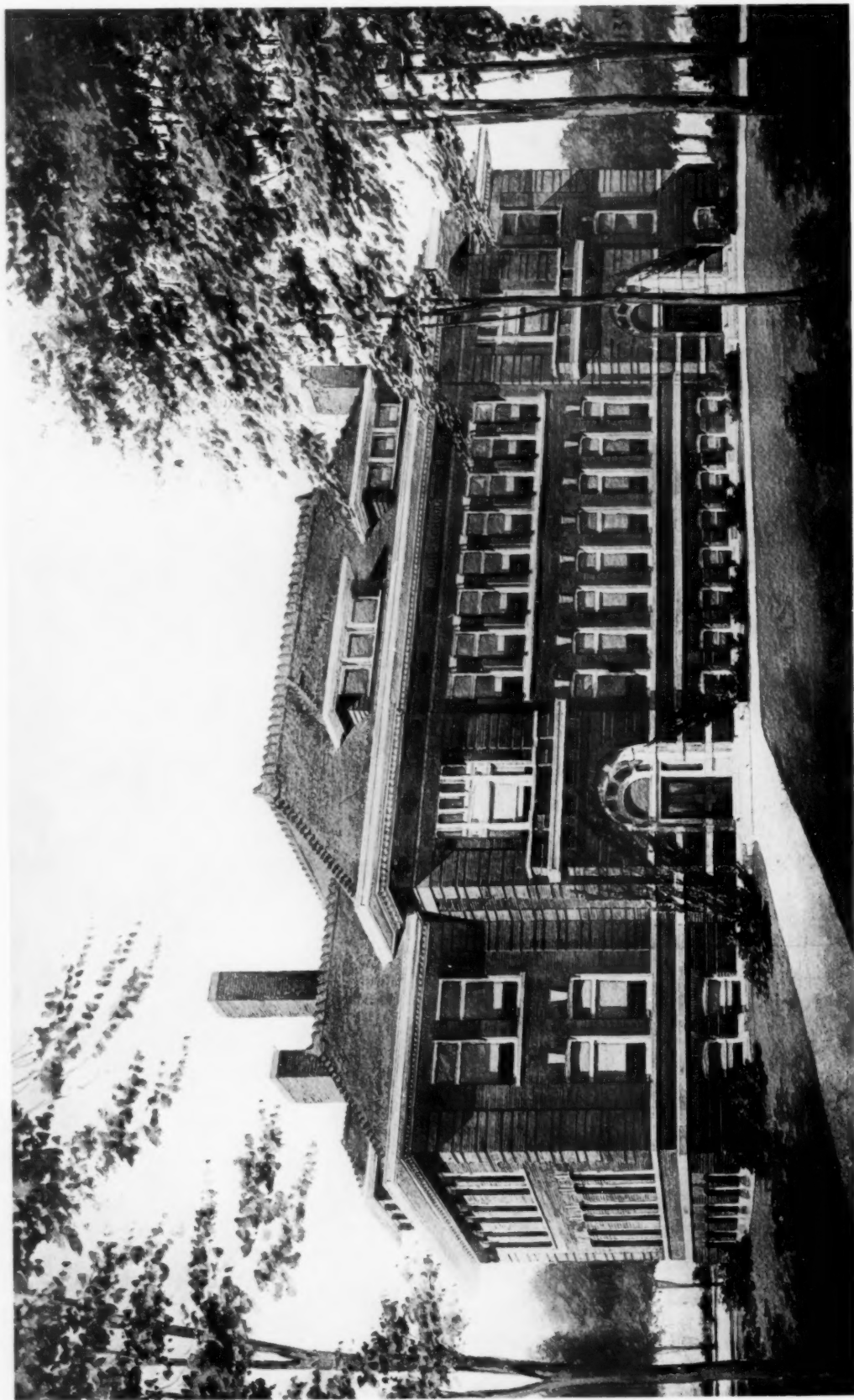
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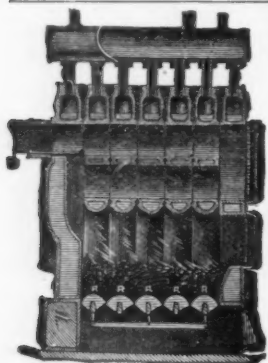
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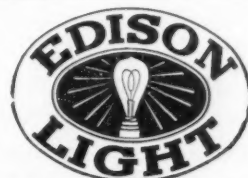
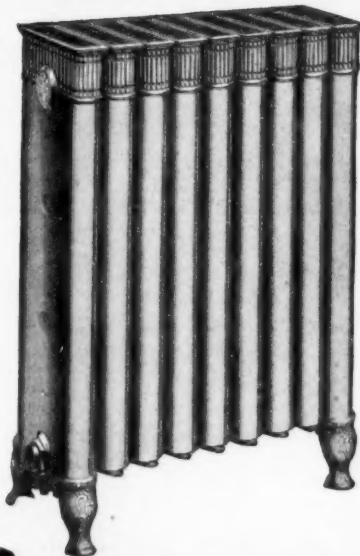
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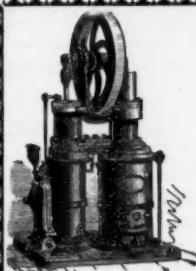
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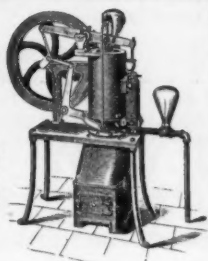
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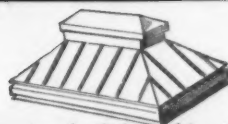
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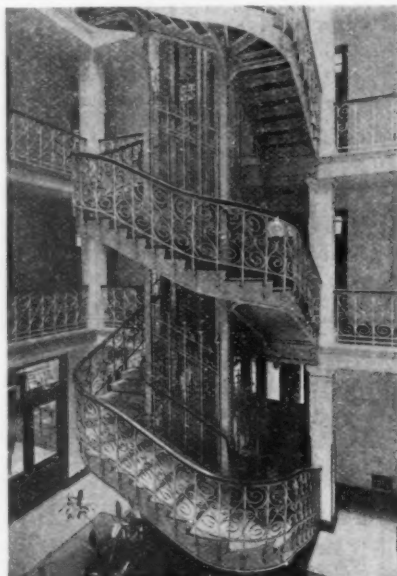
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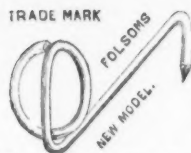


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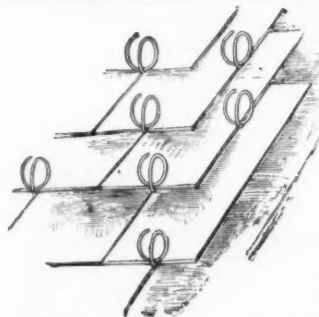
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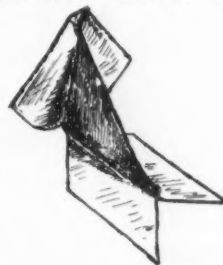
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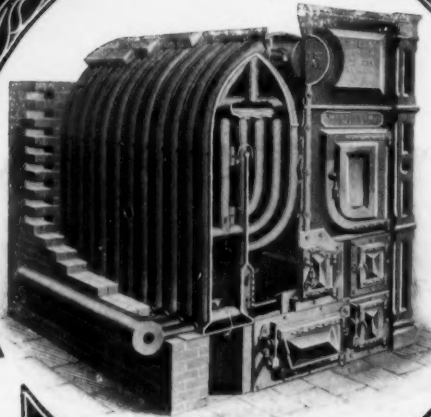
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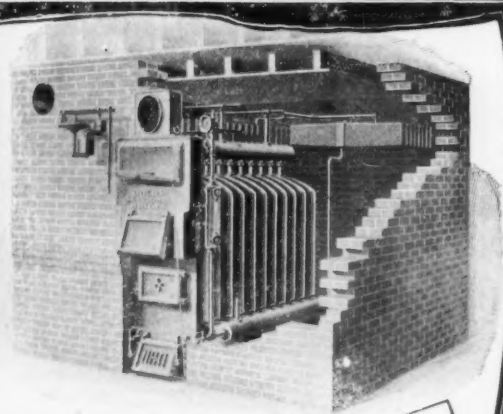
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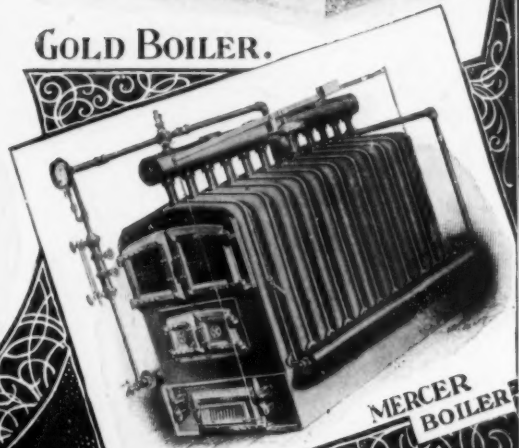
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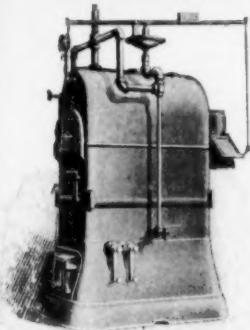
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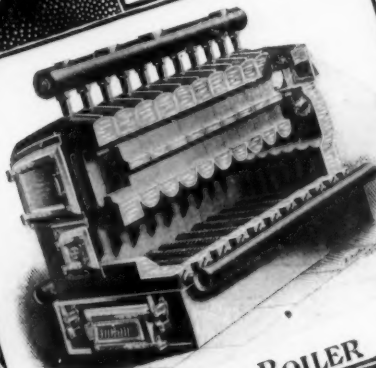
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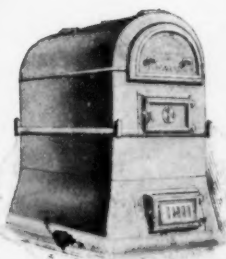
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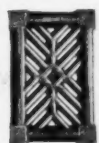


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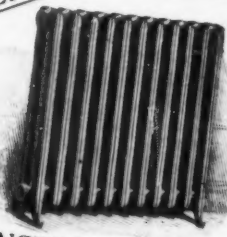


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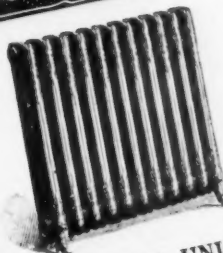


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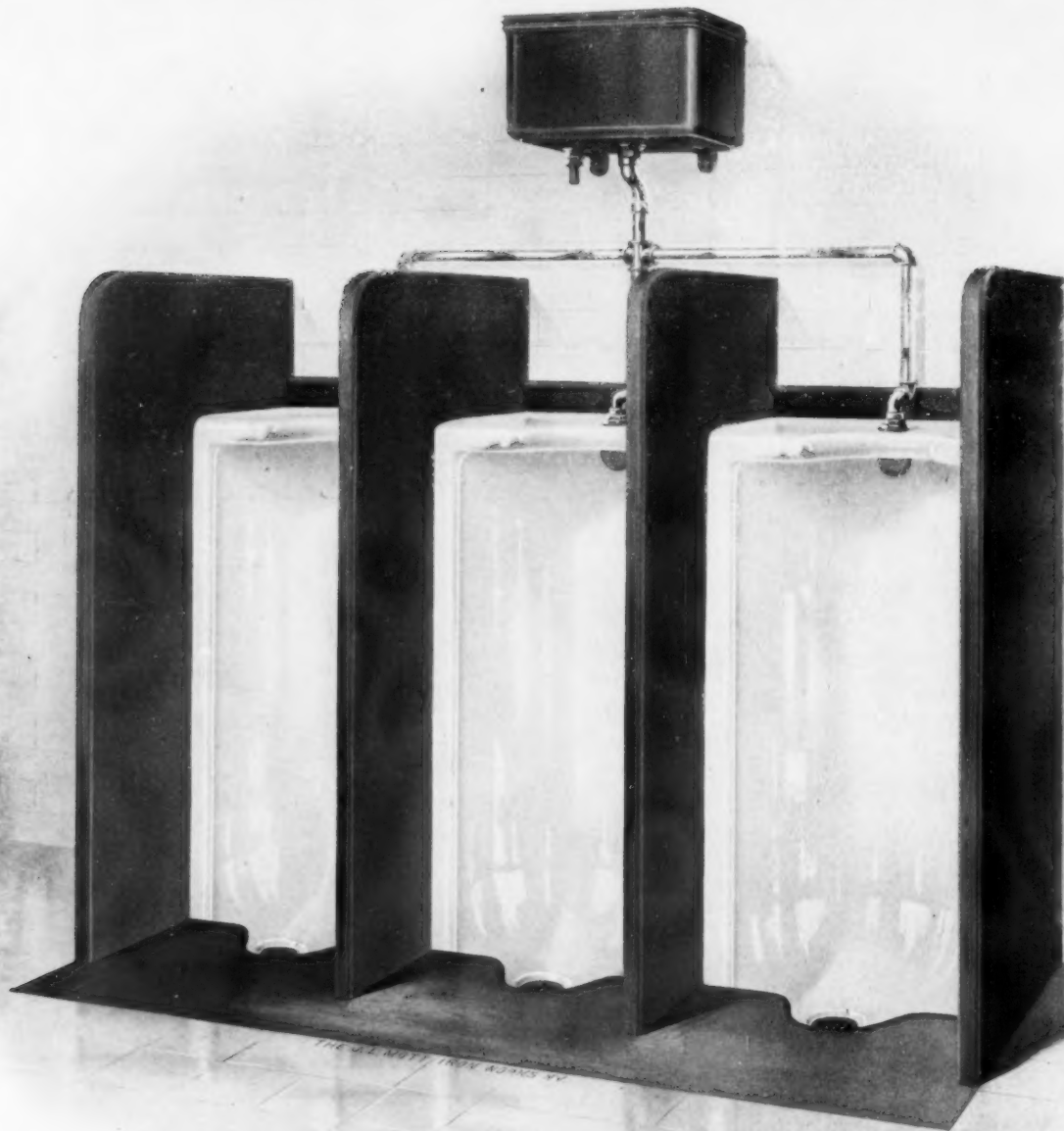
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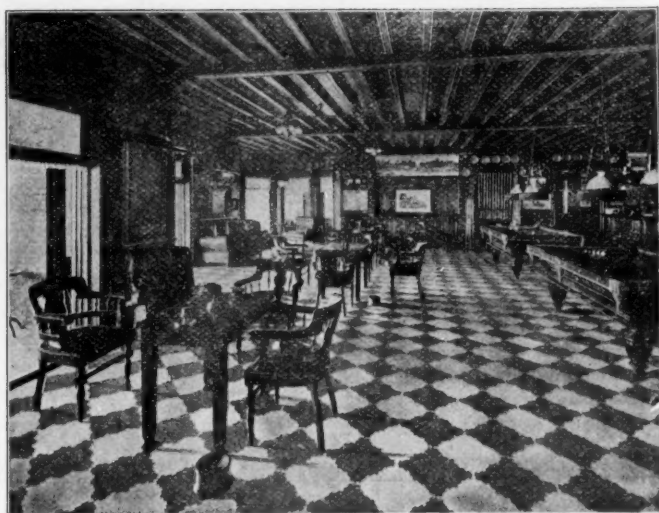
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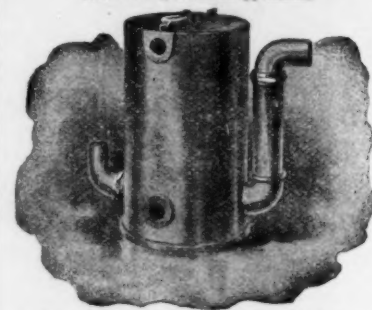
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BUILDING INTELLIGENCE.

(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 SUMMERS.

Aberdeen, Mass.—The Westminster Co. has sold a lot of land located on Leamington Road, overlooking Commonwealth Ave., containing about 12,000 feet. The purchaser will erect a stone house for his own occupancy.

Asheville, N. C.—R. S. Smith of this city was chosen as the architect for the new auditorium at the meeting of the directors recently, with the proviso that his plans, modified to meet the approval of the stockholders, shall not call for an expenditure of more than \$30,000, all told.

Baltimore, Md.—The contract for remodeling and making extensive improvements to the store of D. Lowenthal, corner of Howard and Lexington Sts., which will be occupied by J. A. Kohner, who has purchased the site on which the building rests, has been awarded to Morrow Bros. The improvements will consist of such alterations and additions as will be needed to make of the building a department store, modern in every feature. New floors, ceilings, lights and elevators will be among the features of the store, and work on these will be begun at once, in order to have things ready in six weeks' time for the new firm to move in.

Bellevue, Pa.—The Trustees of the Bellevue M. E. Church are contemplating the erection of a \$40,000 brick and stone edifice at California and Home Aves., Avalon.

Beverly, Mass.—The Davenport farm on Cabot St., containing an old Colonial mansion and several acres of land has been sold to a syndicate of Beverly and Boston persons. It is said the property will be opened up in the way of house lots.

Boston, Mass.—Two bills, with accompanying petitions, have been received in the Massachusetts House for the enlargement of the Suffolk County Court-house in this city. One by Mr. Vinson, of Boston, recommends the appointing of a commission to procure plans for an addition of one or more stories. The city is authorized to incur indebtedness beyond the debt limit of \$1,000,000. The Aylward Bill is similar, except that it provides for the expenditure of \$1,200,000, divided equally between the city and the commonwealth.

Bridgeport, N. J.—Horton & Hemmenway, of Providence, R. I., are to erect the new half million dollar depot here for the New Haven Railroad system. It will be constructed of buff brick with granite trimmings.

Brookton, Mass.—Josiah F. Prescott has sold to F. C. Fletcher, of Melrose, a lot of land on the southern side of Boyden St., containing 7,500 feet. The purchaser will build a dwelling-house.

Construction of the new high school building on Warren Ave. will be started in the spring, if the commissioners can secure the additional money from the city government that is needed to complete and equip the structure, according to the plans accepted by the city and approved by the school committee. The plans accepted by the city will present a building that will cost about \$255,000.

Brooklyn, N. Y.—Another hotel is being projected in the vicinity of the Long Island Railroad station. A syndicate has purchased some property running between Livingston and Schermerhorn Sts., in the



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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

vicinity of Flatbush Ave. No work will be done on the building, which it is proposed to make twelve stories in height, until the question as to whether Livingston St. will be widened or not is settled. The hotel is to cost \$1,250,000, and will be first-class in every respect.

Plans for a fifteen-story modern hotel are being made by Farfitt Brothers, for a group of capitalists, who are considering the building of such a structure on the site of the old Academy of Music, in Montague St., Brooklyn. It is proposed to invest \$2,000,000 in the project, \$610,000 of which will probably be paid for the site.

Cambridge, Mass.—A new seven-story dormitory is to be erected for Harvard students on Mt. Auburn St., beside Claverly Hall. The building will contain 34 single suites. It will be equipped with a house telephone, shower-baths, steam heat and besides all other modern conveniences. Mr. Isaac McLean is the owner and the dormitory will be named Ridgely Hall.

Plans have been prepared by F. A. Norcross, 110 Tremont St., Boston, for a \$200,000 edifice for St. Paul's R. C. Church on Bow and De Wolf Sts.

Camden, N. J.—The Trustees of the Free Public Library have invited the four following architects to compete in the competition for the successful design for the new Carnegie Library, at Broadway and Line St.: Cope & Stewardson, Frank Miles Day & Bro., Herbert D. Hale, with Henry G. Morse, Jr., as associate, William L. Bailey.

Cedar Rapids, Ia.—It is understood that A. H. Connor, of this city, will erect the Allison Hotel. Cost, \$100,000. Dieman & Flake, architects.

Chattanooga, Tenn.—The Oak Street Cumberland Presbyterian Society will erect a handsome dwelling for its pastor. The Centenary Methodist Society has about decided to erect a new church edifice.

Chicago, Ill.—Plans have been perfected for a sixteen-story store and office building to cost \$1,600,000, which Otto Young is to erect at the southwest corner of Wabash Ave. and Madison St., upon the property known as St. Mary's Block. The building is to have a frontage on Madison St. of 180 feet, and on Wabash Ave. of 80 feet. It is the intention of Mr. Young to make this building one of the most attractive improvements in the business section of the city. The exterior will be of white enameled

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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

tile and the interior is to be finished in mahogany and marble. The main entrance will be in the middle of the Madison St. frontage, and there will be another entrance near the south end of the building on Wabash Ave.

At a cost of more than \$250,000, a new hospital is to be built on the site of Michael Reese Hospital, 29th St. and Groveland Ave. This was decided by the United Hebrew Charity Association at a recent meeting. Subscriptions of \$115,000 were made at the meeting, contingent, however, on the raising of the rest of the sum needed.

George W. Stewart has arranged for plans for 43 flat buildings, costing in the aggregate \$400,000, on which work is to be started early in the spring. A. E. Colcord is the architect. Thirty-seven of these buildings, two stories each, are to be built at W. Harrison St. and 45th Ave., at a total cost of \$275,000; a large three-story building with 27 flats is to be built in Buena Park, at a cost of \$75,000; 4 three-story buildings are to be built at Almslie and Evanston Aves., at a total cost of \$48,000, and a two-story building is to be built at W. Monroe St. and Kedzie Ave., at a cost of \$8,000.

Niels Buok has drawn sketches for a three-story stone front building, 50' x 70', containing 6 flats and an annex of 7 stores, 22' x 40', each, to be built at the southeast corner of Brompton Ave. and N. Halsted St., at a cost of \$35,000.

Contracts have been let for a three-story building at 4641-43 Prairie Ave., \$20,000; three-story building, 50' x 74', on Champlain Ave., near 50th St., \$20,000; 2 two-story buildings and one three-story building on Washington Park Pl., \$25,000; three-story building on Oakwood Boulevard, near Vincennes Ave., \$20,000; three-story building of 6 flats on Prairie Ave., near 47th St., \$20,000; three-story building, 50' x 75', 1419-21 Eastwood Ave., \$20,000; three-story building, 50' x 75', 5247-49 Calumet Ave., \$20,000.

W. Carby Zimmerman, 21 Van Buren St., will prepare plans for 83' x 92' sewerage pumping station. Cost, \$40,000.

Cincinnati, O.—Report states that John J. Ryan will erect a brick, stone and marble flat at Gilbert and Woodburn Aves., Walnut Hills, at a cost of about \$175,000.

Clinton, Ia.—Clinton Y. M. C. A. workers are planning to build one of the handsomest association buildings in the State, and a canvass for a \$50,000 fund has already started.

Columbus, Ind.—The School Board has accepted plans by E. E. Dunpal for a \$50,000 high school, and it is reported that the contract for constructing same will soon be let.

Danville, Ill.—A. W. Heiny, of Danville, proposes to erect a new opera-house on the site of the old house. It will be made as nearly fireproof as possible with the latest conveniences.

Darlington, Wis.—The Board of Supervisors of Lafayette County has accepted a bequest of \$125,000 to erect a court-house.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Denver, Col.—The contracts will be let at once for the new Broadway School at S. 15th and W. 11th Ave., costing \$150,000.

Des Moines, Ia.—The First Unitarian Society has an option on a site for the erection of a new church. Plans will not be adopted until the canvass for funds is completed. A \$30,000 building is expected. George Henry has plans for a \$5,000 residence to be built on Grand Ave. Will have hardwood finish, gas and electric light, hot-water heat, etc.

Hallett & Rawson have drawn plans for the new Carnegie Library, which will be two-story, of pressed brick with stone trimmings, steam heat, electric lights. Cost, \$50,000.

Dubuque, Ia.—The German Theological Seminary will erect a building. Cost, \$30,000.

Duluth, Minn.—The Board of County Poor Commissioners will erect a new county poor-house, at a probable cost of \$40,000.

Durham, N.C.—It is said that a charter has been granted to the Durham & Southern Ry. Co. to construct a railroad from Durham to Cary. Capital, \$1,000,000.

Edmond, Okla.—The corner stone of the new \$40,000 State Normal Building was laid recently under the auspices of the Masons.

Fort Snelling, Minn.—The military appropriation bill carries an item of \$50,000 for a hospital at this fort.

Franklin, Ind.—Plans have been completed by Harris & Shopbell, of Evansville, for a \$25,000 high school, and it is reported bids will soon be asked for erection.

Galesburg, Ill.—The congregation of the First Lutheran Church is said to be contemplating the erection of a \$75,000 building.

Glassport, Pa.—Glassport will build a new \$60,000 school-building to replace one recently destroyed by fire.

Grand Rapids, Mich.—The Non-Trust Plaster Co. has purchased a location for a \$50,000 factory which it intends to erect in this city. While at present nearly all the details of the purchase are withheld, it is said that plans for the factory have been drawn and that if it is built as now contemplated it will give employment to 50 or 75 hands.

Guthrie, Okla.—The general plans and front elevation of the proposed building at Guthrie have been prepared at the office of the supervising architect and were sent to the cabinet board for their approval. The building will cost the full \$100,000 appropriated by Congress and will be completed within the present year.

Hannibal, Mo.—Plans have been completed for a high school to cost \$50,000.

Hartford, Conn.—Brown, Thompson & Co. have plans for a brick automobile station and machine shop in this city. Isaac A. Allen, Jr., 906 Main St., Hartford, is the architect.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Indianapolis, Ind.—H. C. Brubaker and W. E. Eldridge have prepared plans for an eight-story building to be erected by the Vancamp Hardware & Iron Co., at a cost of about \$250,000.

Iowa City, Ia.—Plans have been prepared by Proutfoot & Bird, of Des Moines, for a science building for the State University. Cost, \$275,000. Bids will be received about June 1st.

Junction City, Kan.—The corner-stone of the high school building that is being erected here was laid recently by the Board of Education. The high school will have a manual training department and is being built at the cost of \$30,000.

Kansas City, Mo.—The contract for the construction of the extension to the federal building in this city has been let to John C. Robinson, of Chicago, at \$311,911, work to be completed by December 1, 1905.

Lafayette, Ind.—It is reported that a \$100,000 gymnasium is to be erected at the Purdue University.

Lake Charles, La.—The Majestic Hotel Co., with a capital stock of \$100,000, has been organized in this city. The new Company has secured one of the most centrally located blocks in the city, at the corner of Pujol and Bilbo Sts. The new building will be four stories high with a frontage of 257 feet on Pujol and 133 feet on Bilbo St. The entire building will be devoted to hotel purposes. Cost, \$100,000.

Lewiston, Idaho.—A three-story brick and stone structure to be used for an office-building is soon to be built here by the German Investment Co., recently incorporated with a capital of \$100,000. The building will be built and owned by this company and will cost not less than \$30,000. It will have a frontage of 80 feet and run back 120 feet.

Madison, Wis.—Cass Gilbert, of St. Paul, has won a competition for the building of a new high school in this city to cost, when completed, from \$500,000 to \$600,000. The building will be commenced this spring and will pay the architect 5 per cent.

Memphis, Tenn.—The new St. Patrick's Church to be erected at the corner of Linden and De Soto Sts. will cost \$50,000. It will be of pressed brick, stone, terra-cotta and marble. Plans by Chighizola & Harker.

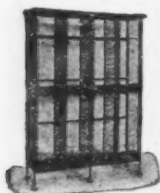
Milwaukee, Wis.—Ground will be broken the last week in March for flats, apartment buildings and residences which will cost over half a million dollars. At offices of architects the sentiment is that building operations here during the spring and summer will be far ahead of former years. It is said that Joseph McC. Bell will on the opening of spring break ground for the erection of 8 or 9 three and four-story apartment-buildings on the site of the old Bell homestead on upper Grand Ave. The structures, which will occupy both sides of the cross street running from Grand Ave. to Wells St., will cost over \$200,000, and will be of the most modern design of apartment-house architecture.



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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Minneapolis, Minn.—Plans for the new Orpheum Theatre to be built on 7th St., between Hennepin and Nicollet Aves. by the Orpheum Circuit Co. have been drawn by Kees & Colburn, the firm of architects which designed the new Chamber of Commerce, the Northwestern National Bank building, and other prominent business structures.

New Castle, Pa.—Plans have been prepared for the \$50,000 Masonic Temple, which is to be erected here by the New Castle Masonic Association. The structure will have a frontage of 80 feet on North St. and 100 feet on Apple St. and will be four stories in height. Buff brick and brownstone will be used in the construction.

New Haven, Conn.—The St. Joseph's R. C. Corporation has purchased a site on Edwards St. upon which to erect its new \$75,000 structure. Plans will be started immediately and just as soon as satisfactory ones are obtained and the specifications are agreed upon the contract will be made for the new structure. It will be of pleasing design.

New Ulm, Minn.—The new parochial school building to be erected by the Holy Trinity Catholic Church, of this city, will cost about \$55,000. The building is to be a handsome brick structure, two and one-half stories in height, and in dimensions, 93' x 158'.

New York, N. Y.—James E. Ware & Son have drawn plans for an eleven-story office-building to be erected by Charles A. Smith on his property, Nos. 43 and 50 W. 35th St., 49' x 100'. The plot is now occupied by 2 three-story dwellings.

Postmaster-General Payne recommends a site for a post-office in the uptown district, comprising a frontage on the west side of 8th Ave. and a depth of 640 feet on 31st and 33rd Sts., to a street to be hereafter made. He also recommends a \$2,000,000 appropriation.

Norwich, Conn.—Congressman Brandegee has introduced in the house a bill to increase the cost of construction of the Norwich post-office to \$115,000, instead of \$110,000, as provided by the original appropriation passed some time ago. The extra \$5,000 is needed to make the excavation deeper.

Palm Springs, Fla.—A new fire-station is to be erected on Orange St.

Pasadena, Cal.—Competitive plans for the proposed new Congregational Church to be erected here have been submitted by Marsh & Russell and by the Vail Architectural Co. The structure is estimated to cost \$30,000.

Pittsburgh, Pa.—The Directors of the Natatorium Co. have appointed a building committee to have charge of the erection of a natatorium in the East End on Friendship Ave., Baum and St. Clair Sts., at a cost of \$160,000.

Princeton, N. J.—A new building, costing \$95,000,

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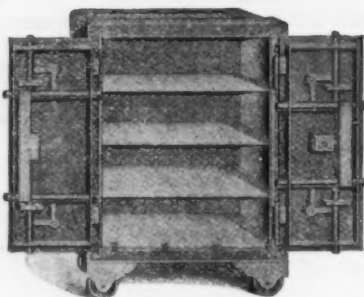
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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

will soon be put up at Princeton University for the Cottage Club. Already half the amount has been raised, and the committee hopes to have the balance on hand by April. The building will face Prospect Ave., and will be constructed in the Georgian style, with an open court in the centre.

Reading, Pa.—Henry L. Reinhold, Jr., 430 Walnut St., Philadelphia, is reported to have been commissioned to prepare plans for a nine-story brick, stone and terra-cotta fireproof hotel to be erected near here, at an estimated cost of \$300,000.

San Francisco, Cal.—The designs for the new Custom-house for this city received from Washington, D. C., call for a building in Classic style and wholly of stone, five stories in height. As a result of the competition among prominent architects of the country the committee on selection of plans awarded the contract to Eames & Young, of St. Louis, who have been appointed architects for the building. The cost of the structure is to be \$1,500,000. The building will occupy the site of the old post-office, facing on Battery St. and extending the full length of the block from Washington to Jackson St. It will be a fireproof structure, faced entirely with granite of a light color like the stone of the new post-office.

Under the terms of the will of the late Charles F. Doe, a millionaire lumberman, of this city, the University of California will receive not less than \$600,000 for the erection of a new library building.

A four-story and basement brick store building is to be erected by Bernard Davinow on the northeast corner of N. Park Lane and 3d St., at an estimated cost of \$30,000.

Henry E. Bothin will erect a six-story and basement warehouse on the north side of 2d St., 248 feet south of Mission St., to cost \$25,000.

Seattle, Wash.—Jas. Black & Son, Carleton Building, St. Louis, Mo., have the contract to erect the Alaska Building on 2d Ave. and Cherry St. for the Century Co., at a cost of about \$400,000.

Shawnee, O. T.—The Sacred Heart Mission has purchased 80 acres of land northwest of the city, from Kish-wah-ton, an Indian. Upon it will be erected a Benedictine College, costing \$65,000.

Spokane, Wash.—Nine competitive plans have been presented for the Carnegie library building for which the donation is \$75,000.

Plans for the new Catholic Church for Seattle have been called for and they are expected to be ready in about two weeks. The lot selected is bounded by Marion and Columbia Sts. and 9th and Terry Aves. The structure will cost \$250,000. Work on the building will begin as soon as the plans are completed, and it is expected that within another month considerable work will be under way.

Taunton, Mass.—The legislature has appropriated \$53,000 for repairs at the Taunton Insane Hospital.

PROPOSALS.

SCHOOL-BUILDING.

[At Cleveland, O.]

Proposals will be received until February 8 for furnishing material and erecting a library for Central High School, including mason, cut stone, carpenter and sheet metal work, roofing, ventilating, heating and electric wiring. STARR CADWALLADER, school director, Board of Education, 1466

PROPOSALS.

BRIDGE.

[At Houston, Tex.]

T. Blake Dupree, county judge, will receive proposals until February 10 for constructing a steel highway bridge across Buffalo bayou. 1466

BUILDING.

[At Bloomington, Ind.]

Proposals will be received until February 15 by the trustees of Indiana University for erecting a student building to cost about \$100,000. 1467

STEEL SUPERSTRUCTURE FOR BRIDGE.

[At Everett, Mass.]

Commonwealth of Massachusetts, Metropolitan Park Commission. Notice to Contractors. Sealed proposals for building and erecting steel superstructure for bridge over the Boston & Maine Railroad, Saugus Branch, Revere Beach Parkway, Everett, will be received at the office of the Metropolitan Park Commission, 14 Beacon St., Boston, Mass., until February 8, 1904. Pamphlets containing further information for bidders, form of proposals, contract and specifications, and general plan may be obtained at the office of the Engineering Department, 14 Beacon St. WILLIAM B. DE LAS CASAS, EDWIN B. HASKELL, EDWIN U. CURTIS, DAVID N. SKILLINGS, ELLERTON P. WHITNEY, Metropolitan Park Commission. WM. T. PIERCE, Engineer. 1467

Treasury Department, Office of the Supervising Architect, Washington, D. C., January 19, 1904. Sealed proposals will be received at this office until 3 o'clock P. M. on the 24th day of February, 1904, and then opened, for the low pressure steam heating apparatus, complete in place, for the U. S. Post-office at Norfolk, Neb., in accordance with drawings and specification, copies of which may be had at this office or at the office of the Superintendent at Norfolk, Neb., at the discretion of the Supervising Architect. 1467

BANK BUILDING.

[At Houston, Tex.]

Proposals will be received in February for erecting a \$200,000 building for the First National Bank, Saginaw & Staats, architects. 1467

CHAPEL.

[At Manchester, N. H.]

Bids will be received until February 20 by the Com. H. A. Young, Chmn., for erecting a chapel in Pine Grove Cemetery. McFarland, Colby & McFarland, architects, Boston, Mass. 1468

Treasury Department, Office of the Supervising Architect, Washington, D. C., January 14, 1904. Sealed proposals will be received at this office until 3 o'clock P. M. on the 15th day of February, 1904, and then opened, for the hot-water heating apparatus for the U. S. Post-office building at Centerville, Iowa, in accordance with drawings and specification, copies of which may be had at this office or at the office of the Superintendent at Centerville, Iowa, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1466

GRADING.

[At Chickamauga Park, Ga.]

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PROPOSALS.

Treasury Department, Office of the Supervising Architect, Washington, D. C., January 14, 1904. Sealed proposals will be received at this office until 3 o'clock P. M. on the 26th day of February, 1904, and then opened, for the U. S. Post-office building, Atlantic City, New Jersey, in accordance with the drawings and specifications, copies of which may be had at the discretion of the Supervising Architect, on application to this office, or the office of the Postmaster, Atlantic City, New Jersey. JAMES KNOX TAYLOR, Supervising Architect. 1466

Treasury Department, Office of the Supervising Architect, Washington, D. C., January 12, 1904. Sealed proposals will be received at this office until 3 o'clock P. M. on the 16th day of February, 1904, and then opened, for the construction of work-rooms under terrace at the U. S. Mint at Philadelphia, Pennsylvania, in accordance with drawings and specifications, copies of which may be had at this office or at the office of the Custodian at Philadelphia, Pennsylvania, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1466

STUDENTS' BUILDING.

[At Bloomington, Ind.]

The trustees of Indiana University will receive bids on February 15 for a students' building, which is expected to cost \$100,000. The plans call for the largest structure on the university campus, and work will begin March 1. 1467

YELLOW PINE TIMBER.

[At Nashville, Tenn.]

Bids are wanted February 15 for furnishing and delivering about 1,470,000 feet B. M. long-leaf yellow pine timber. LIEUT. COL. CLINTON B. SEARS, Corps Engrs. 1467

COURT-HOUSE.

[At Valdosta, Ga.]

The county commissioners of roads and revenues will receive proposals until February 15 for erecting a 72 x 100-foot brick county court-house. R. T. MYDDLETON, Clerk. 1466

SEWERS.

[At Washington, D. C.]

Sealed proposals will be received until February 20 for constructing sewers in the District of Columbia. HENRY B. F. MACFARLAND et al., Commissioners, D. C. 1466

BUILDING.

[At Portsmouth, N. H.]

Sealed proposals will be received at the Bureau of Yards and Docks, Navy Department, Washington, until February 6, 1904, and then and there publicly opened, for constructing a two-story brick and steel building at the navy yard, Portsmouth, N. H. Funds available, \$38,000. Plans and specifications will be furnished by the chief of bureau upon deposit of \$10 as security for their return. MORDECAI T. ENDICOTT, Chief of Bureau. 1466

STEEL AND IRON.

[At Fort Monroe, Va.]

Engineer Office, U. S. Army, Room 2 Custom-house, Norfolk, Va. Sealed proposals for furnishing and delivering steel and iron at Fort Monroe, Va., will be received here until February 8, 1904. Information furnished on application. E. EVELETH WINSLOW, capt. engrs. 1466

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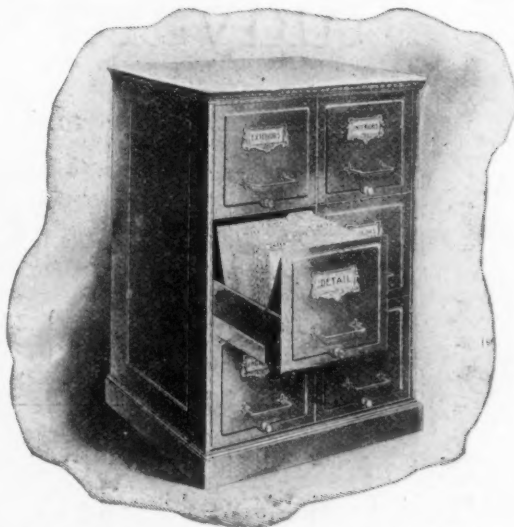
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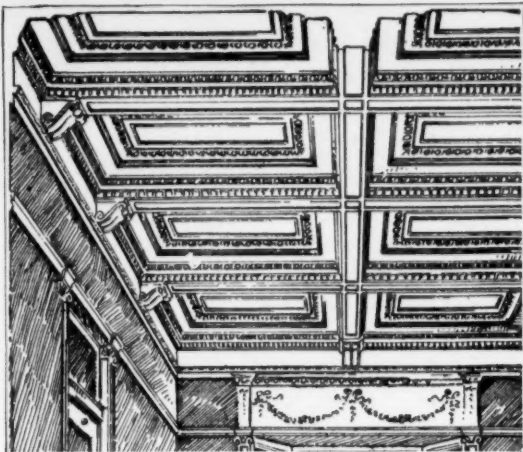
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SECTION 8. It is unprofessional to attempt to supplant an architect after definite steps have been taken toward his employment.

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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.

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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.

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