

NOVEMBER 19, 1904

THE
AMERICAN ARCHITECT
AND BUILDING NEWS

Vol. LXXXV

REGULAR EDITION

No. 1508

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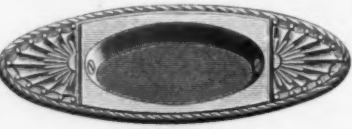
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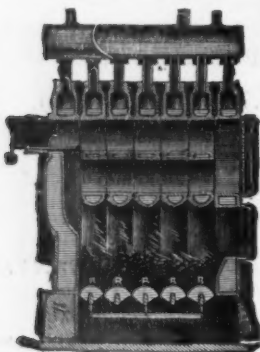
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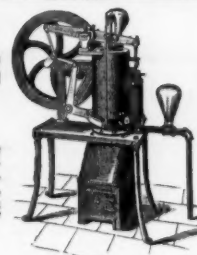
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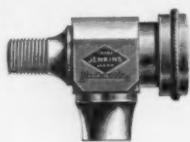
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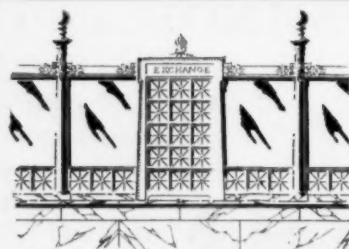
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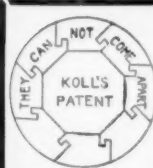
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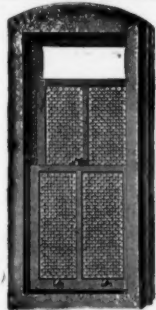
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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

BALTIMORE, MD.—Henry Smith & Sons are the general contractors for the erection of the new building for the National Bank of Baltimore. It will occupy the old site at the corner of Baltimore and St. Paul streets, will be constructed of pink granite, and will be fireproof throughout. The entrance to the doors, windows, etc., will be of brass, and the windows of wire glass. It is expected that the building will be ready for occupancy in about five months. Estimated cost, \$90,000.

BALTIMORE, MD.—The new Maryland Savings Bank, to be erected at the corner of Baltimore and Holliday streets, will be in the modern French style of architecture. The Baltimore Herald states "that the base of the building, to a height of 16 feet, will

be of Indiana limestone and will rest on a course of Maryland granite, 2 feet 6 inches above the sidewalk; above the base, the north, east and south walls will be faced with an iron spot Roman size buff brick. The columns, pilasters and trimmings will be of Indiana limestone, all of which will be surmounted by an ornamental classic cornice and parapet of terra cotta to match the stonework. . . . The banking room will be wainscoted in Italian marble, as will also the alcove, vestibule and ladies' room, while the floor will be tiled with white Vermont marble. In the rear of the banking room will be located the vault. This will be 7 feet 6 inches by 10 feet in the clear, and will be constructed of Brooklyn chrome and Bessemer steel and equipped with the latest

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

electrical security devices. . . . All of the first floor windows are provided with heavy iron grilles. . . . The building will be fireproof throughout and will be equipped with a direct electrical passenger elevator. . . . Messrs. Thomas L. Jones & Son, who are superintending the construction of the building, expect to have it completed and ready for occupancy by April 1, 1905."

The architects of the building are Messrs. Mottu and White.

BALTIMORE, MD.—Messrs. Parker & Thomas, a Boston firm of architects, have been chosen in the competition for designing the new buildings to be erected, at a cost of \$20,000,000, by Johns Hopkins University. An estate outside the city has been acquired, comprising 140 acres, and this will be the new site for the institution. The plans provide for a group of buildings in colonial style, consisting of an administration building, chapel, auditorium, library, recitation hall, four museums, dormitories, dining hall, gymnasium, powerhouse, stadium and other athletic buildings.

BANGOR, ME.—Work on the new union station for the Maine Central R. R., at the foot of Exchange Street, will begin, it is said, early in the spring of 1905. Plans have been completed by a Boston firm of architects and approved by the directors. Preliminary to the erection of the station buildings, it will be necessary to cut away many thousands of yards of solid ledge along the southerly side of Washington Street, and to drive piles on the site of the building, which is largely composed of "made land" and wharves. The face of the wharves on both river and stream fronts will be rebuilt of granite. The new structure will cost in the neighborhood of \$350,000.

BUFFALO, N. Y.—Work has commenced on the new freighthouse to be erected on Perry Street by the Lackawanna R. R. It will be in two portions, 500 feet long, and cost \$50,000.

CHICAGO, ILL.—A new organization has been formed, to be known as the New Illinois Athletic Club, for which a \$500,000 clubhouse will be erected in Michigan Avenue, between Adams and Monroe streets. It will be twelve stories high and fireproof throughout. A huge natatorium will occupy most of the first floor, basement and cellar. The tank will be the largest in the country, and will be adjusted so that after the water has been run off it can be converted into a large arena, in which boxing and wrestling bouts can be held.

CHICAGO, ILL.—The L. C. Paine Freer estate, it is reported, will build in the near future a large warehouse at the northeast corner of Madison and Market streets, now held under lease by Marshall Field & Co. This lease expires May 1, 1909, but it is understood the lessees are willing to relinquish it before its expiration.

COLUMBUS, O.—The plans of F. L. Packard have been approved by the Board of Trustees for the Girl's Industrial Home central dining and assembly hall, and bids are to be received on December 3. An appropriation of \$25,000 has been made for the improvement.

CINCINNATI, O.—St. Andrew's R. C. Society is contemplating erecting next spring a \$60,000 edifice.

The Board of Public Service has authorized improvements to be made to the City Infirmary, at a cost of \$37,557.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

DALLAS, TEX.—The corner-stone of a new hospital, to be erected by the Tri-State Medical Association, at a cost of \$150,000, was laid recently.

DES MOINES, IA.—The Blue Line Transfer Company has had plans drawn for a fireproof storage building, which it expects to erect this winter on its property at Third and Elm streets, adjoining its present transfer warehouse. The new building will be for high class merchandise storage and for storage of household goods. It is proposed to use in the construction steel and hollow blocks, enclosing the steel to protect it from fire. It will be three stories in height, costing \$35,000; contracts to be let at once.

DAVENPORT, IA.—Plans have been drawn by Edw. S. Hammatt, Whitaker Bldg., for a \$30,000 building to be erected at Fifth and Rock Island Streets, for the Sieg Iron Company.

DECATUR, ILL.—A \$50,000 business building will be erected by A. Wait at Water and William Streets.

ELGIN, ILL.—The Y. W. C. A. will erect a new \$25,000 building.

GLEN GARDNER, N. J.—The general contract for the erection of the new buildings for the N. J. Sanitarium for Tuberculous Diseases, at Glen Gardner, has been awarded to Henderson & Co., of Philadelphia, whose bid was \$161,437. The structures will consist of an administration building, service building, two wards and a power-house. George B. Post, of New York, architect.

GAITHERSBURG, MD.—Press reports state that the Gaithersburg Milling & Mfg. Co. will erect a new \$30,000 building on the site of the mill recently destroyed by fire.

GREENSBURG, PA.—Work on the new \$1,000,000 Court-house for Westmoreland County will now be pushed rapidly forward. By the decree of the Supreme Court, judgment has been entered in favor of William Miller & Sons, of Pittsburgh, against Controller John H. Brown, for \$108. The decree settles finally the question of the legality of the contract entered into by the Board of County Commissioners with the Pittsburg firm almost three years ago. The contract price of the building is \$878,000.

HOUSTON, TEX.—Plans have been drawn for a new edifice which the Shearn M. E. Society expects to erect, at a probable cost of \$100,000.

KEARNY, N. J.—The Town Council and the Free Public Library Commission have purchased a site on which it is proposed erecting a town hall and a library.

LEXINGTON, KY.—The Lexington Auditorium Company will erect a five-story building on Main Street, costing \$150,000.

MEMPHIS, TENN.—Two large building permits are to be issued this month—one to the Memphis Trust Company and one to the Tennessee Trust Company. Two fifteen-story office buildings will be erected, each costing in the neighborhood of \$400,000.

MOBILE, ALA.—Press reports state that bids will be received until December 10 by C. H. Ackert, Gen. Mgr. Southern Ry. Co., Washington, D. C., for erecting a \$100,000 union passenger station here after plans by P. Thornton Marye, Richmond, Va.

MORENCI, MICH.—Henry W. Wachter, of Toledo, O., has prepared plans for a municipal building to be erected here, at a cost of \$24,000.

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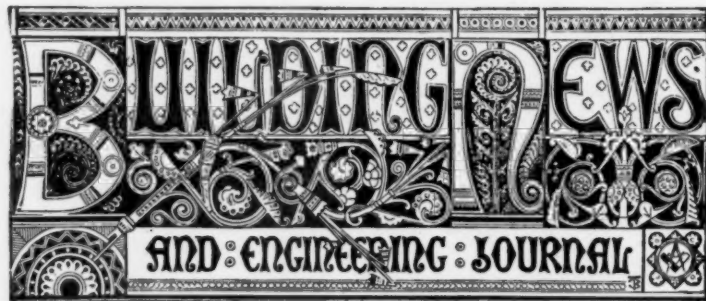
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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

MINNEAPOLIS, MINN.—Plans have been drawn by Boehme & Cordella, Kasora Bldg., for a six-story hotel to be erected on Fifth Street and Hennepin Avenue, by the Minneapolis Brewing Company. Cost, about \$300,000.

NEWARK, N. J.—The Mutual Life Insurance Company has awarded the contract for the erection of a six-story granite office building at Broad and Clinton streets. The building will cover nearly one-quarter of a block. Cost, \$1,500,000.

NEW YORK, N. Y.—E. Brielmaier & Sons have drawn plans for a \$50,000 Polish church building, to be erected in Brooklyn. It will be a brick and stone structure in the Roman style of architecture.

NIAGARA FALLS, ONT.—Plans are in preparation by Architect Frank Allen Gifford for a new \$500,000 hotel, to be erected on the site of the old hotel which was burned five years ago. The Clifton Hotel Company has been formed, and it is reported that \$250,000 of the capital is already provided.

NEW ORLEANS, LA.—Bids are wanted November 30 for constructing marine barracks and officers' quarters at naval station here. Col. F. L. Denny, Q. M., U. S. Marine Corps.

PORTLAND, ORE.—Bids will be received by the Supervising Architect, Washington, D. C., until Dec. 13th, for the installation of an electric passenger elevator in the U. S. Post-office and Court-house at Portland, as advertised in the *American Architect*.

ROCKPORT, MASS.—John J. Flynn & Son,

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Salem, Mass., have been awarded the contract to erect the Carnegie Library building, at Rockport, from plans by McLean & White, of Boston. Local granite will be the building material.

SALT LAKE CITY, UTAH.—Bids will be received until Dec. 8 by the Supervising Architect, Washington, D. C., for the installation of two electric passenger elevators in the U. S. Court-house and Post-office here, as advertised in the *American Architect*.

TRENTON, N. J.—A site has been selected in Montclair Heights on which to erect the new normal school.

TROY, N. Y.—Mr. Robert Cluett, president of Cluett, Peabody & Co., large collar manufacturers, and for ten years president of the Troy Y. M. C. A., is to erect, at his own expense, a six-story building adjoining the present Association building for the exclusive use of boys between 12 and 17 years of age.

WINNETKA, ILL.—The Congressional Society of Winnetka is having plans drawn by Raeder & Coffin for a new church. It is to be a pressed brick and stone structure, with slate roof, 100x86 feet, and will cost \$75,000.

WAYNE, PA.—A colonial residence, built with cream colored brick, Indiana limestone trimmings, green slate roof and large porches, is to be erected on Windemere Avenue for Mr. C. A. Buch from plans by J. A. Dempwolf, architect, York, Pa. The interior will be finished in mahogany and white and fitted with the best of plumbing and lighting fixtures and indirect heating. Cost, \$30,000.

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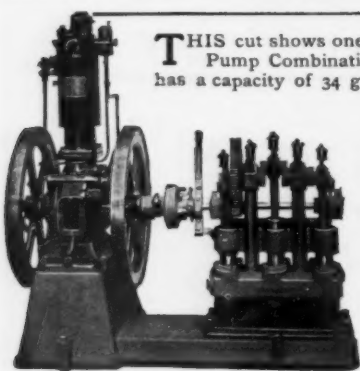
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The American Architect and Building News

VOL. LXXXVI

SATURDAY, NOVEMBER 19, 1904

No. 1508



SUMMARY:—

Annual Report of the Supervising Architect of the Treasury.—The Relatively Small Number and Average Cost of Government Buildings.—Burning of the Harcourt Studios, Boston.—The Rights of Artists to Fair Studio Accommodation.—Police Assaults on Bodies of Students.—Death of Valentine C. Prinsep, Painter.—Contemplated Publication of the Archives of School Hygiene.—Miss Fairbanks Turned Out of Her Famous Cottage at Dedham, Mass. 57

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NOTES AND CLIPPINGS. 64

THE annual report of the Supervising Architect of the Treasury makes the interesting statement that the work of the office "is more nearly up to date than it has been for many years previously." This agreeable condition of things is due to two causes: First, during the last session of Congress only two, and these two unimportant, buildings were authorized, and second, the work actually authorized and in hand had necessitated not only a "large increase" in the office force, but in the office accommodation, the latter at a cost of twelve thousand dollars, so that there were more hands to do less work and do it under more favorable conditions. In this way it has been possible to do a great deal toward catching up with the docket, and the record now shows that there are fifty-three buildings in course of erection, while there are only one hundred buildings authorized on which work has not begun—it is fair to infer that this means actual construction and not preparatory or working drawings.

THE Supervising Architect's report does not confirm the general belief that the Government is an unreasonably voluminous and lavish builder, and hence that it is not only permissible but wise and prudent for the economists to vote down most of the public building bills that are brought before Congress. In the list of public buildings included in an appendix to the Report, we find enumerated only three hundred and thirty-six as being completed and occupied at this time, although three hundred others included in the list are authorized, and the larger number of these in various stages of completion. Still an allowance of fifteen public buildings per State does not seem like an unreasonable extravagance. It must be remembered, however, that this list shows only the buildings that are under the guardianship of the Treasury Department, and that a considerable number of

buildings belong to other Departments of the Government. Still the Treasury is par excellence the Government's builder. When we come to the matter of cash outlay, we find that the average original cost on completion is but little more than three hundred and four thousand dollars, and it should be understood that the average is affected by the cost of a surgeon's house, amounting to less than seven hundred dollars, as well as by the most expensive building in the list, the New York Post Office, which consumed over eight and a half million of dollars. In fact, if all the costly work of the Mullet régime should be excluded it would appear that the Government was not, after all, more lavish in its outlay in buildings than is fairly proper.

A VERY spectacular fire in Boston last week which destroyed the Harcourt Studios, in which some forty artists strove to win both bread and fame, following so shortly after the burning of Mr. Saint Gaudens's isolated studio, calls attention to several things. Some of the artists doubtless were not sorry to have their accumulation of crude early sketches disposed of so easily; but, nevertheless, the loss of much good and earnest work, some of it actually commissioned and more of it salable, is to be regretted because it falls upon a class which is not fairly provided for in our commercial system, else artists would not have to seek studio accommodation in all sorts of unsafe premises, where the needed space and light can be had for such rental as the impecuniosity of the class can afford. In the case of the Harcourt Studios a large part of the building was used as one department of a large organ factory, and as successful organ making requires the premises to be kept heated to an even and fairly high temperature, a considerable part of the building, quite apart from the dry wood used in the organs themselves, must have been in a highly combustible condition. When to this is added the contents of forty studios, each with its accumulation of pine stretchers and paint-covered canvases—to say nothing of light draperies and artistic miscellany—it is surely apparent that the environment thus established was one in which delicate women, and men who, rightly or wrongly, are generally believed to be somewhat more effeminate than their fellows, ought never to have been allowed to spend their working lives—in some cases their entire life.

NATURALLY, Boston is peculiarly well adapted as a working centre for artists, and we believe that if landlords and real estate owners had found it profitable to cater to the needs of the class Boston would still be, as once it was, the chief artistic center of the country. The south side of Boylston Street, where it faces the Common and Public Garden, offers an unrivalled site for a series of studio buildings. Here and there along this stretch there are buildings containing studios, but these are more often occupied by photographers, who have a

chance of making a commercial income that will guarantee the rent, than by painters whose income is necessarily uncertain. The Boylston Street land is too valuable for investors to think of building there nowadays studio buildings which would afford the cheap accommodation that artists deserve to have. But there are equally good and more available sites on the south side of the Back Bay Park and Fenways, and we believe, now that the Museum of Fine Arts is to be moved to that part of the town, that it would be well worth someone's while to build in that neighborhood one or more fireproof buildings of the simplest and most economical description as to interior treatment for the especial use of artists. Planned so as to provide a small suite of living rooms in connection with a certain number of studios—only a few of which need to be of large size—the chance of getting a fair interest on the investment seems to us to be fairly good.

THE extraordinary and seemingly inexcusable assault of the Boston police upon the students of the Massachusetts Institute of Technology after a political torchlight procession, a fortnight ago, is so unusual as to deserve a record here. There is a natural antagonism between the police and the over-exuberant portion of all student bodies, and clashes more or less serious are not uncommon, though we recall none so serious as this in this country. A day or two later, students at Innsbruck were assaulted, not by the police, but by the military, with fixed bayonets, which were used with fatal effect. Here there was actual need of interference, since a riot was in progress, the German students being engaged in an assault on their Italian fellow students, who had won their dislike. In like way, Russian students often come into conflict with the ever-present garrison force. Even in Paris, the students at the *École des Beaux-Arts* have had passages at arms with the *sergents de ville*, who do not hesitate to use the heavy sword-bayonets with which they are armed in place of the policeman's billy. If our memory is good, one of these collisions was the direct outcome of the unpopularity of Viollet-le-Duc and the course of lectures on Gothic architecture he had been engaged to deliver.

PERHAPS more than most people artists are the development of their environment and opportunities, and this seems to be true of Val Prinsep, who died in London last week. He was so commonly known by his nickname that most people never knew that his godfathers endowed him with the less abbreviated name, Valentine Cameron. He was born in Calcutta in 1838, while his father was there resident as a member of the Indian Council, so his leanings toward Oriental, or rather symbolic themes, might have been expected to be more prominent than they were. But he was quite catholic in his choice of subject, and was applauded for his "Venetian Lover," 1869; his "Newmarket Heath—the Morning of the Race," 1875; his "Kashmiree Nautch Girl," 1878, as well as for many charming subjects of a more insular character. In 1876 he was sent to India to do an official painting to be presented to the Empress-Queen by her faithful Indian subjects, and into this great canvas, twenty-seven feet long by half as many wide, he

wrought the portraits, of one hundred and fifty Indian potentates, and as he had to travel into every part of the peninsula to secure the needed sittings, he had contact with the luxury of Oriental life in a way and degree that made his experience absolutely unique. For many years Mr. Prinsep was Professor of Painting at the Royal Academy, and was recognized by his pupils as well as by his intimates as a peculiarly lovable man. Besides his painting he wrote two novels and two plays, the one as successful as the other.

THE first Congress of School Hygiene, which was held at Nuremberg last April, proved so interesting and valuable that it has been decided to establish and issue a series of publications under the general title of "Archives Internationales d'Hygiène Scolaire." We are asked to assist the undertaking by announcing that it will be a great help in the preparation of a bibliography of the subject, which is to be one of the first undertakings, if the authors of any books, treatises or papers dealing with schools as architects have to consider them, will be good enough to send one copy to Professor John A. Bergstrom, Department of Education, Indiana University, Bloomington, Ind., and a second copy to the editor-in-chief, Prof. Dr. Griesbach, Mulhausen, Elsass-Lothringen. The association will also publish, at first in pamphlet form, but later as completed volumes, original papers dealing with any branch or phase of school hygiene, and will pay the author for accepted matter at the rate of fifty marks (say twelve dollars) per printed page, but will make no payment for illustrating matter.

MAN'S inhumanity to man takes on its most repellant form—in spite of its being its commonest expression—when it is exercised *en famille*, as it were. What has seemed to be a very needless exhibition of unreasonableness is connected with the quaint little cottage at Dedham, Mass., built about 1639 and still inhabited by one of the descendants of the original builder. This, the Fairbanks Cottage, has long been one of the show sights of the town, and many will remember the pride with which Miss Fairbanks used to show visitors her treasured heirlooms, a pleasure which advanced age has for some time denied to her. Amongst other associations brought into being by the recrudescence of "patriotic societies" was one formed by the Fairbanks family in consequence of a family reunion held at the Dedham homestead some years ago, and it was then determined that the cottage should be preserved and maintained in its present form as an historic monument; so a corporation was formed and took title to the place, with the proviso, however, as the public understood, that Miss Fairbanks's tenancy should not be disturbed. Seemingly the family incorporators did not reckon with the iron family constitution which the old lady had inherited, and, becoming irritated because, though bedridden, she still cumbered their ground, served upon her a notice, addressed to her as a "dear cousin," admonishing her to vacate the premises by November 1. Perhaps it is well for the credit of the late political campaign that this seemingly needless bit of crowding did not obtain earlier publicity.

REINFORCED CONCRETE IN BUILDING CONSTRUCTION.*

THE use of metal, in the form of steel or iron, in combination with concrete, has been known for a very long time. Railway rails and rolled joists, covered with concrete, for the formation of heavy floors, bridge-decks, and the like; and rolled joists or plate girders, forming the abutments of concrete arches, also in floors, are familiar examples.

Such construction is, however, not of the class that it is proposed to consider; and in current literature and text-books, is not covered by the term "reinforced concrete."

The essential characteristics of this construction are:—

Firstly, that the whole of the metal used shall be placed in those positions, and be so proportioned as to section, that it can take up the greater portion of all the tensile and shearing stresses in the structure, but does not act by itself in cross bending.

Secondly, that the concrete is not to be treated as a mere filling or cover, but must be so placed, and so proportioned, that it can take up the greater portion of all compressive stresses.

Thirdly, that the whole of the metal shall be entirely embedded within the mass of the concrete, being nowhere exposed to view.

Fourthly, that the whole construction shall be as far as possible continuous and monolithic.

The term reinforced concrete has many synonyms, of which "armored concrete," "armed concrete," "ferro-concrete," "sidero-concrete," "concrete-steel," are often met with in English journals. These various terms by no means indicate different materials, nor do they imply any difference in their distribution or relative arrangement; precisely the same physical, chemical and statical principles governing the correct consideration of every one of these forms. This difference in nomenclature arises largely from the exigencies of trade competition.

The same observations apply to the names of the several so-called "systems" of reinforced concrete, it being the habit in Europe to designate various methods of design and practice (though differing often only very slightly in minor and unimportant details), with the name of a "system," coupled with the name of the designer. Very many of these minor variations in method obviously depart from sound and scientific practice, and it can only be concluded that their propounders chiefly hold in view the desire to keep clear of sounder methods where those are already covered by Letters Patent.

Confining our attention only to those "systems" which can claim a prudent adherence to scientific principles, we have, as the principal form the Monier system, which is in general use all over Europe and in the United States, and is the chief constituent of all types, and as modifications or developments of it, the Hennebique system, most largely used in France, which super-adds special provisions for the shearing stresses; the Ransome system, which is most popular in America, and is characterized by the use of twisted bars instead of round bars of metal; and the Roebbing system, also often used in America, where the bars are partly rectangular, instead of round, in section.

It is not my province, nor would time permit, to enter into a discussion of the relative merits of these different systems in points where they conflict. It is sufficient to say that the several systems which I have enumerated can fairly claim to embody the best principles of reinforced-concrete designs, as founded upon patient and well-directed scientific research.

Nor can I hope, in the short space of a single paper, to dwell at all upon the history of the development of this form of building construction. I prefer to devote the available time to a brief explanation of its principal characteristics, and to illustrate upon the screen some notable examples of its successful application.

Some general data as to the observed phenomena in the behavior of a combination of steel with concrete will be of interest.

The concrete used in the construction is always cement concrete. Standard practice is to specify a concrete with a rich mortar, about 2 to 2½ parts of sand to 1 part of cement, thoroughly mixed with stone or gravelly aggregates, or sometimes coke, of fine gauge, 1 inch and under, in the proportions most usually of 1 part of mortar to 1 or 1½ parts of stone, gravel, etc. Intimate mixture and uniform distribution of the cement are here as important as in ordinary concrete. With good materials, properly manipulated, the following average ultimate strengths in compression may be expected:—

Concrete of 1 part cement, 2½ parts sand, and 5 parts screenings:—

At 7 days	2,500 lbs. per square inch
At 28 days	3,500 lbs. per square inch
At 6 months	4,500 lbs. per square inch
At 2 years	6,500 lbs. per square inch

As materials vary all the world over, an absolute standard for allowable stress cannot be fixed. The building regulations framed by the authorities in the German empire direct that the safe working stresses to be used in the concrete in compression shall not exceed one-fifth of the ultimate strength at 28 days, to be based upon actual tests of the particular materials employed in each particular case. This allows of a design up to 700 pounds per square inch, but I may add that the practice usually obtaining is to design for a stress in compression not exceeding 500 pounds per square inch under a full load. French practice is 420 pounds per square inch.

The concrete of the composition above referred to may be expected to have the following ultimate strengths in tension, viz.:—

At 7 days	150 lbs. per square inch
At 28 days	220 lbs. per square inch
At 3 months	250 lbs. per square inch

It is, however, generally laid down by Building Regulations, and uniformly adopted by designers, that the tensile strength of the concrete in a reinforced-concrete construction shall be wholly disregarded in the stress calculation. This is an assumption which is very appreciably in the direction of safety.

It has been established experimentally that there is a very considerable strength of adhesion between cement concrete and the metal embedded therein, due partly to physical and partly to chemical reasons. These experiments have been carried out exhaustively in many different countries, and during a series of years. The most notable are those by Bauschinger, at Munich. At an age of 28 days, the force necessary to overcome this adhesion has been found to average about 500 pounds per square inch of surface of metal in contact with the concrete, varying with the percentage of water used. With good design the surfaces of the metal are usually, necessarily, so considerable, that the forces which tend to disturb this adhesion are only a small fraction of this ultimate adhesive strength.

It is also an established fact, based upon observations extending over many years, that steel or iron wholly embedded in concrete is entirely protected from corrosion in any form, and this even when the work or specimen are continuously submerged in, or saturated with water. The reason is that, chemically, neither carbonate nor oxide of iron can be formed in the presence of the limes and silicas in the cement. It will be found that if a piece of metal, such as a bright wire nail, be partly embedded in a pat or block of mortar or concrete, and the specimen be left submerged in water for an indefinite period, the piece of metal will be found, upon breaking up the specimen, bright and uncorroded where embedded, but considerably rusted at the exposed end. As the lasting qualities of concrete made with sound cement are well established, it follows that in reinforced concrete we also have a material, which in the matter of mere durability, is unimpeachable.

It is further claimed for reinforced concrete that it is probably the best fire-resisting form of construction yet known. Modern experiences in large conflagrations seem to fully justify the claim so made; and I hope to show, later, some illustrations bearing upon this point. The reasons for this may be briefly stated. While the specific heat of iron or steel is very high, that of concrete is extremely low. By this is meant that concrete absorbs heat at a very slow rate, or is a poor conductor of heat. A high temperature surrounding a mass of concrete will penetrate but very little into the mass—experiments tend to show that the penetration will be less than one-quarter of an inch. It follows that the temperature of the embedded metal cannot differ appreciably from that of the concrete which surrounds it. It remains only to add that the coefficient of expansion under heat of steel or iron, and of cement concrete, agree very closely within wide ranges of temperature. Thus, a disruption of the composite materials through unequal expansion of either may be inferred to be improbable. Many experiments and actual conflagrations have shown that such a disruption does not, in fact, occur. As both materials are non-combustible, it follows that the constructions are, as nearly as possible, completely fire-resisting.

Having reference again to the fact that the external heat can penetrate only slightly into the mass, it will be seen that a beam, column, or floor of reinforced concrete is not, and cannot be,

*A paper read at the General Meeting of the Royal Victoria Institute of Architects, June 26, 1904, by John Monash, M.C.E., A.M.I.C.E., LL.B. The paper was illustrated by lantern slides prepared by A. Henderson (V.P.), and by a large model of a floor in reinforced concrete.

subject to those considerable changes of form, which in the case of metal columns, joists and girders directly exposed to the full temperature of the flames, often lead to the complete collapse of the external walls of the building. This deduction has also been amply demonstrated by experience.

Ordinary cement concrete has a very low modulus of elasticity. The modulus of elasticity for iron or steel is about 30,000,000; that of concrete averages only about one-tenth of this. In plain words, concrete will stretch under a given pull, much more than iron or steel would stretch under a pull of the same intensity.

But, on the other hand, the elastic limit of concrete is very low, while that of iron is very high. In other words, concrete, when not reinforced, although it can be made to begin to stretch more easily than iron, will stretch but very little before entirely rupturing, while iron will stretch very considerably before rupturing.

Without tracing all the steps in the reasoning, which are lengthy, and somewhat abstruse, it follows that if a given tensile stress or pull be applied to a mass of reinforced concrete, then momentarily (while the pull is slight) the concrete will bear a considerable share of the pull, and the iron but little; but as the pull increases, an ever-increasing share of the pull is taken up by the iron by reason of its refusing to stretch so easily as the concrete. If the experiments be continued, this will go on until the stress has become so great that the small share of stress left to be borne by the concrete becomes greater than the concrete by itself can bear; then the concrete will crack, and the specimen, so far as it is a piece of true reinforced concrete, will have failed; thereafter the metal will bear the whole of the tension until its point of rupture is also reached. Now it may be shown, both analytically and experimentally, that this failure of the concrete, or, as it is called, the appearance of the "first cracks," will not occur until the elastic limit of the metal has been passed. Hence to ensure the immunity of a piece of reinforced concrete from cracking when subjected to tension, it is only necessary to provide a sufficient section of metal to ensure that the stress upon the metal shall not exceed its elastic limit. Now, in mild steel the elastic limit is often as high as 40,000 pounds per square inch; so high a limit is not relied upon, and it is usual to provide that the greatest possible stress upon the metal used in the tension side of a beam shall not, under the fullest load, exceed from 15,000 to 20,000 pounds per square inch. German, Swiss and Austrian building regulations provide for a maximum stress upon the metal used in reinforced concrete of 750 kilograms per square centimetre for iron, 1,000 kilograms per square centimetre for steel.

In this connection, it remains to mention briefly that the presence of the metal reinforcement in its correct position in the mass of concrete lends to the whole structure a remarkable elasticity, or ability to deform or deflect, and completely recover its original form, without the smallest sign of any cracking of the concrete. I have on several occasions conducted destructive tests of beams which showed deflections easily perceptible to the eye without the aid of instruments, completely elastic in character, and without any signs of cracking of the concrete.

Having now referred to the principal characteristics of the two elementary materials in their combination, I desire, before showing upon the screen examples of actual works, to indicate briefly the elementary methods of application to building construction.

These applications may be classified into its use as arches, beams and pillars. But inasmuch as an arch partakes of the character either of a pillar, when uniformly loaded, or of a beam, when partially loaded, we may confine ourselves really to the two elementary forms of pillars, or cases of longitudinal compression, and beams, or cases of cross bending.

The consideration of "pillars" covers not merely direct compression, but also long column action subject to lateral buckling; while the case of "beam" (using the term in its mathematical sense) covers floors, plates, girders, joints, cantilevers, and all parts subject to cross bending, including also walls subject to lateral, wind or water, or other pressures.

The typical form of pillar or column may be of any desired section in plan, either square, circular, hexagonal, or octagonal. The reinforcement consists of two separate systems, viz.: (1) A series of vertical bars disposed generally near the outer surface, and uniformly distributed around the perimeter, and (2) a series of horizontal ties binding together the vertical bars at short intervals in height. (See Figures 1 and 2.)

The effect of this arrangement is to greatly postpone, and generally to wholly prevent, the usual method of failure of an unreinforced concrete column, by what is familiarly known as the "pyramidal" fracture. The ultimate strength of the column in

direct compression is enormously increased, while a great resistance to lateral buckling is provided by reason of the outer sur-

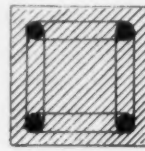


FIG. 1. COLUMN—SECTIONAL PLAN.

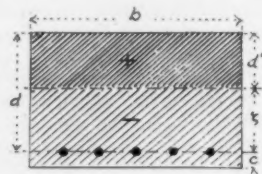
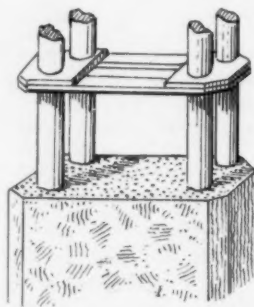


FIG. 3. PLATE.

faces being capable of resisting high tensions, due to their reinforcement. It has been shown by Bauschinger, in Germany, and Considère, in France, that the combined strength of the two materials in combination is several times greater than the sum of the strengths of each tested separately.

The elementary form of a reinforced concrete beam is shown in figure 3, which is a cross-section showing a series of round bars disposed as closely as practicable along the under surface.



the compressive member, or in other words, to transmit the shearing stresses.

From this, it is only a short step to the next, but very important, development, that of the T beam, of which Figure 4 shows a type, also in cross section:—

Here all the metal in the lower member has been brought together into fewer, larger bars, and most of the concrete below the neutral axis has been omitted. Although such a beam is not quite as strong as the beam shown in Figure 3, it is relatively very much stronger per unit of concrete used, and also much lighter.

It will be observed that the upper member of this T beam has a considerable width relatively to that of the rib. Of course, this ratio is not unlimited, but a few trial computations will show that a very moderate width of top member will provide an ample compression area to balance the tensile strength of the rib, with the percentages of reinforcements usually adopted.

If we now place two of these T beams side by side, a little dis-

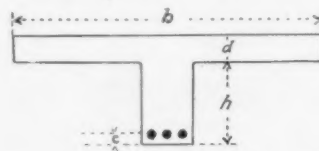
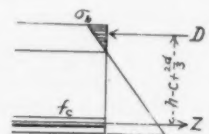


FIG. 4. T BEAM.



tance apart, as shown in Figure 5, and connect their upper members, we realize a floor supported by two ribs or joists. Now, the floor is formed by, and itself forms the compression members of, these T beams, and for this function requires no reinforcement.



FIG. 5. PAIR OF T BEAMS.

But the floor has another function, which is, to bridge over the space between joist and joist, and must for this purpose be reinforced according to the method of Figure 3, and also by bars

near the upper surface, at the points of support. The combination shows in outline the modern and important principle of monolithic construction, which has been developed to a high degree of complexity, floors, joists and girders being all one continuous mass. It involves two important features, each of which makes greatly for economy and strength. The first is that the effective depth of the girders, joists, or ribs is to be counted, from the position of the reinforcing rods, not merely up to the under side of the floor, but right up to the top surface of the floor; a further consequence of this being a substantial saving in height in every floor. The second feature is that the floors, and in the fuller developments, the girders and joists, also act as continuous beams, whereby the bending developments are greatly reduced, and the stresses to be provided for are lessened.

I apprehend that this general description has now advanced to a sufficient stage to render intelligible several of the views which have been prepared.

A photograph was shown upon the screen taken during the actual destructive testing of such a T beam as is described above. It was conducted in Gorinchem, near Amsterdam, in Holland. The clear span was 23 feet. The horizontal top plate was 4 feet 6 inches wide and $3\frac{1}{2}$ inches thick. The rib was 8 inches wide by $12\frac{1}{2}$ inches deep, so that the over-all depth of the specimen was $15\frac{1}{2}$ inches. The relation of span to depth was therefore about 17 to 1. The principal reinforcement, at the bottom edge of the rib, consisted of five round bars each 20 mm. dia.—giving a total section of metal of slightly under $2\frac{1}{2}$ square inches. The photograph showed the specimen when supporting a load of 49,400 pounds. Its age was then only four weeks.

The underground railway, Vienna, which encircles the city, has a roofing of monolithic reinforced-concrete construction in the simple form just described—i. e., a repetitive arrangement of T beams with floor-deck between. The span is 42 feet, and the spacing of the ribs is 5 feet 6 inches, centre to centre. The length of line covered in this way is 2,200 yards. The upper surface is a public road, carrying heavy public traffic, and was designed for a 40-ton rolling load and a distributed load of 500 pounds per square foot.

I trust the general principles have now been sufficiently outlined to justify my passing on directly to more complete examples and more complex developments. I have only to add that whenever, in the nature of the design, the direction of the bending moment is reversed (as near the ends of fixed girders), so as to bring the tensions to the upper surface, it is only necessary to reverse the design of the beam, by placing the reinforcing rods near the upper surface also.

Time will scarcely permit of any detailed description of the methods employed in the actual work of construction. It must suffice to say that it is in the first place necessary to construct a complete mould for the whole of the work in contemplation, of soft-wood timber, supported upon wedges so placed as to permit of easy demolition after the concrete has set hard. This timber work can, of course, be used repetitively, with a certain small percentage of waste for each readjustment of form. It is usual to so arrange this centering or framework that the supports may be removed from under all the floor plates and minor joists, without disturbing the central supports of the more important beams. In this way the supports of the floors generally may be removed in from ten to fourteen days after the placing of the concrete, while those to the main girders may be left for three to four weeks, offering little obstruction to other work proceeding around.

As soon as the timber framework is placed in position the whole of the reinforcing rods are then brought into place, all requisite cutting and bending is done, and the rods are loosely tied, where they intersect, with fine wire, and the whole skeleton work is temporarily supported in its correct position. When all is ready the placing of the concrete is commenced, and proceeds as a continuous operation, without pause of more than, say, one hour, until the whole area to be dealt with as one monolith is completed. The points to be insisted upon in this work are—(1) a thorough mixing of the materials, both dry and wet; (2) a uniform percentage of water, adjusted to suit the prevailing temperature; (3) a thorough compacting of the concrete into its place.

Up to this point I may have created the impression that this form of construction is applicable only in the interior of the building, but this is far from being the case. It should be clear that these principles are equally correct for the complete erection of a self-contained structure. The ends of the main girders may rest upon columns equally as well as upon brick or stone walls. Indeed, the more completely and universally in any given build-

ing the monolithic principle is applied, the more perfectly are the advantages claimed for the system realized.

The next example is on a much more imposing scale, being a large warehouse in Alsace. Every portion of the building which performs stress-resisting functions is built of reinforced concrete. It is to be observed, as a broad principle, that the advantages and economies in the use of the system rise in proportion to the severity of the load-carrying functions to be performed, and are therefore more striking for heavily loaded warehouses than for residential buildings. In the present example the points of junction between the girders and the columns may be stiffened to any desired degree by iron insertions so as to form a joint, offering whatever degree of resistance to distortion is required. Thereby the stability of the whole building is ensured in a far higher measure than when reliance has to be placed merely upon the individual stability of the external walls. In this way the external walls cease to serve any purpose in carrying the building proper, or its contents, and are relegated to the minor function of forming a clothing or curtain to the building, and giving to it its conventional external appearance. It will be observed also that by this means the largest light openings may be provided without the result of unduly weakening the outer walls. The building mentioned, which has eight floors, including basement and attics, was completely erected in four months. The floors are designed for loads of 3 to 4 cwt. per square foot. It has been stated that the cost of this building was 30 per cent less than if carried out in the orthodox fashion with heavy external walls and steel pillars and girders.

I now introduce to your notice another example equally imposing, but of a totally different character. This is Ingall's Building, in Chicago, designed and carried out by Messrs. Elzner & Anderson, of Cincinnati, and was completed in September of last year. It has a height of sixteen stories. Footings, columns, girders, walls, stairs, floors, and roof were constructed entirely of reinforced concrete, without any exposed structural steel whatever. The outside walls of the building are a mere veneer of marble, brick and enamelled terra-cotta. It is 100 feet x 50 feet 6 inches in plan, and 210 feet high above street level, and was completely erected in 198 days. In each floor, the erection of framework and moulds took five days, and the concrete work was erected complete in two days; each story was allowed twenty-one days to harden, and operations thus proceeded on three stories simultaneously. The principal factors in the design were:

Resistance to wind-pressure.....	30 lbs. per square foot
Live loading first floor.....	100 lbs. per square foot
Live loading second floor.....	80 lbs. per square foot
Live loading all other floors.....	60 lbs. per square foot
Live loading roof.....	30 lbs. per square foot

Each main girder supports a floor area of 32 feet x 16 feet; this area being further subdivided by a cross girder. The floor plate, which thus has an unsupported span of 16 feet in both directions, is 7 inches thick on the first floor, and 5 inches thick on all other floors. The brickwork veneer of each story is supported by a projecting ledge of concrete on the wall plates, 3 inches wide, and bonded to the concrete by projecting galvanized-iron wires, set 18 inches apart, horizontally, and every sixth course, vertically. The whole magnificent building has given every appearance of complete success.

The successful applications of reinforced concrete are so varied, so numerous and so interesting, that I have found it very difficult to make a characteristic, though reasonably limited, selection from the examples to which I have access. One case of interest is that of stairways, and I will say that a winding staircase constructed in the Palace of Fine Arts in the Paris Exhibition, 1900, was designed for a full loading of 154 pounds per square foot, and carried an enormous traffic most successfully.

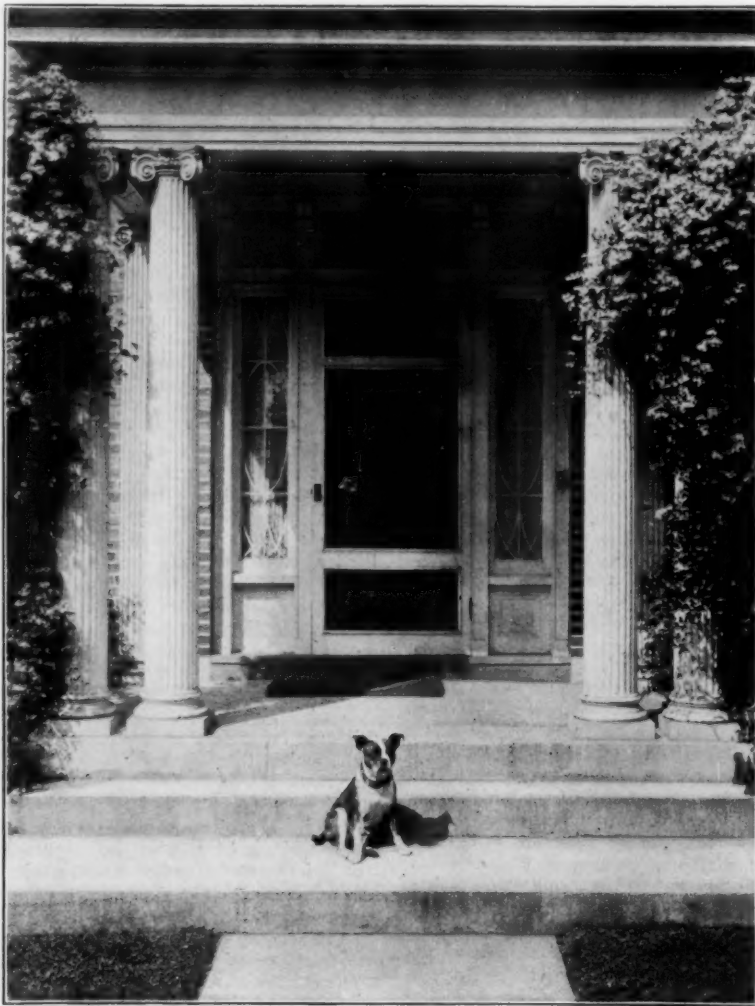
I have not yet referred to the artistic side of this form of construction. It must not be supposed that there is nothing to be said under this head. On the contrary, for reasons, which a little consideration will make evident, the existence of ribs and other projections depending from the ceiling affords special opportunities for bold and handsome ceiling effects. Here, again, examples are so numerous that it is difficult to make a choice for illustration.

As I have now touched upon the question of the fire-resisting qualities of reinforced concrete construction, I will bring my paper to a close by selecting for description, out of many, one example of its actually observed behavior in a large conflagration.

The general scheme of construction adopted in the Bond and

Trust building of the United States Fidelity and Guarantee Company, in Baltimore, was as follows: The building consists of five stories, 20-inch x 20-inch columns in ground floor, diminishing in upper floors, the spans for main girders are 21 feet, the spacing laterally of columns is 11 feet, the floors are slightly arched, being 3½ inches thick at centre.

exceeding 2,000 degrees Fahrenheit were attained. It is a fact that the metal in the fireproof safes of many buildings was melted. During the fire, the building adjacent to the Bond and Trust building completely collapsed, and in its fall tore away a considerable portion of the brickwork in the front, and one of the side walls of this building. The fire had therefore complete access



THE PORCH: HOUSE OF JULES BREUCHAUD, ESQ., PARK HILL, N. Y.

*Warren, Smith & Biscoe,
Architects.*

The whole construction, except the outer walls, was of monolithic reinforced concrete, supported on "wall columns." The external walls were 18 inches thick, of brick throughout, and stood independently of the monolithic frame, and not as a veneer, previously described.

It is stated that during the fire, in February last, temperatures

to the whole of the contents of the third and fourth floors, which were completely consumed.

I will now show you a photograph of the building after the fire.

This was taken ten days after the fire. The debris of the collapsed neighboring building had been cleared away, and the demolition gang had already made considerable efforts to tear

down this building also, with ropes and winches. After pulling at it for several days, and pulling out a further portion of the side walls, it was decided that the structure was so secure that it offered no danger, and it was permitted to stand.

About three weeks afterwards a test was made by the United States Government, who detailed an officer of the Engineering Corps of the United States Army to investigate the matter. The floor, which was designed for 150 pounds per square foot, was loaded to the extent of 300 pounds per square foot, and the load left on for twenty-four hours. The greatest observed deflection was one-sixteenth of an inch. A minute inspection of the building, made by Mr. C. G. Edwards, building surveyor, showed that two columns were damaged on the corners for a length of two feet, exposing the corner rods. It could not be determined whether this was due to heat, or to a blow. The top floor showed several slight cracks on the under side of the floor plates, but not enough to impair their efficiency. It is further stated by Mr. Edwards that the depth to which the fire affected the concrete was nowhere more than one-eighth of an inch.

AUGUSTE BARTHOLDI'S LAST MONUMENT.*

THE plan for this monument has, I believe, remained a well-kept secret. Possibly the preliminary sketches for it will be found among Bartholdi's last drawings. At all events we are certain that the great artist had not begun to mould the *machette*. And yet it existed in his mind precisely in the form in which it will one day be silhouetted against the horizon.

Bartholdi conceived it by a single flash of creative genius—his usual way. For his fertile imagination was seconded by the powerful tide of sentiment that ordinarily goes with extreme youth but was at Bartholdi's command even upon the threshold of old age. The subject was a monument to commemorate that renaissance of athleticism which marked the nineteenth century and which the successive and varied efforts of England, Sweden, Germany and France have brought to a happy culmination, whereby one of the noblest traditions of ancient pedagogy has been restored under modern forms. When I first told him how earnestly I desired to see that important movement consecrated by his genius, Bartholdi neither consented nor declined. He gazed into space, and I saw that his mind was brooding over the idea. A few hours later the plan was conceived.

"In the center," he explained, "I shall place the *Meta*—the faithful goal about which the struggle in the stadium became doubly intense, doubly audacious, doubly fierce, and where the superstitious ancients set up the statue of some minor divinity, malice and cunning personified, threatening the deception and defeat of the contestants. Against this background of polished marble I shall group a perfect melange of sports—fencing and football, skating and boxing, horsemanship and cycling. I shall even have an automobile of the latest model. For, though the world of sports meets with changes from age to age, its spirit remains ever the same, and there is a marked similarity in the forms that give it expression. The *Meta* is always the dominant symbol—a rude, inexorable symbol, and for that very reason the more significant and comprehensive."

A significant and comprehensive symbol thrust up against the sky has invariably been the thing Bartholdi's chisel sought chiefly to produce. To answer this requirement he halted at no sacrifice; once he had conceived a design, he saw it through. Was there a trace of stiffness in such and such a gesture, a hardness in such and such a pose? No matter, provided only that the monument, when seen from a distance, impressed the crowd as being clearly and precisely outlined. How eloquently, how warmly, and with what conviction he would enunciate his theory of the educational value of sculpture, and how earnestly he would develop that theory in talking with his friends! He was sure to be understood by those who frequented his studio in the Rue d'Assas, and still more so by those who sought him out in his peaceful retreat of Colmar. As you listened, you seemed to get a bird's-eye view of his entire work and to reach a better comprehension of its scope and significance. Then stood forth—oh, so nobly!—that calm satisfaction in duty performed, that patriotic zeal, those unconquerable hopes, those measureless triumphs of self-abnegation which find robust expression in the "*Liberty*" of New York, the "*Lion of Belfort*," or the "*Vercingetorix*" of Clermont.

"To reach the understanding, to touch the feelings, to move the will"—this might have been the artistic device of Bartholdi. He cared little for the praises of the æsthetic or the admiration of

the aristocracy. He addressed himself to the masses. He was their sculptor. He sought to reach the springs of united action whence come the grandest outbursts of popular enthusiasm, and the lesson he would teach was the lesson of self-sacrifice. Parlor statues, museum statues, could never be born of a spirit like his. Not that he lacked the skill to adorn his work with grace and elegance, but he had neither the impulse nor the leisure to devote himself to so limited a clientèle. Nothing short of the public monument could satisfy his machinations—the colossal monument, in harmony with its setting, severe and frank in its every line, the monument to set up in such a way as to defy time, overcome indifference, and serve the future by recounting the brilliant story of the past. There would have been no end to the series of those heroic, commanding figures, and how we should have loved to see him carry to completion those that wandered, still vague, in the limbo of his thought and whose secrets he has taken with him into the tomb!

He spoke to me again of a scheme for the *Meta* that pleased him so; he wanted to have it built of porphyry, high and broad, with white figures of youths and athletes thronging about it. That, he said, would be a lesson in history as well as a lesson in philosophy—a reminder of undying Greece, the mother of all civilization, and a declaration that the clash between effort and destiny remains forever the supreme law of life.

We shall erect the *Meta* as Bartholdi conceived it. No doubt we shall find it no easy task. In his plans for it he quite overlooked the artistic honorarium. He had a way of passing over that chapter in silence, as if it concerned only an insignificant surplus. To succeed, we shall have to draw lessons of joyous perseverance from the long life just brought to its close. These abound. He freely discussed the picturesque incidents of his extremely arduous career; for though you can easily raise funds to glorify a novelist or a dramatist whose pen was broken only yesterday by death, it is quite another matter to raise funds to symbolize the threefold heroism of a frontier city or to celebrate the transatlantic memories of a war that changed the face of the world. Lafayette, Denfert-Rochereau—public opinion didn't order the statues that commemorate them! it had to be forced to. The odyssey of "*Liberty*'s" arm, the automobile journey for "*Vercingetorix*," the question of pedestals—costly structures which the most devoted subscribers never thought about beforehand and which almost staggered their generosity—all this Bartholdi would recall with a charming drollery unmingled with rancor or vanity. He never tired of inventing ingenious expositions or astonishing lotteries, and little by little the necessary sums were obtained.

It will be the sublime recompense of the late distinguished sculptor that his work is to be continued after his death. His monument to Sergeant Höff is soon to be dedicated; an energetic committee is busied with the work of erecting his monument to the aeronauts of the siege of Paris; and then it will remain to realize his latest conception, whose genesis I have just recounted and whose beauty I have so earnestly, and so unsuccessfully, sought to describe.



THE NORTH END BATH-HOUSE FOR THE CITY OF BOSTON. MESSRS. MAGINNIS, WALSH & SULLIVAN, ARCHITECTS, BOSTON, MASS.

FRONT AND SIDE ELEVATIONS OF THE SAME.

HOUSE OF JULES BREUCHAUD, ESQ., PARK HILL, N. Y. MESSRS. WARREN, SMITH & BISCOE, ARCHITECTS, BOSTON, MASS.—

TWO PLATES.

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PORTICO OF THE SAME.

THE PERISHABLENESS OF WOODS.—Experiments have been made to ascertain which wood lasts the longest. It was found that birch and aspen decayed in three years, willow and chestnut in four years, maple and red beech in five years, and elm and ash in seven years.—*Exchange*.

*Translated by the Boston Transcript from the French of Pierre de Coubertin in *Le Figaro*.

NOTES AND CLIPPINGS

KING DADDU'S STATUE.—Dr. E. S. Banks, field director of the University of Chicago expedition to Babylonia, has reported the discovery of a statue which he regards as the oldest in the world. It was found eight feet beneath the ruins of the ancient city of Udnun, near the present village of Bismya, and has been identified by an inscription as that of King Daddu of Udnun. The statue is of pure white marble, weighing 200 pounds, and is almost perfect. Udnun is mentioned in the code of Hammurabi, but little is known of it. King Daddu is not mentioned in the earliest records.—*Exchange*.

PICTURESQUE PADUA.—Padua, in spite of its flat surroundings, is one of the most picturesque cities of Upper Italy, and the seeker after gardens will find many charming bits along the narrow canals or by the sluggish river skirting the city walls. Indeed, one might almost include in a study of gardens the beautiful Prato della Valle, the public square before the Church of Sant' Antonio, with its encircling canal crossed by marble bridges, its range of baroque statues of "worthies," and its central expanse of turf and trees. There is no other example in Italy of a square laid out in this park-like way, and the Prato della Valle would form an admirable model for the treatment of open spaces in a modern city.—*The Century*.

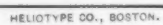
FIRE-RISKS IN THE NEW YORK SUBWAY.—The "impossibility" of fire occurring in the New York City subway is apparently taken for granted. It seems a mistake that such an idea should have been allowed to be entertained, and that it should have been practically indorsed by those municipal officers under whose purview comes the responsibility for seeing to the fire protection of the city. It must never be forgotten that it is always the unexpected that happens, and that where there is so much electrical work and an exposed third rail, to say nothing of cars in which the seats are of inflammable material, instead of being of steel, the possibilities of fire are always present. It is not given to human nature to be infallible, much less can it be expected that automatic machinery, even of apparently the most perfect sort, will not occasionally go wrong, or that some official, even the most skillful and conscientious, will not be caught napping. All that can be said with regard to the chances of danger from fire is that they are so remote as to enable the public to use the subway in full confidence that everything that can be done to avoid such a disaster as that which horrified Paris some time ago has been done by the management of the road. To state dogmatically that there is no danger of fire to travelers on the subway is to engender a spirit of carelessness among officials of all ranks which may be productive of a bar accident at a point apparently the least exposed to any such peril.—*Fire and Water Engineering*.

BRITISH VS. METRIC WEIGHTS AND MEASURES.—At a time when the adoption of the metric system is persistently advocated, interest may certainly be taken in reasonable criticism of such proposals. An organization has recently been formed, under the style of "The British Weights and Measures Association," with the primary object of combating the metre, and the secondary object of standardizing and simplifying British Imperial weights and measures, so as to make them more useful than at present. A small pamphlet published by this association puts the adverse case in exceedingly simple terms, and the arguments raised are based on essentially practical considerations. For instance, it is pointed out that the metre is unsuitable for navigators and for those engaged in the textile industries. Also, that in navigation, in the measurement of shipping, and in the manufacture of cotton, woollen, linen, jute and hemp, British standards are practically universal, even in France and other strongholds of the metric system. Some striking estimates are given of the heavy cost to engineering firms of any radical change in the present Anglo-Saxon units, the outlay being computed at 100,000,000*l.* for British, and 200,000,000*l.* for American manufacturers. These figures may seem absurdly high, but they are supported by the testimony of prominent engineers in both countries, as well as by calculations made on behalf of the Franklin Institute of America. It ought not to be overlooked, however, that metric units are already much used by both British and American engineering firms, and that the change to the metric system would certainly not be made suddenly. In any event, it is not likely to be made for many years, and in the meantime nothing but good can result from attempts to simplify the use of British weights and

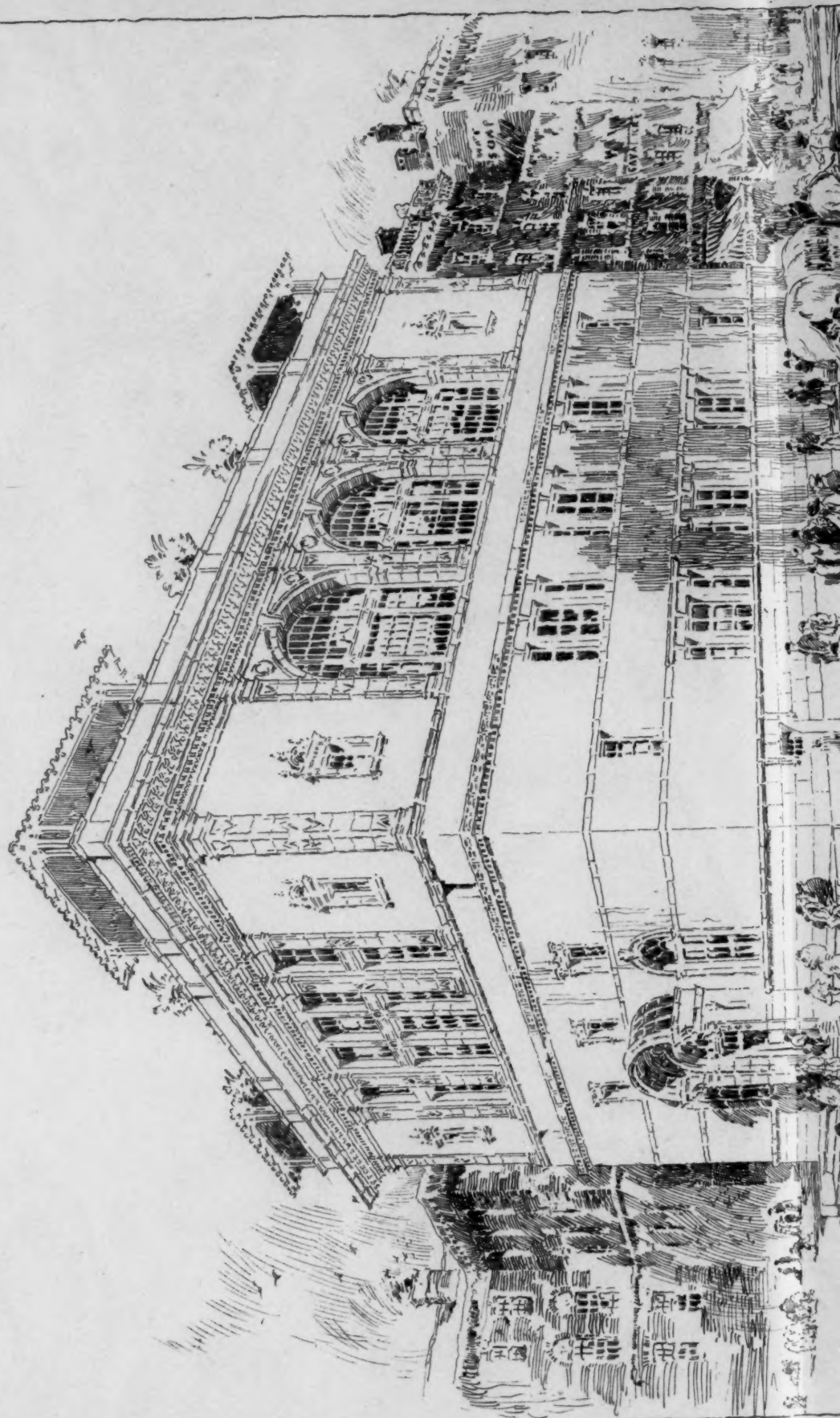
measures, and to abolish the unnecessary and meaningless variations now attending their application to many departments of commerce and industry.—*The Builder*.

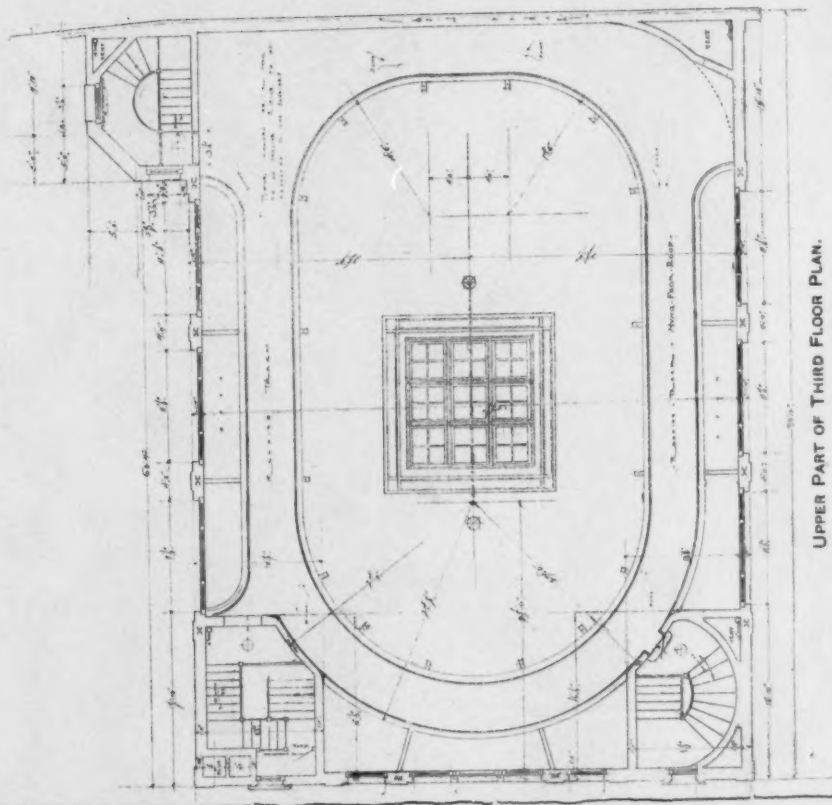
THE CASE OF THE ARCHITECTS OF THE CONGRESSIONAL LIBRARY.—We have before now commented on the extraordinary injustice shown to Messrs. Smithmeyer & Pelz, the American architects. As long ago as 1873 they succeeded in gaining the first prize of \$1,500 in the competition for the Congressional Library. They afterwards received the commission to prepare the working drawings. The undertaking was so vast, and there were so many authorities to satisfy, it was necessary for the partners to abandon all other practice during twelve years. Altogether the work occupied about thirteen years. Before the buildings were completed Government officials took over the plans, a proceeding which does not cause much surprise in America, where justice has often to succumb to the exigencies of politics. Such a course, however, called for fair payment for the services rendered. Messrs. Smithmeyer & Pelz, in addition to the premium, have received 48,000 dollars. That was supposed to be an equivalent for thirteen years of toil, and their payment of all expenses. The sum is so ridiculous for a work of national importance, a committee of the Senate was lately obliged to investigate the whole affair. It was testified by witnesses that in America an architect's expenses amount to about 50 per cent of his receipts. At that rate 24,000 dollars would be left for the partners, or 12,000 dollars for each, and as the committee's report says, "This gave to each one an annual compensation of 923.07 dollars, which sum represents the wages of a junior draughtsman employed in an architect's office as a copyist merely." Messrs. Smithmeyer & Pelz have applied for permission to sue the Government in the Court of Claims for additional compensation to the amount of 108,708 dollars. This would make their pay for the plans and drawings at the rate of 2½ per cent on the cost of the library. Considering the manner of treatment to which they were subject that amount is barely equitable.—*The Architect*.

THE SKY-SCRAPER PROBLEM.—Prussian business men and manufacturers are agitating for a relaxation of the building regulations of the most paternal of governments, so that they shall no longer be restricted to structures of moderate height. In Berlin no buildings may exceed 74 feet in vertical elevation, and in this movement for "sky-scrapers" the argument is advanced that modern methods of steel construction insure stability and safety to life, and that, therefore, the 74-foot limit is no longer necessary. The Prussian Ministers of Public Works, Interior and Commerce, who considered the petition, were unmoved by the reference to American experience in the matter of tall buildings, and have for the time being blocked the efforts of those who sought a change. While it is much too late for the exercise of any such spirit of conservatism in American municipalities, where in most cases the mischief is already beyond repair, there is ample room for future reforms. The engineering problems as to the height to which buildings can be carried with due regard to stability of construction, fire risk and the safety of the people quartered in them may be left to the architects, insurance experts and fire-fighters. It is not merely a question of feet and inches, but of civic art; not so much that the limit shall be 74 feet, or 125 feet as in Boston, or 250 feet as in the case of some sky-scrapers; it concerns the proportion which all buildings shall bear to the width of the streets on which they are placed. American cities are already too familiar with instances of structures of faultless design and beautiful proportion dwarfed into insignificance by some towering commercial building, which has nothing to commend it but its impressive height. And the grouping of such structures side by side on narrow streets, entirely regardless of their relation to each other or to the points from which they are viewed, is another evil which has unhappily come to be regarded as a matter of necessity. There is little prospect or hope that American cities for many years to come will consent to the restrictions in architectural design and size which have made Paris so noteworthy, but Philadelphia has a peculiar opportunity in its various boulevard projects to take a step in the right direction. The millions to be expended for the condemnation of land, the opening of broad avenues and the planting of trees will be worse than wasted if no control is exercised over the style and class of buildings which are to be erected. It will be no easy task to control by statute or municipal ordinance, especially where legislation owes its origin to interested grafters, but certain broad principles and proportions can be laid down to the great benefit of the city, the boulevards and the property owners. Such a plan, with the advice of skilled artists and architects, would lend dignity and beauty to what may very easily become something wholly different.—*Philadelphia Public Ledger*.

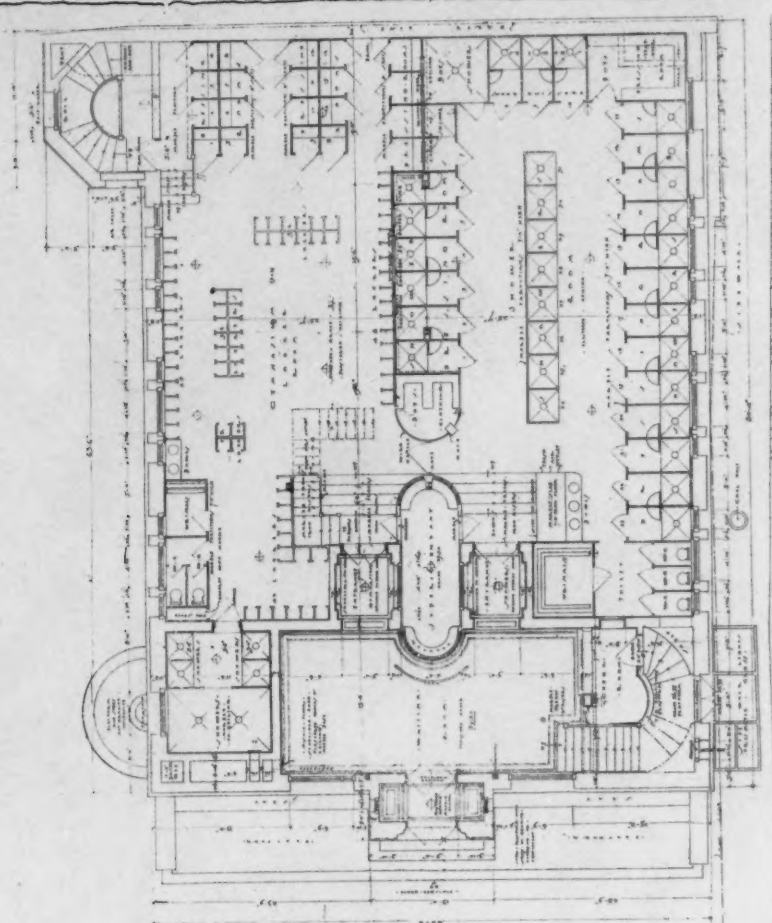


The American Architect
Nov. 19, 1904.
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UPPER PART OF THIRD FLOOR PLAN.



FIRST FLOOR PLAN.

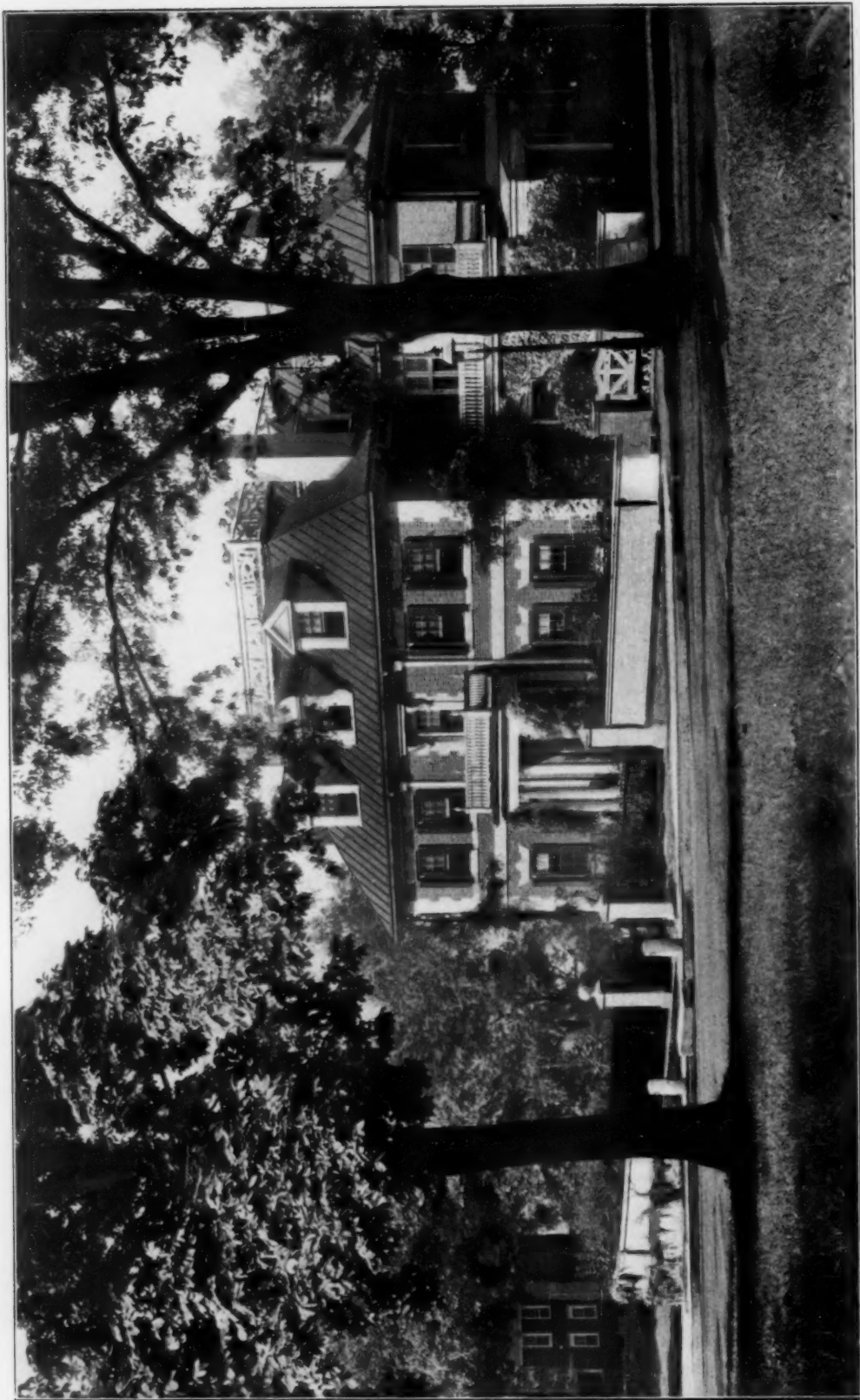
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(AS ORIGINALLY PLANNED).

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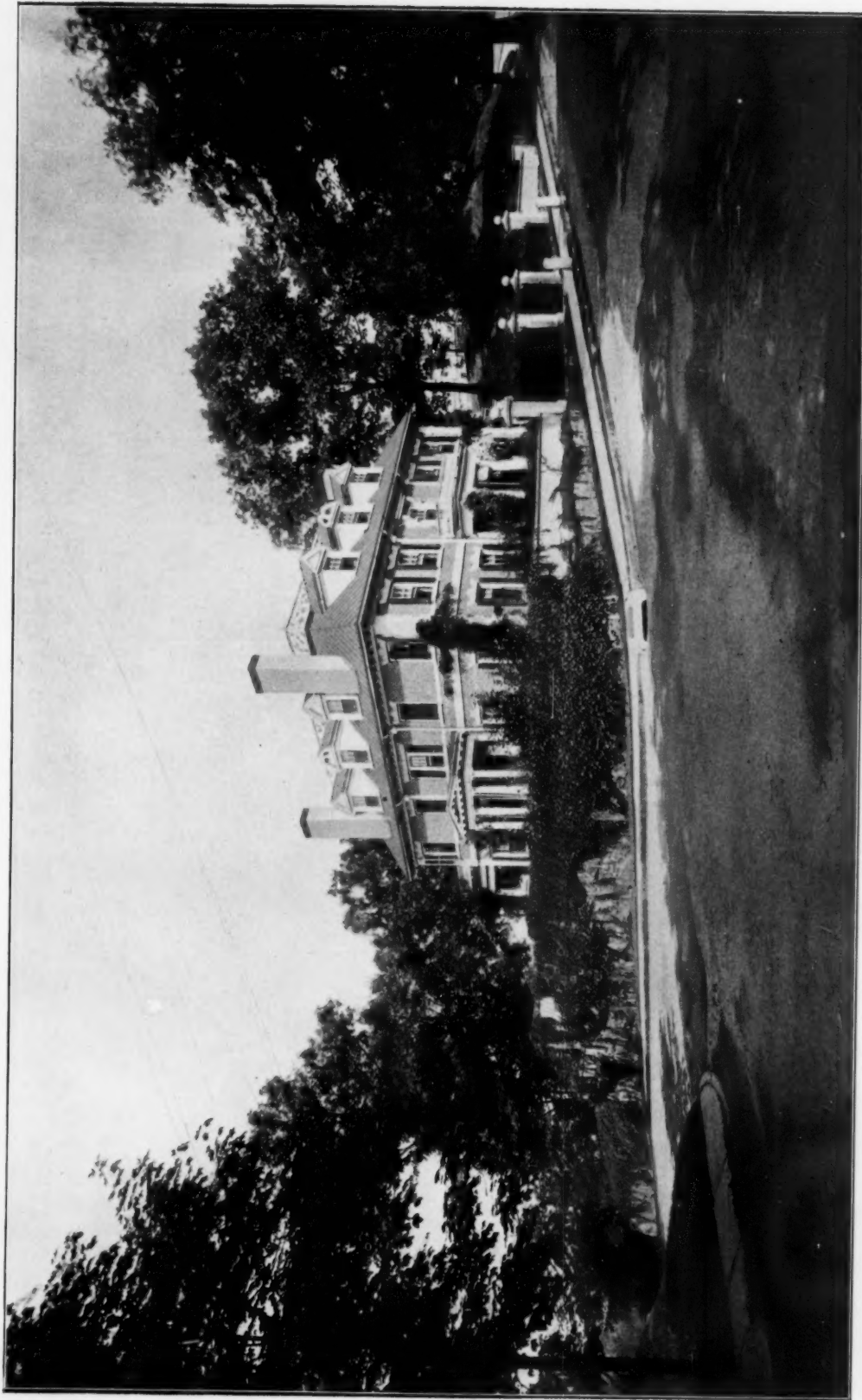


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